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Cyber-Physical Production Systems And Their Practical Integration And Application With Simio Software

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CYBER-PHYSICAL PRODUCTION SYSTEMS AND THEIR PRACTICAL INTEGRATION AND APPLICATION WITH SIMIO SOFTWARE

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Dedication

This work is dedicated to my father, mother, brother, friends and mentors who made possible the creation of this work thanks to their support.

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by

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THESIS

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I would like to express my sincere gratitude to my advisor Dr. Renteria for his support, technical advice and guidance. Without his assistance, this work would not have come to fruition.

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Nomenclature

Acronyms

SCADA:	Supervisory control and data acquisition
CPS:	Cyber-Physical Systems
CPPS:	Cyber-Physical Production Systems
IIoT:	Internet of Things
FDT:	Factory Digital Twin
GA:	Genetic Algorithm
HMI:	Human Machine Interface
PLC:	Programmable Logic Controller

Chapter 1: Introduction

Industry 4.0 comprises a diverse array of technologies and components that are revolutionizing the manufacturing industry, from Digital Twins, Cyber-Physical Systems and Augmented Reality. The elements that englobe Industry 4.0 vary from framework to framework. Nevertheless, there are similarities in the available literature on what constitutes Industry 4.0. Some of the most critical components specified by the available literature include Digital Twins and Cyber-Physical Systems. A Factory Digital Twin is a virtual representation of a production system that can mimic the behavior of the physical asset. Moreover, a digital twin must have synchronization with its physical twin (i.e., production floor), active monitoring to detect significant events in its physical twin, and the capability to simulate what-if scenarios [1].

The general Digital Twin concept was first introduced by NASA in 2012 [4]. This digital twin surged with the need to have on earth an accurate representation of a vehicle in space. Here, the digital twin was defined as the integration of multi-physics, multi-scale, probabilistic simulations, and physical models of a space vehicle that receives information collected by sensors located in the real-vehicle during his expedition in space.

When it comes to Cyber-Physical Systems, Monostori reports in [2] that Cyber-Physical Systems (CPS) are one of the most important future directions of computer science, information, and communication technologies, which are referred to as Cyber-Physical Production Systems (CPPS) when applied in the manufacturing sector.

One can define Cyber-Physical Production Systems (CPPS) as the system of system components of all levels of production (e.g., field level, process control level, plant management level, and enterprise resource planning level) interconnected through the Industrial Internet of Things (IIoT). Where this CPPS can monitor the entire system, improve the decision-making process, and respond accordingly [3].

In essence, Industry 4.0 is aiming towards methods to simulate and monitor a real-life system. But there needs to be more work done to develop and integrate such theoretical

frameworks to bring this industry to fruition. This work will be based on a SCADA system incorporating Industry 4.0 technologies. Experimental frameworks such as this one will enable the industry to generate and standardize the components and building blocks that will encompass Industry 4.0.

Chapter 2: Cyber-Physical Production System and Solution Approach

Generally, Supervisory Control and Data Acquisition (SCADA) systems monitor and control industrial processes, such as manufacturing processes, electric power transmission, water distribution, and environmental monitoring. It makes it possible for operators to control and gather information through distant process controllers [5].

2.1 Cyber-Physical Production System Framework Proposition and Approach

The proposed CCPS framework is composed of a methodology to monitor, simulate, analyze, and control production facilities. This approach will allow the administrator to gather data remotely from the production floor, which includes the number of active machines and machine breakdowns. Moreover, this CCPS provides an optimization approach allowing scheduling production and remote control of production floor equipment (i.e., on or off). As previously mentioned in Chapter 1, the foundation of this framework is a SCADA system integrated with a Factory Digital Twin (FDT) and Genetic Algorithm. The proposed hardware architecture comprises PLCs, industrial sensors, HMIs, and PCs. Fig 2.1 shows the proposed CCPS framework. And Fig. 2.1.2 shows the data flow of the proposed CPPS.

The sequence of operation is as follows: (1) AC current sensors connected to production floor machines monitor and determine the machine's status. (2) These sensors send the data to client PLCs located in the control level. (3) The information is retrieved by the server PLCs at the information level. (4) The admin PC can request the data retrieved by the information level using a Human Machine Interface (HMI). (5) Data is extracted at the optimization level through MATLAB and exported to an Excel file. (6) The extracted data is imported into the factory digital twin/genetic algorithm. (7) At the “information” level, the factory digital twin/genetic algorithm (GA) obtains the optimal production schedule. (8) Finally, the production machines are turned on or off, depending on the scenario.

The proposed CCPS allows monitoring, simulating, analyzing, and controlling the production facility. This approach will allow the administrator to gather data remotely from the

production floor, which includes the number of active machines and machine breakdowns. The collected data feeds the FDT, composed of a GA and a discrete-event simulation. Hence, this FDT provides an optimization approach that can schedule production and remotely control the status (i.e., on or off) of production floor machines.

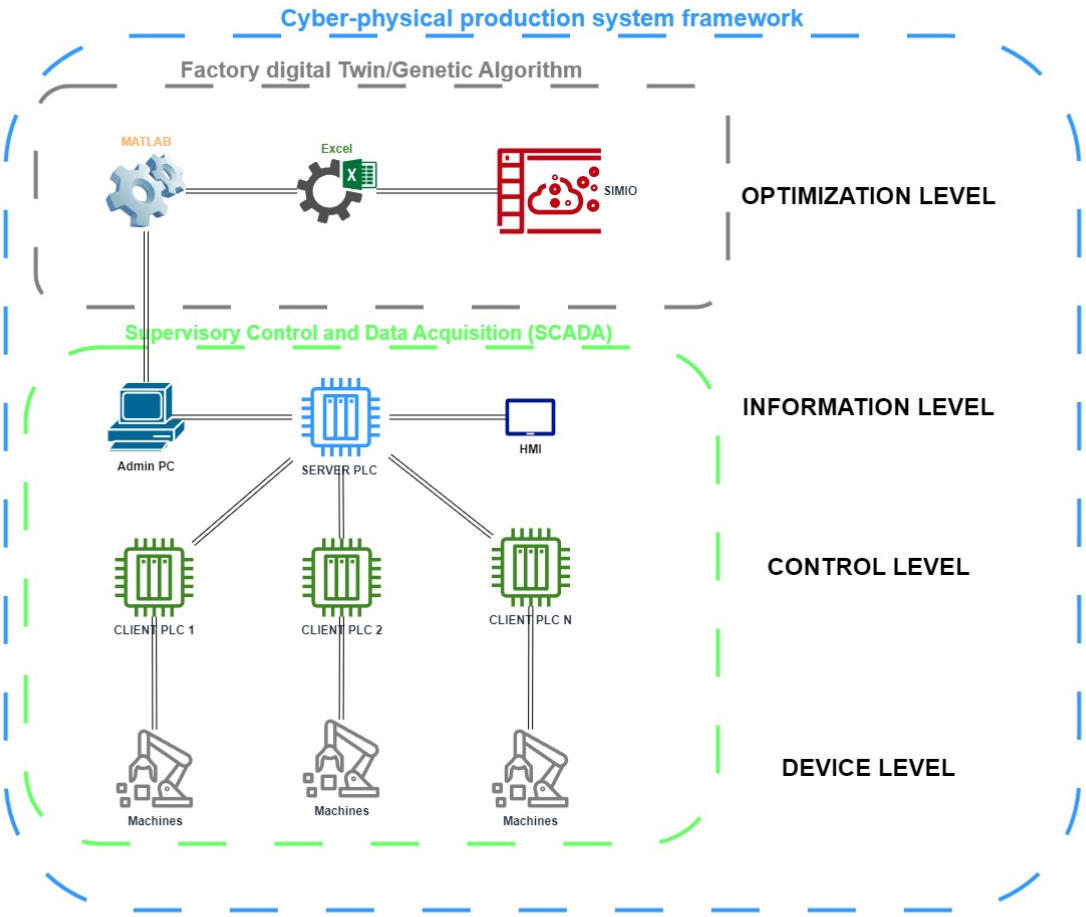


Figure 2.1: Cyber-Physical Production System Framework

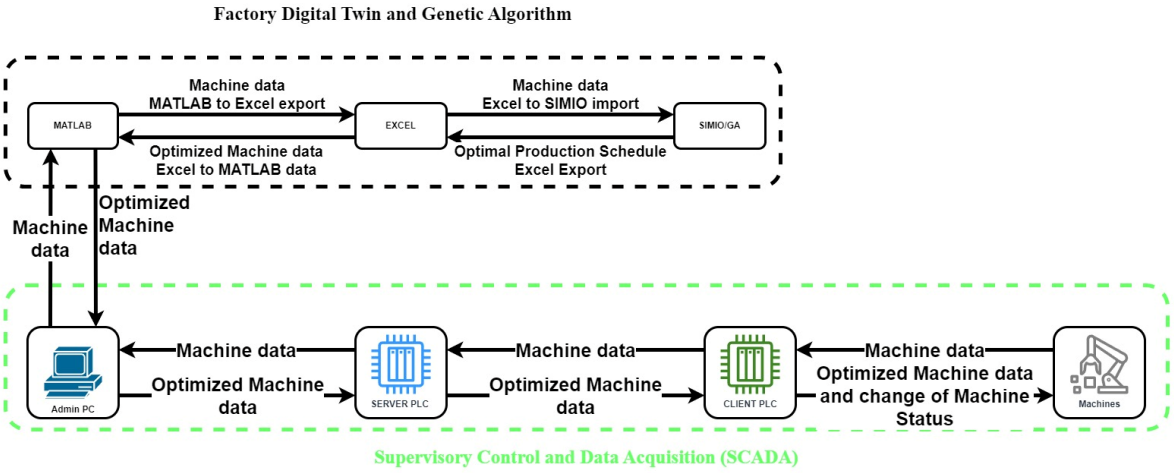


Figure 2.1.2 Data Flow Diagram

2.2 LABORATORY SET-UP

To prove the concept, an industrial set-up was integrated into a laboratory. One of the PLCs is used to model the server PLCs in the information level that are used to retrieve and monitor the client PLCs that would be controlling the industrial processes on the control level. The data retrieved by the information level can be requested by the admin PC with the use of a Human Machine Interface (HMI). Once the data is present in the information level, the administrator can use the data in the Optimization Level. This level oversees running discrete event simulations as well as a genetic algorithm. These simulations and algorithms will provide an optimization output that can be used to control the client PLC effectively proving the concept of the proposed CPPS.

2.3 SCADA SYSTEM OVERVIEW

The foundation for this research proposes a model for Smart Manufacturing that integrates a SCADA system with SIMIO simulation in a laboratory set-up to prove the concept described in section 2.1. A description of this industrial set-up and its implementation will be presented in this chapter. The physical system consists of the following items: a floor PLC (PLC-

2), an admin PLC (PLC-1), a human-machine interface (HMI), and the admin PC. PLC2 is located on the production floor. The purpose of the floor PLC is to record the status of the currently active or inactive machines on the production floor. PLC-1 is in charge of managing the communications between our production facility and the admin PC; The HMI is our control unit that will help the manager to oversee the production facility; admin PC acts as a client that retrieves critical data from PLC-1, which can be used to simulate the facility with SIMIO simulation software and to make informed decisions regarding the production process. Fig 2.2 shows the laboratory set-up, and Fig 2.3 shows the connection diagram of the system.

Figure 2.2: Laboratory set-up.

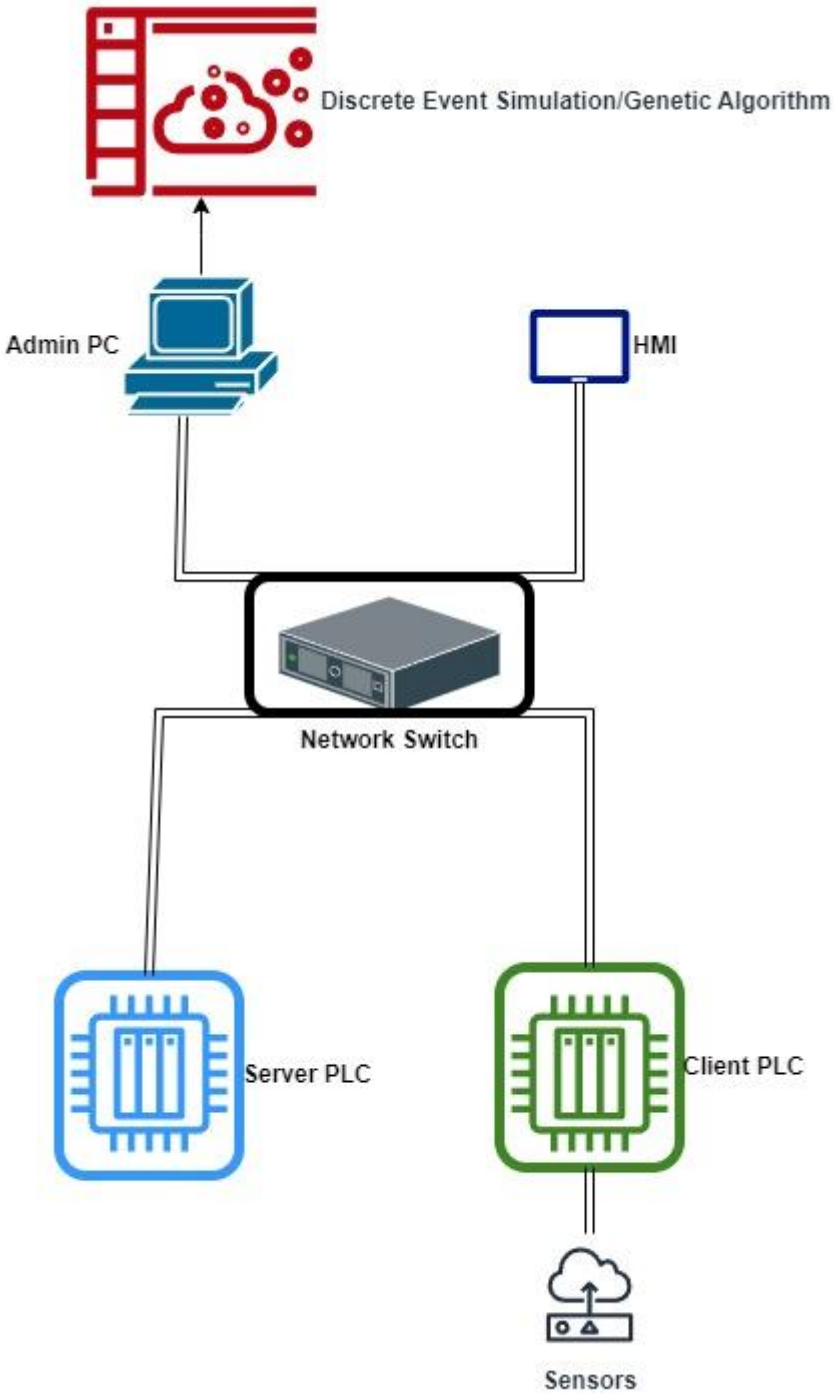


Figure 2.3: Scada system network connection diagram.

2.3.1 Client PLC (Control Level)

This section will describe the operation of the control level and the components that compose the client PLC such as the networks and data blocks. As mentioned, this PLC operates at the control level and controls the machines at the device level. For this set-up, eight machines will be simulated by using a series of switches and coils in network 1.

2.3.2 CONTROL LEVEL SOLUTION APPROACH

Client PLC-2 consists of one network, shown in Fig 2.4, which contains two data blocks. The first data block contains the data linked to the switch functionality. This data is responsible for capturing the switch status, and the second data block is linked to coils that capture the machine's status. Eight switches were used to simulate the status acquisition from the AC current switches, which can be either turned on or off. These switches are also used to control the devices on the production floor for simplicity.

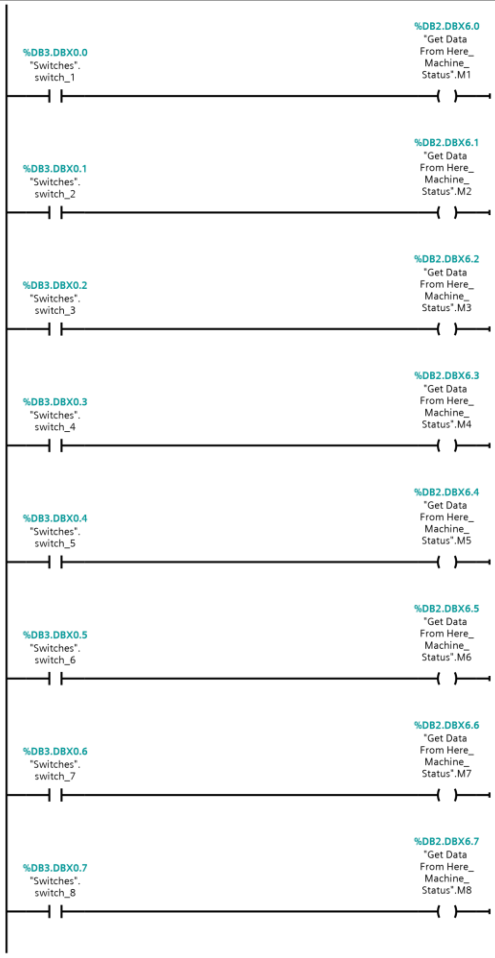


Figure 2.4: Network 1 (PLC-2) Switch and coil network representing the machines in the manufacturing facility.

2.4 SERVER PLC (INFORMATION LEVEL)

This section will describe the supervisory level, including the networks in the server PLC. This section will also explain the different function blocks located in this PLC, which include the following: PUT/GET, TCON, TDISCON, TSEND, and TRCV. Finally, this section will explain the integration between the function blocks and the HMI. that allows for the system's control, monitoring, and data transmission functionality.

2.4.1 Information Level Solution Approach

Server PLC-1 is located in the management facility. This PLC acts as our server to monitor and manage the machines on the production floor. Hence, this PLC can control and acquire data from client PLC-2. The method used to perform these capabilities was by employing the integrated PROFINET interface for communications, specifically S7 communications. The S7 communication protocol is generally used between PLCs that are part of Siemen's controller family and is particularly helpful for SCADA applications.

2.4.2 PUT/GET application.

The two main blocks for the S7 protocol are the PUT and GET blocks. Essentially, the PUT block allows us to put data in PLC-2, while the GET block helps us to acquire the data from PLC-2. The GET block is composed of multiple parameters for its functionality. We will focus on the essential parameters required for this application. The first parameter is called enable (EN), this parameter enables the capacity to exchange data and is of Boolean type. Request (REQ) is the second parameter of the GET block. This one is concerned with the control of the block; it enables data reception in PLC-1 on a rising edge. The following parameters are ADDR_X and RD_X. ADDR_X points to the area where the data will be read in PLC-2, consequently, allowing us to extract the data from PLC-2.

RD_X stores the data in a data block in PLC-1 named “Read Data Block Here” MX_Read. Note that the GET block only has four fields for addressing and reading. The application in this research requires the acquisition of eight machines, so it was necessary to use two GET blocks shown in Fig 2.5 to help us read and capture the status of the eight machines in PLC-1.

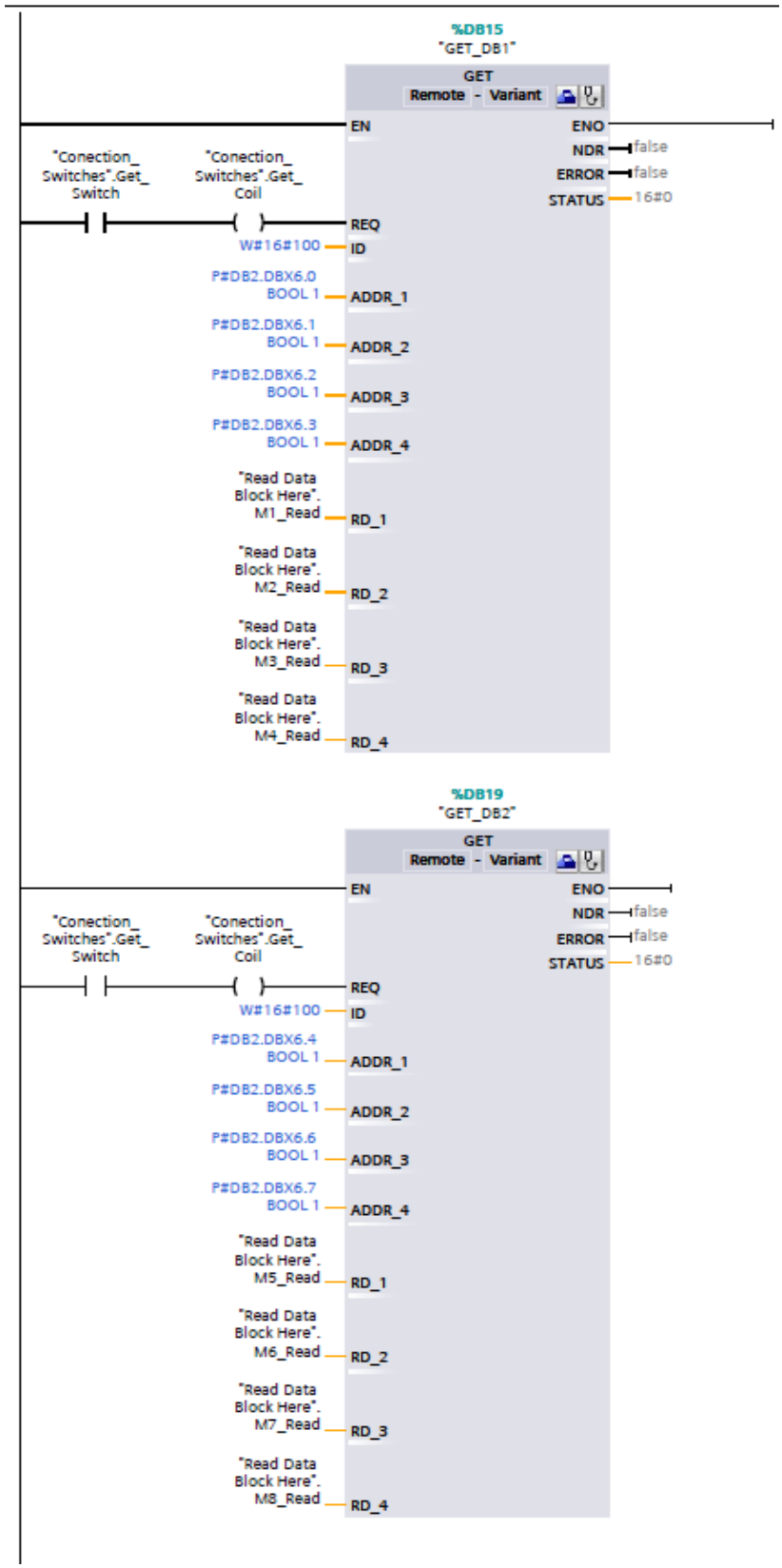


Figure 2.5: Network 10 (PLC-1) Get functionality to request data from floor PLC-2.

The PUT block has an identical layout to the GET block; the only difference is its functionality. The two properties that offer different functionality are ADDR_X and SD_X. ADDR_X. is a pointer to the area in PLC-2 where the data will be written, and SD_X points to the data in PLC-1 that will be written to PLC-2 on a rising edge.

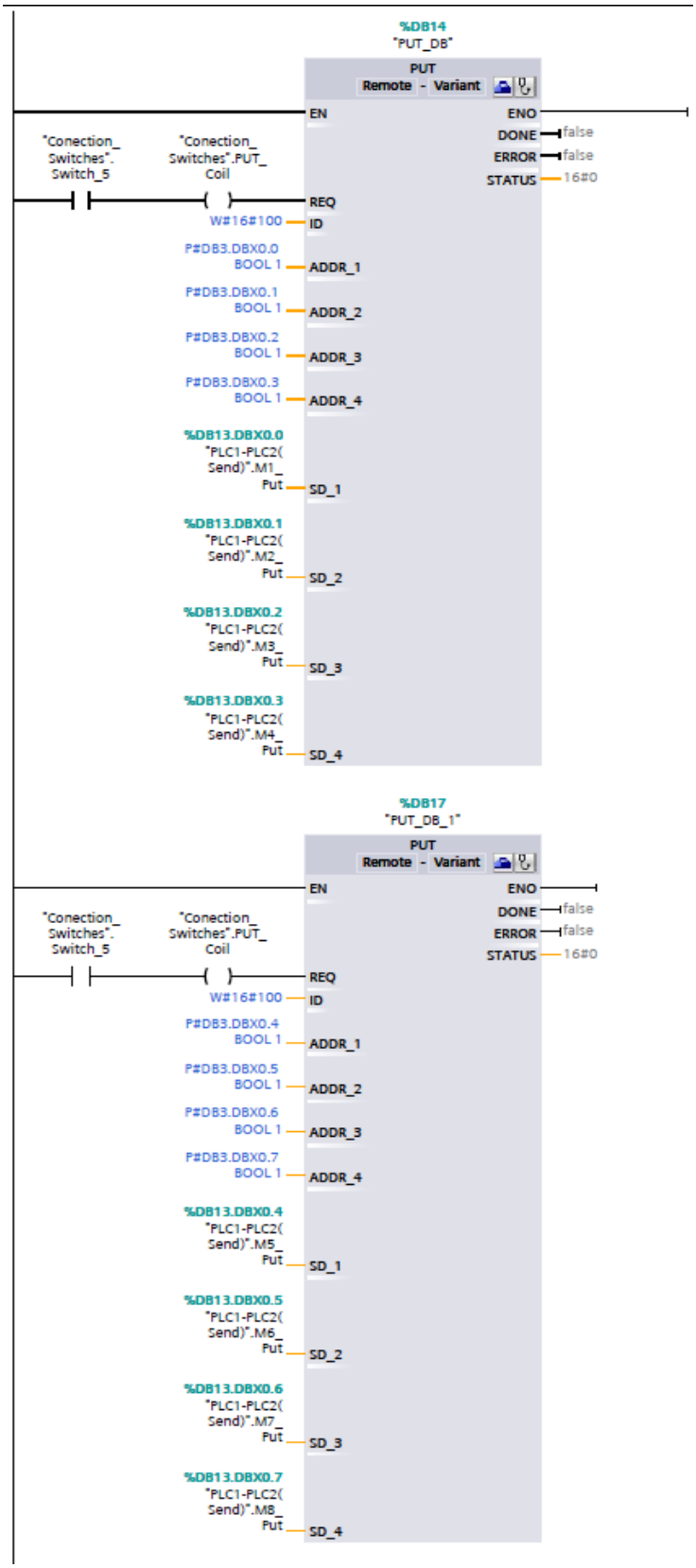


Figure 2.6: Network 11 (PLC-1) PUT functionality to update active machines in floor PLC-2.

2.4.3 HMI infrastructure

As mentioned in Chapter 2, an HMI was incorporated into the system to control, oversee and manage the production facility. This HMI can also turn on or off machines located in the production facility. An HMI interface was designed and linked to the PLC program to accomplish this functionality. The details of this interface will be discussed later on. The networks that accomplish this functionality are composed of two PUT blocks and another network composed of switches and coils.

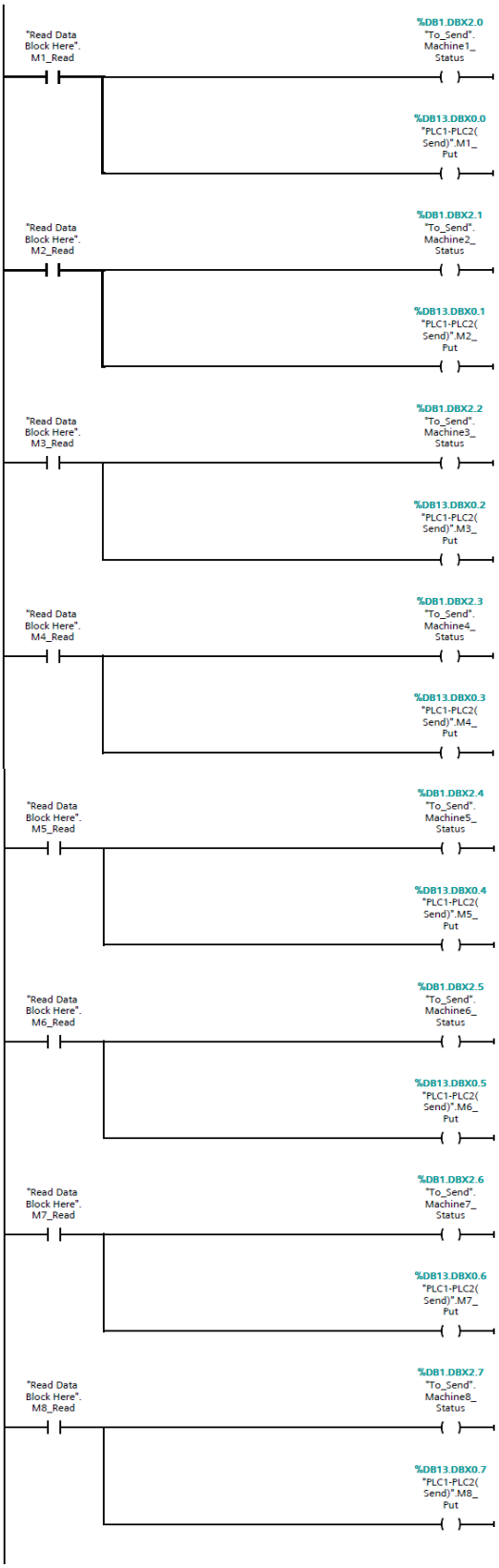


Figure 2.7: Network 8 (PLC-1) Machine Control.

The switches in Fig. 2.7 are required to turn machines on or off from the admin PLC-1. The tags used in these switches are used in multiple networks to capture and modify the status of these machines. For instance, they are linked to the HMI switches that will, in turn, allow us to manage the manufacturing facility. Moreover, the switches are connected to two coils. The first coil stores the data that will be send to the admin PC to acquire data in MATLAB. The second coil powers on or off machines with the HMI. The second coil data is passed to a PUT block in network 11 that will send the data to PLC-2, achieving the capacity to turn on or off the machines from the HMI. See Fig. 2.6 for reference.

2.4.4 OPEN USER COMMUNICATION IMPLEMENTATION

PLC-1 also incorporates the capacity to communicate with the admin PC. This interaction aims to acquire the active machines and stations on the production floor, so that this data may be captured and used for various processes, this interaction requires the use of a TCON block. This TCON block was designed to allow open user communications. This type of communication can be established with devices incorporating IP/TCP communications, which is the case of the admin PC.

2.4.5 TCON/TDISCON application

TCON requires the creation of different tags to capture the status of the block. This network added switches and coils to control the TCON block. Network 2, shown in Fig. 2.9, grabs the tag "TCON_DB_1" status from network 1, shown in Fig 2.8. When the tag "done" is active, the switch is activated, indicating that the communication to the PC is done. The SET instruction is an indicator that will help the user verify if a successful communication with the admin PC was accomplished.

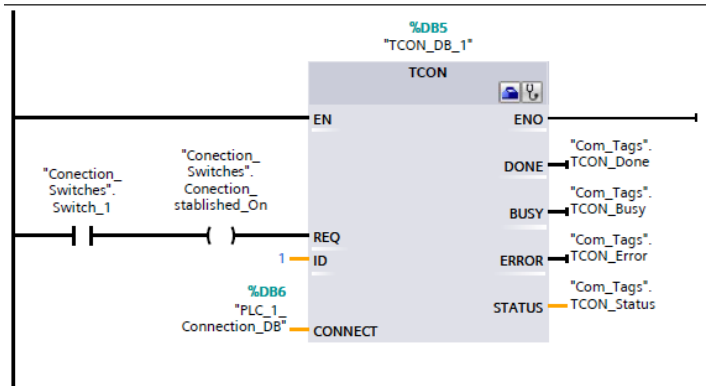


Figure 2.8: Network 1 (PLC-1) Establishes a connection with the admin PC.

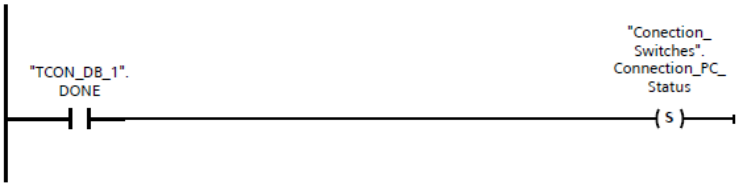


Figure 2.9: Network 2 (PLC-1) Indicates a successful connection with the admin PC.

TDISCON allows the system to terminate the connection with the admin PC, shown in Fig. 2.10. This block operates similarly to TCON. The only difference is that this block terminates the connection instead of establishing a connection. Moreover, TDISCON requires the same ID as TCON and the creation of tags for its operation.

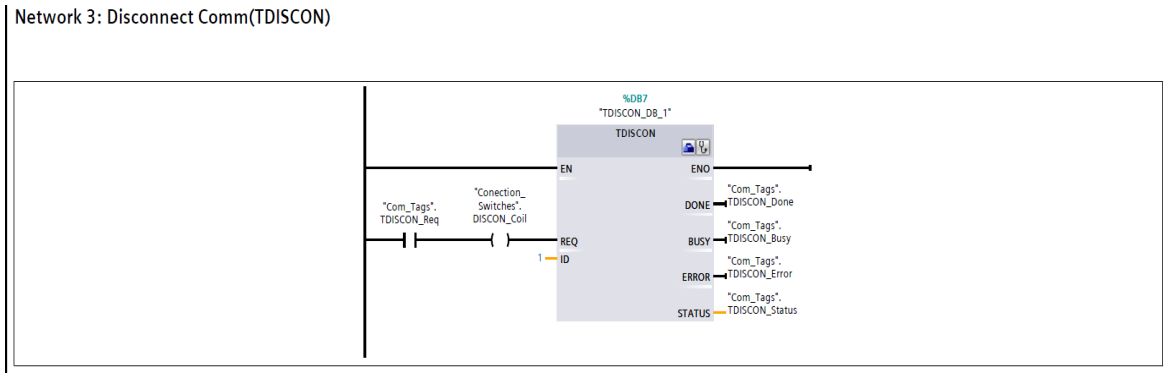


Figure 2.10: Network 3 (PLC-1) Terminates the connection with admin PC.

2.4.6 TSEND application

PLC-1 can transfer data to the admin PC. This functionality was accomplished with the use of the TSEND block. This block was used in three different networks discussed throughout this section. Each network sends different data to the admin PC depending on the necessities of the manager. Network 4, shown in Fig. 2.11, uses this block to send the active on-floor machines received from PLC-2 with the help of networks 8 and 10 to give the administrator awareness of the active machines in the production facility.

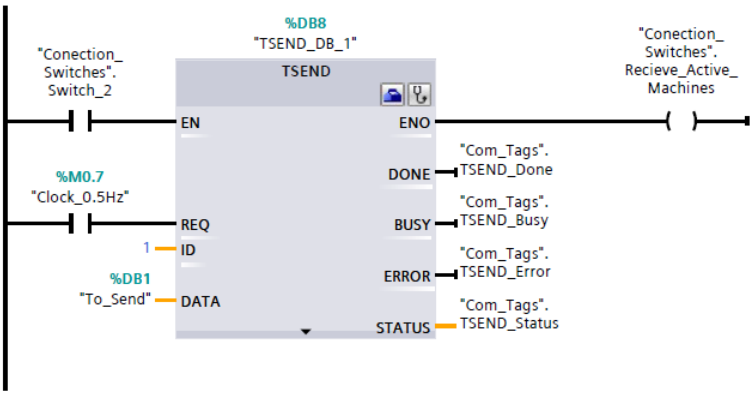


Figure 2.11: Network 4 (PLC-1) Sends the status of the machines located in the production facility to the admin PC.

Network 5, shown in Fig 2.13, uses this block to send the number of active stations. This block retrieves this data from the data read in network 9, shown in Fig. 2.12. This network uses as inputs the data that was retrieved from PLC-2 with network 10. Stations are then separated into groups of 2 machines. Since we have eight machines, there are a total of 4 stations. Network 9 uses OR logic, which means that if a machine is active, it will energize a coil to indicate that the station is active. This information is then used to know the capacity of a station.

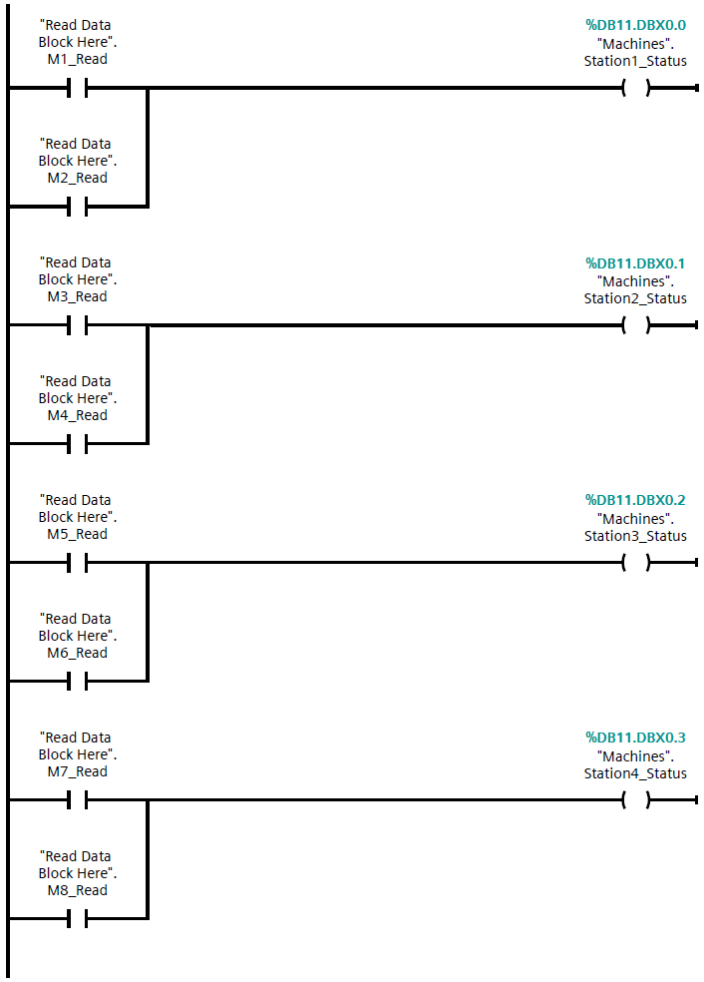


Figure 2.12: Network 9 (PLC-1) switch and coil network that identifies which stations are active.

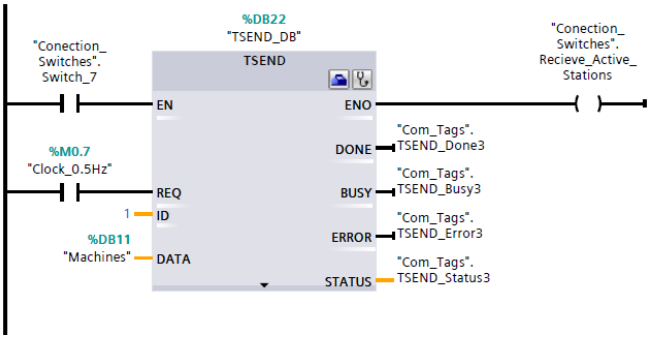


Figure 2.13: Network 5 (PLC-1) Sends the number of active stations to the admin PC.

Network 6, shown in Fig 2.14, uses the TSEND block as a method to update the capacity of a station. Since Network 5 assumes a capacity of two machines when received in MATLAB. This block helps the administrator to update the actual capacity of a station. The information is

taken from a data block named "Update Capacities" that needs to be modified by the administrator if there are inactive machines in a station.

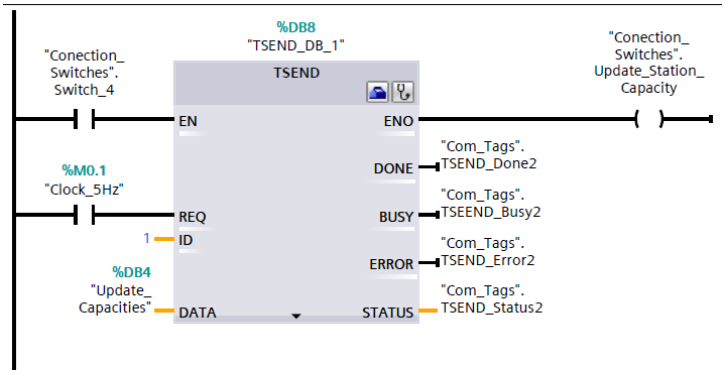


Figure 2.14: Network 6 (PLC-1) sends the stations that are to be modified to a capacity of one in MATLAB.

2.5 ADMIN (PC) – SENDING DATA TO FLOOR PLC-2.

The system can also send data back to the machines located at the paint job shop/Production floor. This data is used to activate or deactivate the machines hooked to PLC-2; this allows the manager to control the facility from an office outside the job shop. This functionality was accomplished by enabling MATLAB in the admin PC to send data to PLC-1. After this transaction is completed, PLC-1 can send the received data to PLC-2 to enable or disable a machine; this is another method of interaction with PLC-2 in addition to the HMI operation.

2.5.1 TRCV application

The TRCV block Fig. 2.15 allows receiving data from the admin PC. This exchange of data requires the use of network 1 TCON block. After a connection with the admin PC is successful, it is necessary to run the MATLAB script dedicated to sending the data to PLC-1. This data can be input by the admin or retrieved from an Excel file. After running the script, the admin has to activate the TRCV block to complete the transaction.

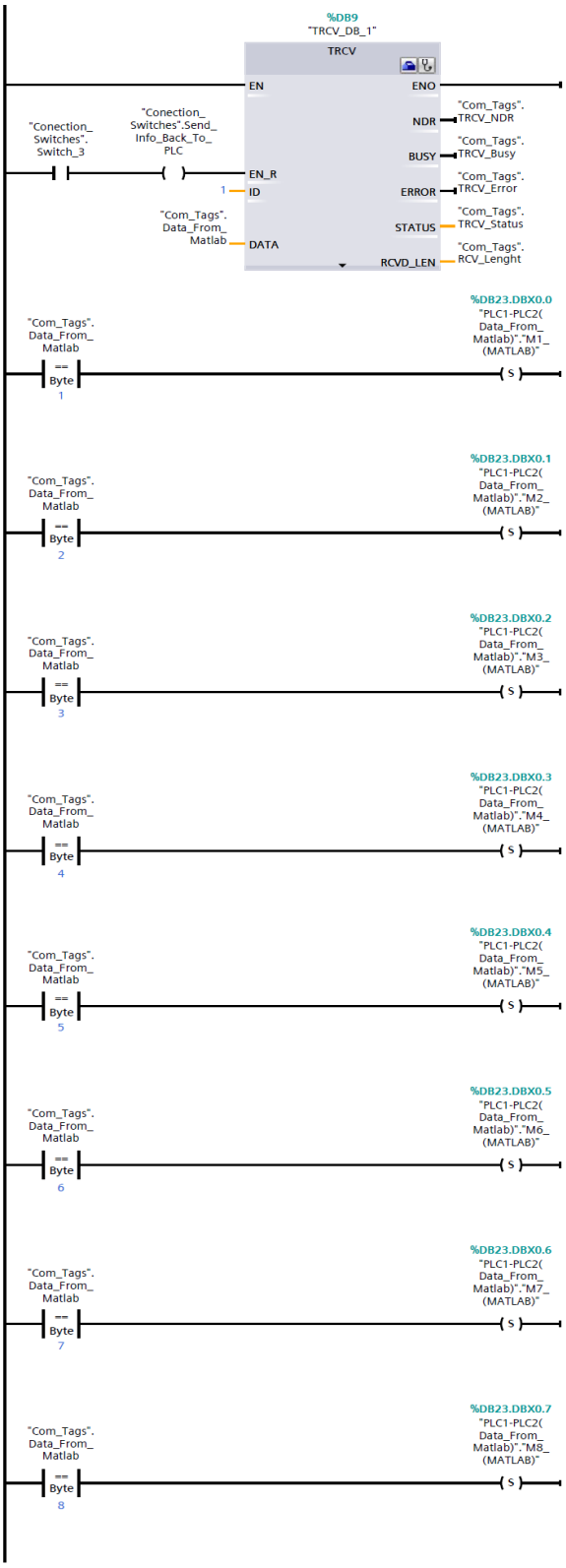


Figure 2.15: Network 7 (PLC-1) Receives the data from MATLAB that is to be modified in PLC-2

TRCV also requires the generation of tags required to store the data required by the TRCV block; this block is also required to have the same ID as TCON and TDISCON to be associated with the same system. The block also incorporates a switch, and a coil connected to EN_R, allowing the admin to receive the data sent by the admin PC. Network 7, shown in Fig. 2.15, adds an arrangement of comparators with set output instructions. The comparators check if a byte with a specific number was received. If this condition is satisfied, the set instruction energizes to a "1". To receive and store the data from de admin PC to PLC-1, the data is then stored in the tag assigned to the set instruction. This network uses eight comparators and 8 set instructions corresponding to the job shop's eight machines.

2.5.2 SENDING DATA FROM PLC-1 TO PLC-2

After the data transaction from the admin PC to PLC-1, it is necessary to send the data to PLC-2 to enable the required machines and disable the ones that are not. This is achieved by using the data stored in the "Set" instruction tags. First, the information linked to these tags is stored in a data block named PLC1-PLC2(Data_From_MATLAB). This data is then linked to the PUT Network 12, shown in Fig. 2.16, which sends the Boolean type data of the Set instructions in Network 7 once the admin activates network 12 on a rising edge.

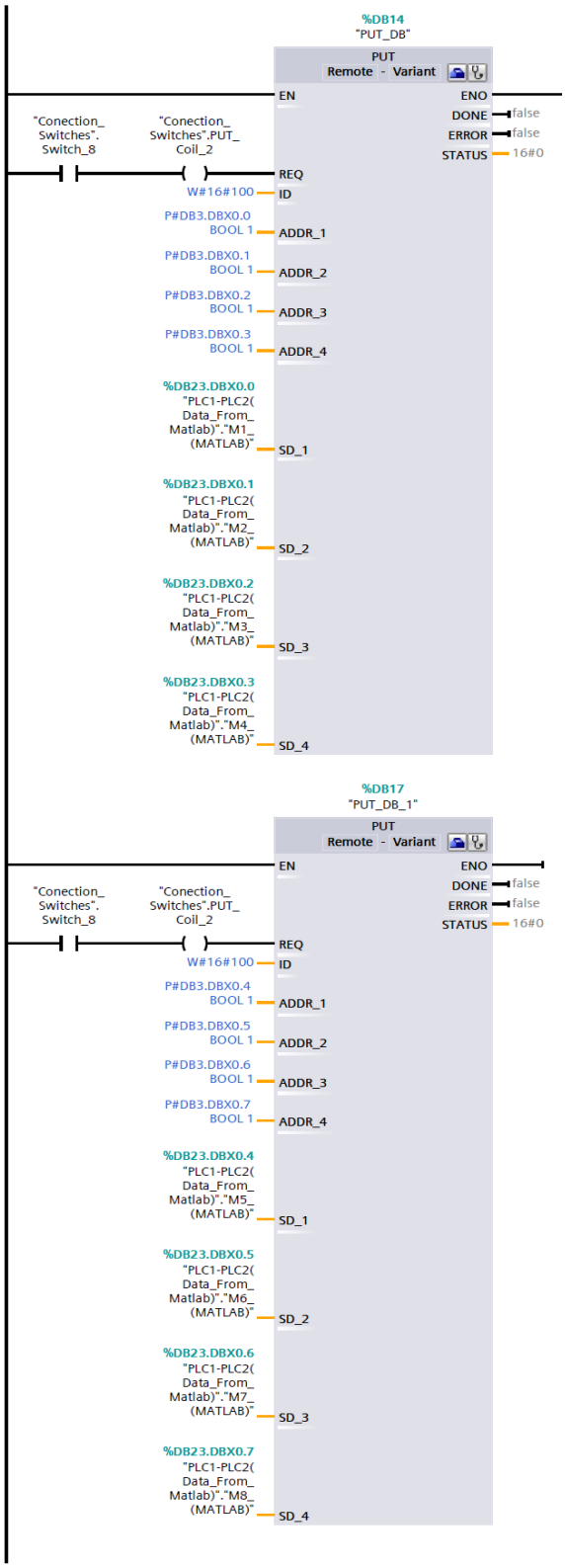


Figure: 2.16 Network 12 (PLC-1) PUT network that sends the data stored in “Set” instructions from Network 7.

2.6 THE HMI INTERFACE

As remarked, the purpose of the HMI is to oversee and manage the facility from the administrator's office. HMIs are traditionally used to allow an operator to interact with the system. Hence, the implementation of one. This project employed a KTP700 Basic Panel from SIEMENS, shown in Fig. 2.17, to allow the admin system interaction. The following sections will show an overview of the interfaces used in this implementation.

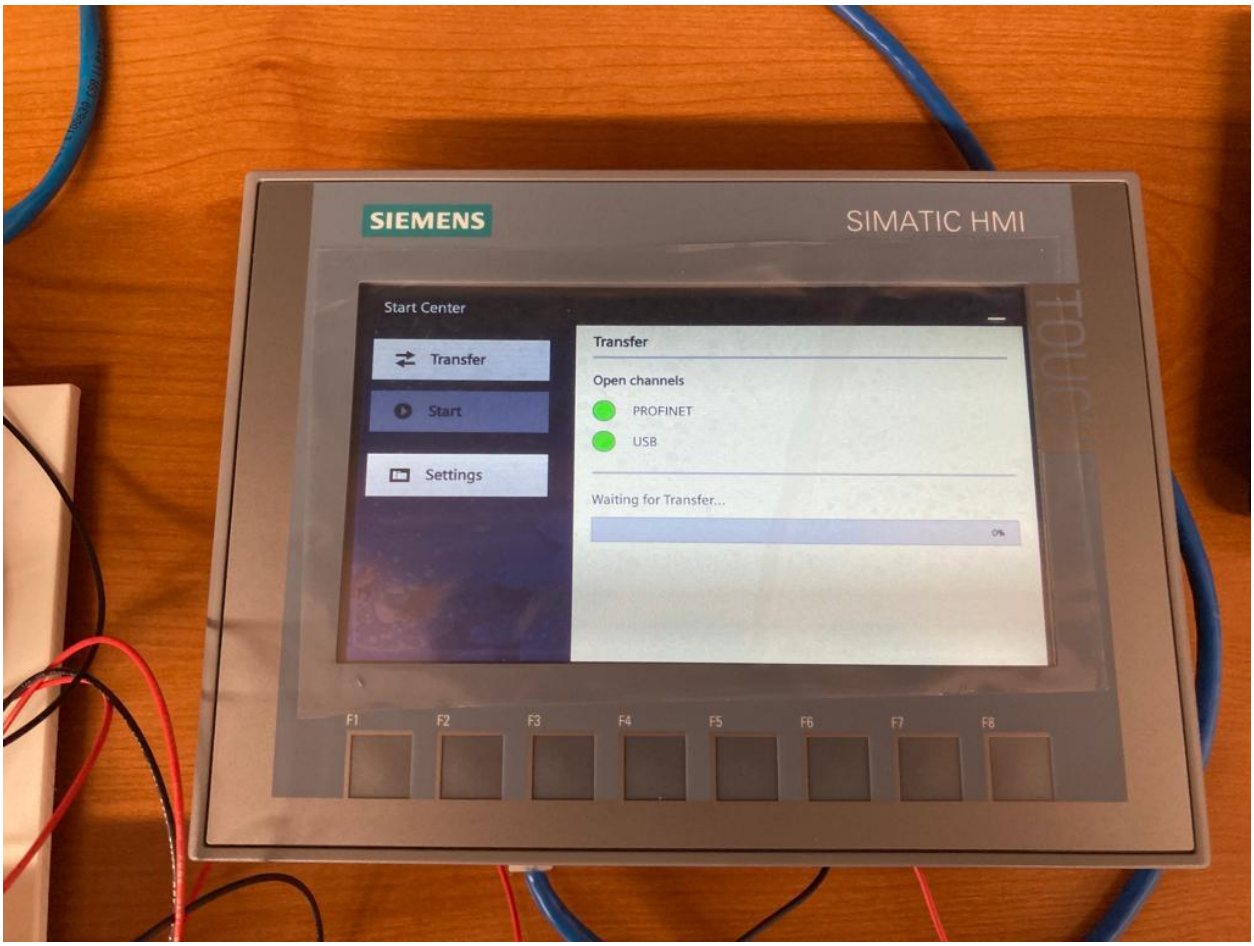


Figure 2.17: HMI Panel Siemens KTP700 Basic.

2.6.1 Communications Interface

The first interface required for this implementation is the Communication Interface shown in Fig. 2.18. This interface enables the communication between the different components of the system and the activation of different blocks such as TCON-Network (1), TDISCON-Network (3), TSEND-Networks (4,5,6), TRCV-Network (7), and GET/PUT-Networks (10,11,12) blocks. This integration is achieved by linking the switch data of these blocks with the HMI buttons available in the HMI interface. In addition to these switches, square indicators were also added to different coils through the networks mentioned previously to indicate when a function or block is active. Table 2.1 shows the link between the different switches with the PLC networks related to the communications interface.

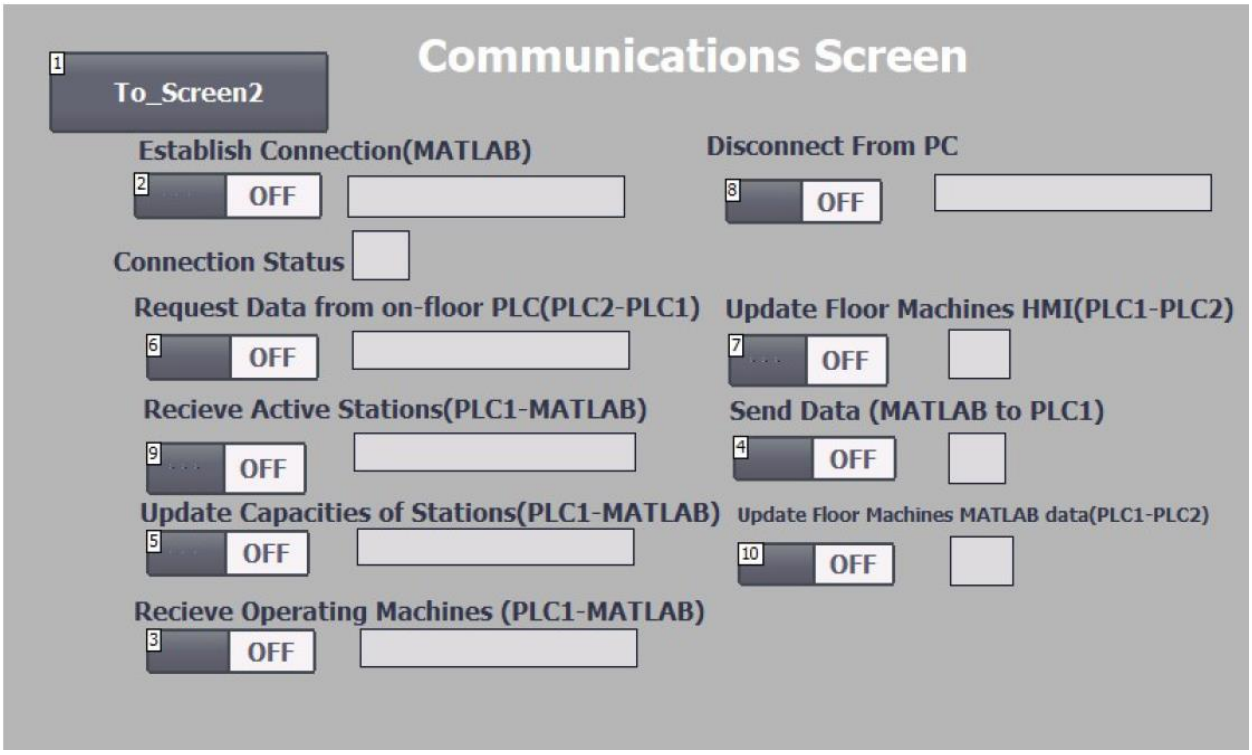


Figure 2.18: Communications Interface

Table 2.1: Link between interface Switches and PLC-1 Networks

Switch Name	Associated Network
Establish Connection (MATLAB)	TCON-Network (1)
Request Data from on-floor PLC(PLC2-PLC1)	PUT-Network (10)
Receive Active Stations (PLC1-MATLAB)	TSEND-Network (5)
Update Capacities of Stations (PLC1-MATLAB)	TSEND-Network (6)
Receive Operating Machines (PLC1-MATLAB)	TSEND-Network (4)
Disconnect From PC	TDISCON-Network (3)
Update Floor Machines HMI (PLC1-PLC2)	PUT-Network (11)
Send Data (MATLAB to PLC1)	TRCV-Network (7)
Update Floor Machines MATLAB data (PLC1-PLC2)	PUT-Network (12)

2.6.2 Floor Management and Monitoring Interface

The Floor Management and Monitoring Interface allows the admin to monitor the number of active machines and stations by acquiring the data with a switch in the communication screen titled "Request Data from on-floor PLC(PLC2-PLC1)" This switch is linked to the activation switches of the GET Network (10). The moment this transaction is completed. The administrator will be capable of observing the active machines and stations in the network in the "Production Floor Management and Monitoring Interface," shown in Fig. 2.19, which also incorporates square indicators that, when active, turn green. It is essential to remember that this interface is linked to switch and coil Networks (8,9), described in sections 2.4.3 and 2.4.6. Hence, this interface can turn on and off the machines linked to PLC-2.

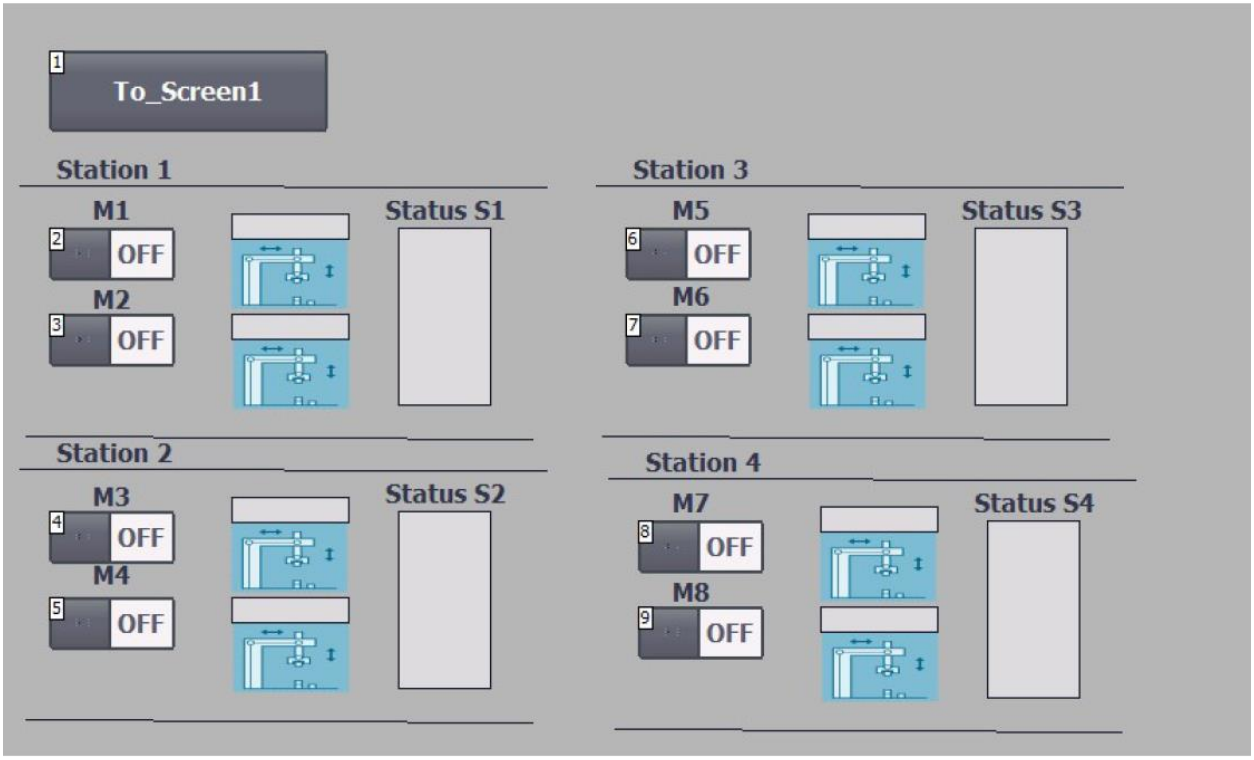


Figure 2.19: Floor Management and Monitoring Interface

2.7 Integration of the Machining Facility and Software

Industry 4.0 requires new forms of controlling and integrating individual components in a system, from robots, transportation, shuttles and mobile platforms. Such systems benefit from the integration of a digital twin. The digital twin helps to keep up to date the current state of the production system [6]. This implementation proposes a method of integration between the physical production floor and simulation software. The software used for this implementation requires. MATLAB, SIMIO, Visual Studio and Excel. For reference, Figure 2.1.2 shows the interaction of the data flow between these programs and the hardware.

2.7.1 Admin PC (Optimization Level)

These subsections will review the interaction and integration necessary to integrate the Optimization Level with the rest of the system. These subsections will also describe the methods and scripts used to acquire the different server PLC data with MATLAB.

2.7.2 MATLAB-Instrument Control Toolbox

The MATLAB Instrument Control Toolbox is a collection of functions that enable the capability to control and communicate with external instrumentation and devices. This toolbox adds a framework and support for the GPIB interface, VISA, IP/TCP protocols, and others. This toolbox was incorporated due to its IP/TCP capability to communicate with the PLCs connected in the network, particularly PLC-1, which communicates with the admin PC via open user communication (OUC) with the TCON block.

2.7.3 MATLAB Script Structure.

The MATLAB script is divided into four different code cells or sections. These code sections can be run independently since each cell serves a different purpose. The first section creates a TCPIP object shown in Figure 2.20 associated with a remote host, in this case, PLC-1. After creating the TCPIP object, a connection is established with the fopen function by referencing the TCPIP object that deals with the acquisition of active machines.

```
%% Cell 1 -receive Data From PLC(Active machines)
t=tcpip('192.168.0.1', 2000, 'Networkrole', 'server');
fopen(t);
```

Figure 2.20: TCPIP implementation to communicate with PLC-1

After dealing with the communication aspects, it was necessary to initialize several necessary variables to acquire the data shown in Fig. 2.21. The variable "C=1" is used in a while loop that always remains active to acquire the data continuously with the "data" variable that references the incoming data from PLC-1 until the connection is terminated. Finally, the "DataToExcel" array is initialized; this array will help the admin to send data to an Excel file if a specific condition is fulfilled.

```
C = 1;
DataToExcel = [1;
while C==1
data=fread(t,1);
```

Figure 2.21: variables require to handle the incoming data.

2.7.4 Receiving Active Machines

This functionality is incorporated in cell 1 in addition to the connection enable functionality shown in Fig. 2.20. The method employed to perform this function was by implementing a truth table of 8 binary inputs sent from PLC-1. Each input represents a machine and is received in MATLAB as a decimal value. For example, if all the machines are on, MATLAB would receive a decimal value of 255 or the equivalent of 1111 1111 in binary. That is how we can identify the active machines and the total number of active stations. This functionality makes the operator aware of the current machine status on the production floor. Fig. 2.22 shows the condition that would be activated if a value of 255 were received, as well as its output.

```
elseif data == 255
    disp('Device 1,2,3,4,5,6,7,8 on')
    DataToExcel = [1;   1;  1;  1;  1;  1;  1;  1];
    xlswrite('Excel_File_Adress.xlsx',DataToExcel,'M2:M9');
end
```

```
Command Window
  Operation terminated by user during icinterface/fread (line 230)


  In PLC_Comm_V1_2_Final (line 19)
  data=fread(t,1);


  >> PLC_Comm_V1_2_Final
  Device 1,2,3,4,5,6,7,8 on
  Device 1,2,3,4,5,6,7,8 on
```

Figure 2.22: Condition for 8 active machines and their respective output.

Besides receiving the active Machines, this code cell allows for data storage in the form of binary data or any data type desired by the administrator to an Excel file by specifying the information inside the "DataToExcel" variable and by setting a specific range in the Excel sheet. The data sent to Excel can be used as a data/machine log or for further data analysis.

2.7.5 Receiving the Number of Active Stations

The purpose of this code cell is to provide a capacity number depending on the number of active machines. This number can be used for simulation purposes. The method to acquire this number was by implementing a truth table for four inputs. Moreover, depending on the received decimal value, the administrator can know the current capacity of a station. The only condition for this segment is that at least one machine should be in operation. When receiving the data in MATLAB, the script will assign a default capacity of 2 if the station is active and a 1 if the station is inactive, given that this code segment operates with Network 9, which follows OR logic. If one machine is active, the station will be active, and MATLAB will assign a default value of 2. This capacity can be updated to the actual capacity of 1 with the Updating Station Capacities code cell in section 2.7.6.

```
%% Cell 4 - Aquirie Active Stations
t=tcpip('192.168.0.1', 2000, 'Networkrole', 'server');
fopen(t);
C = 1;
Dev1 = 0;
Dev2 = 0;
Dev3 = 0;
DataToExcel = [];

while C==1
elseif data == 15
    disp('Station 1,2,3,4 Active')
    DataToExcel = [2;2;2;2];

xlswrite('Excel_File_Adress.xlsx',DataToExcel,'M2:M5');
end
```

Figure 2.23: Receive station capacity functionality.

2.7.6 Updating Station Capacities

The purpose of this code script shown in Figure 2.24 is to work in conjunction with Network 6, explained in section 2.4.6. After running this code cell, the administrator needs to specify the stations with a capacity of 1 inside the data block "Update Capacities." The operator can know the actual capacity of each station thanks to the information retrieved by cell code 1 that was run previously. To specify the capacity of a station, the operator requires to specify the Boolean data of four different variables that represent the number of stations. This data is then received in MATLAB. The MATLAB script will update the capacity to the Excel worksheet previously used to receive the number of active stations depending on the information received.

```
%% Cell 2 -Update Capacities of stations
t=tcpip('192.168.0.1', 2000, 'Networkrole', 'server');
fopen(t);
data=fread(t,1);
elseif data == 15
    disp('Actual capacity for station 1,2,3,4 is (1)')
 DataToExcel = [1];

xlswrite('Excel_File_Adress.xlsx',DataToExcel,'M2:M2');

xlswrite('Excel_File_Adress.xlsx',DataToExcel,'M3:M3');

xlswrite('Excel_File_Adress.xlsx',DataToExcel,'M4:M4');

xlswrite('Excel_File_Adress.xlsx',DataToExcel,'M5:M5');


end
```

Figure 2.24: Updating Station Capacities Functionality.

2.7.7 Sending Data to The Server PLC

As mentioned in section 2.5.1, Network 7, this application was required to update the Device Level status depending on the output of the Discrete Event Simulation/ Genetic Algorithm from the Optimization Level. This is accomplished by acquiring the output from The Factory Digital Twin and exporting this output to an Excel file or by specifying the output values directly in the dedicated MATLAB script shown in Figure 2.25. Once the data is in an Excel file

or the script, we can send the data back to the Information Level by following the process described in section 2.5.1.

```
%% Cell 3 -Send data Back to PLC
t=tcpip('192.168.0.1', 2000, 'Networkrole', 'server');
fopen(t);
data = xlsread('Excel_File_Adress.xlsx','Sheet1', 'A1:A9');
disp(data)
A=data(1,1)
B=data(2,1)
C=data(3,1)
D=data(4,1)
E=data(5,1)
F=data(6,1)
G=data(7,1)
H=data(8,1)


fwrite(t,A);
fwrite(t,B);
fwrite(t,C);
fwrite(t,D);
%fwrite(t,E);
%fwrite(t,F);
%fwrite(t,G);
%fwrite(t,H);
```

Figure 2.25: Sending Data from MATLAB to The Server PLC functionality.

2.7.8 Excel and Simulation Integration Approach

This laboratory set-up required a method to import the acquired data from the MATLAB scripts to the simulation software. During this research, it was noted that it was necessary to show a clear path that could demonstrate how to import data into the simulation software. SIMIO provides some resources, such as their Simio LLC GitHub repository, that could help users to implement different API functionalities for different executions. The only downside of this repository is that it needs to provide a clear guide on how to implement the different projects available in the repository. Hence, this thesis will show how to deploy the "ImportObjectsFromExcelUsingEPPlus" API and showcase this application's capabilities.

2.7.9 ImportObjectsFromExcelUsingEPPlus (Extension)

ImportObjectsFromExcelUsingEPPlus is a SIMIO extension that allows users to modify an existing project from an Excel spreadsheet or import a model from an Excel spreadsheet into SIMIO. This extension is located inside the Simio LLC GitHub. To deploy the extension, it is necessary to have SIMIO and Visual Studio previously installed.

To ensure maximum compatibility with the SIMIO software, two workloads were installed with Visual Studio, shown in Figure 2.26. Once Visual Studio is properly installed, we can then proceed to download the ImportObjectsFromExcelUsingEPPlus file from the Simio LLC GitHub. After the download is completed, we have to create a folder under the documents folder and name this folder "SimioUserExtensions" and extract the contents of "ImportObjectsFromExcelUsingEPPlus-master.zip" inside this folder.

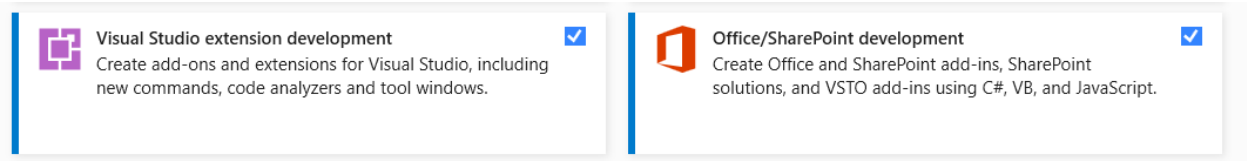


Figure 2.26: Visual Studio workloads for Extension Compatibility.

Once inside the "ImportObjectsFromExcelUsingEPPlus-master" folder, we need to open the "ImportObjectsFromExcelUsingEPPlus.sln" shown in Figure 2.27, which will open Visual Studio. This file is responsible for adding the Extension to SIMIO.

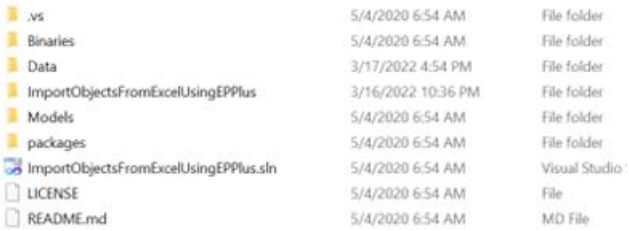


Figure: 2.27 Visual Studio Project.

Once inside Visual Studio, we then need to specify the output paths. The first path is under the build tab and needs to be set to: "C:\Users\<username>\Documents\SimioUserExtensions\." As shown in Figure 2.28, the second path that needs to be modified is located under the debug tab. This path will be set to: "C:\Program Files(x86)\Simio\Simio.exe" shown in Figure 2.29.

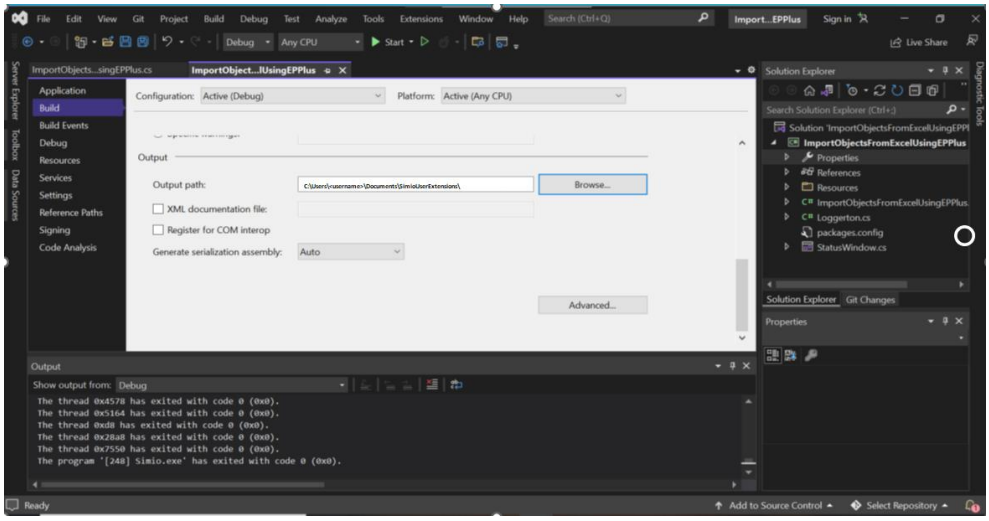


Figure 2.28: Build output path.

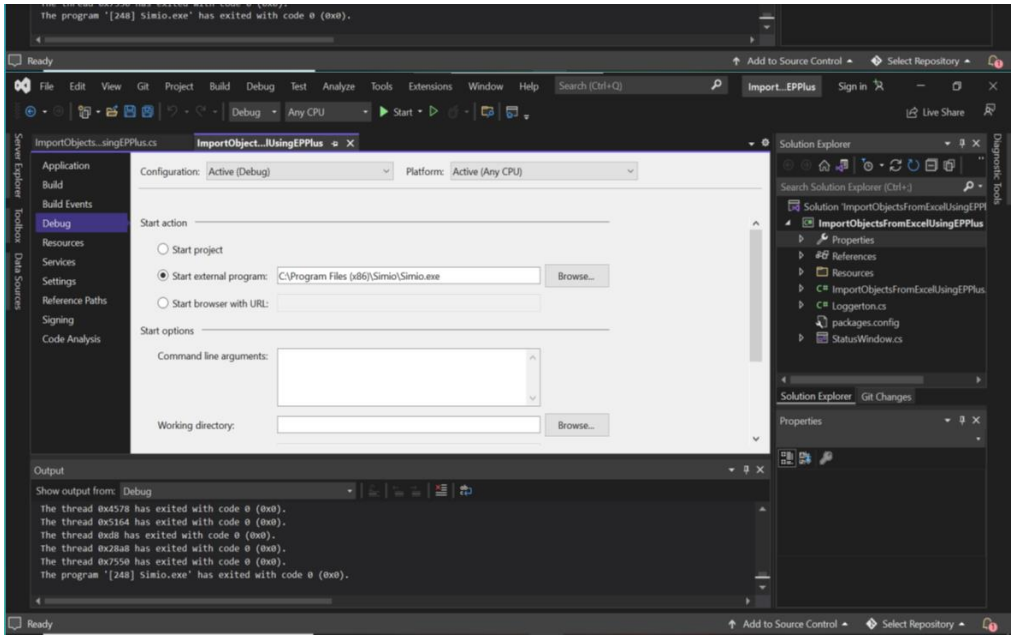


Figure 2.29: Debug output path.

After setting the output paths, we can run the Visual Studio project. This will open SIMIO with the extension already enabled. This extension will appear under the Project Home tab >Action tab. See Figure 2.30 for reference. The extension will be titled: "Load objects, links, and vertices from Excel spreadsheet using EPPlus"

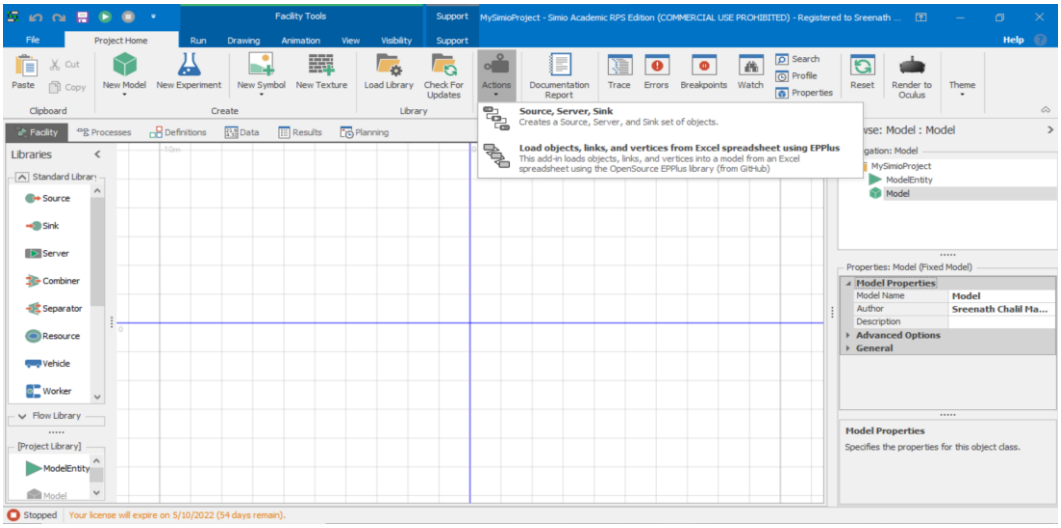


Figure 2.30: Extension Enabled in SIMIO.

Once the extension is enabled in SIMIO, we can test its functionality by importing the sample spreadsheet included in the "ImportObjectsFromExcelUsingEPPlus-master.zip" under "C:\Users\<username>\Documents\SimioUserExtensions\ImportObjectsFromExcelUsingEPPlus-master\Data" shown in Figure 2.31. Figure 2.32 showcases the import function that will help to implement the Factory Digital Twin block.

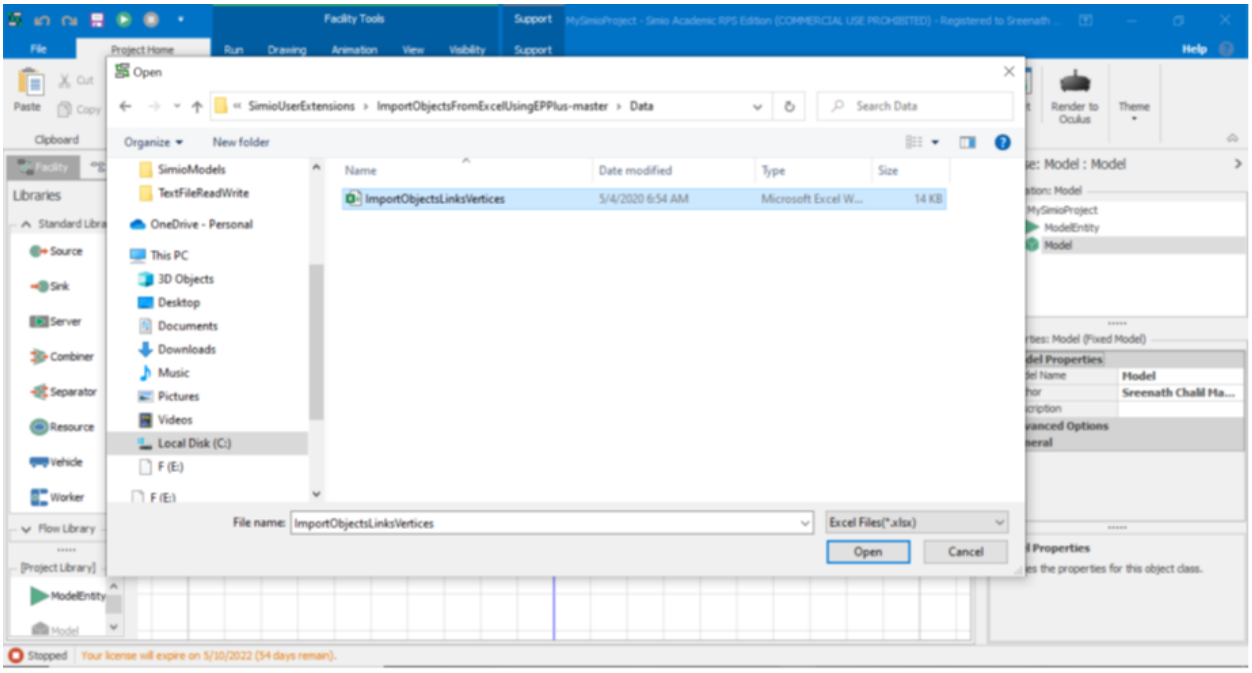


Figure 2.31: Importing an Excel spreadsheet project into SIMIO.

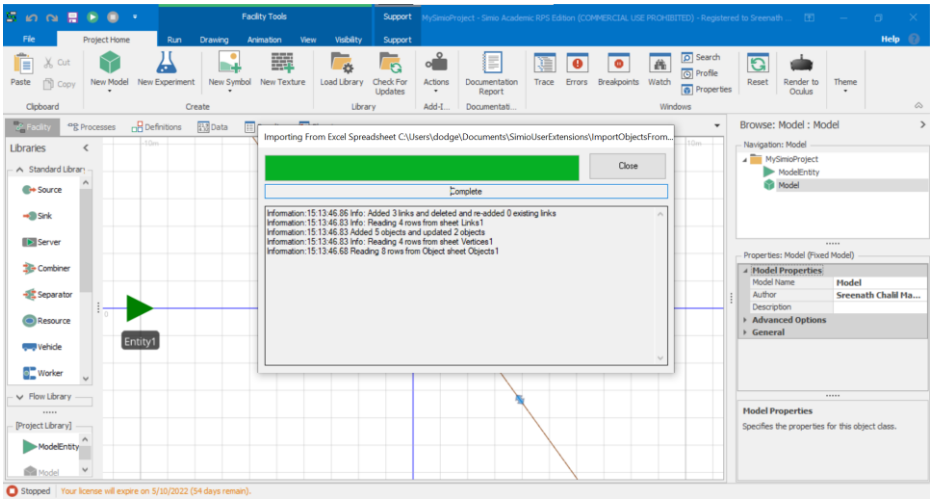
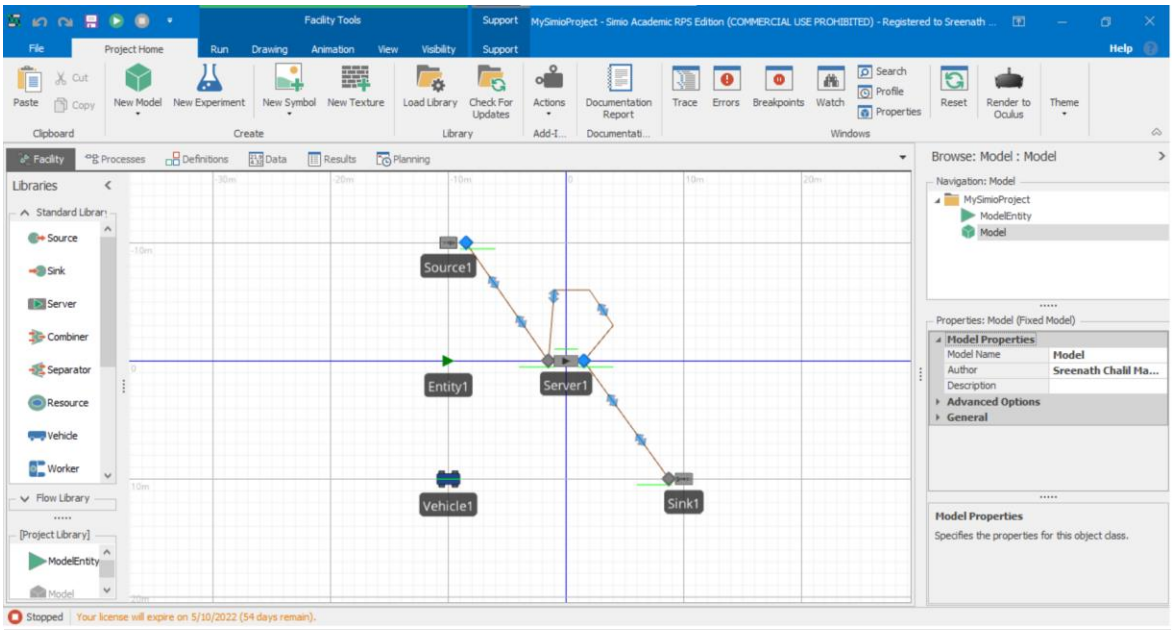


Figure 2.32: Importing an Excel spreadsheet project into SIMIO 2.

This extension allows users to add and modify Objects, Links and vertices from a SIMIO project. Users can use this extension to create SIMIO projects from an Excel spreadsheet or to modify an existing SIMIO project. Figure 3.33 shows the Excel spreadsheet that is exported into SIMIO and the resulting SIMIO project.



	A	B	C	D	E	F	G	H	I	J	K	L
1	Object Class	Object Name	X	Y	Z	Length	Width	Height	EntityType	InitialNumberInSystem	RideOnTransporter	TransporterName
2	ModelEntity	Entity1	-10		5	1	1	0.5				
3	Vehicle	Vehicle1	-10	0	10					1		
4	Source	Source1	-10	0	-10				Entity1			
5	Server	Server1	0	0	0							
6	Sink	Sink1	10	0	10							
7	TranferNode	Output@Source1	-8.5	0	-10						TRUE	Vehicle1
8	TranferNode	Output@Server1	1.5	0	0						TRUE	Vehicle1

Figure 2.33: Excel Spreadsheet and resulting SIMIO project.

Users can also modify Object properties inside the Excel template shown in Figure 2.31. For this research, it was necessary to add the capability of changing the initial capacity of a station. To accomplish this, “PropertyA” was removed from the spreadsheet and replaced by “InitialCapacity” shown in Figure 3.34.

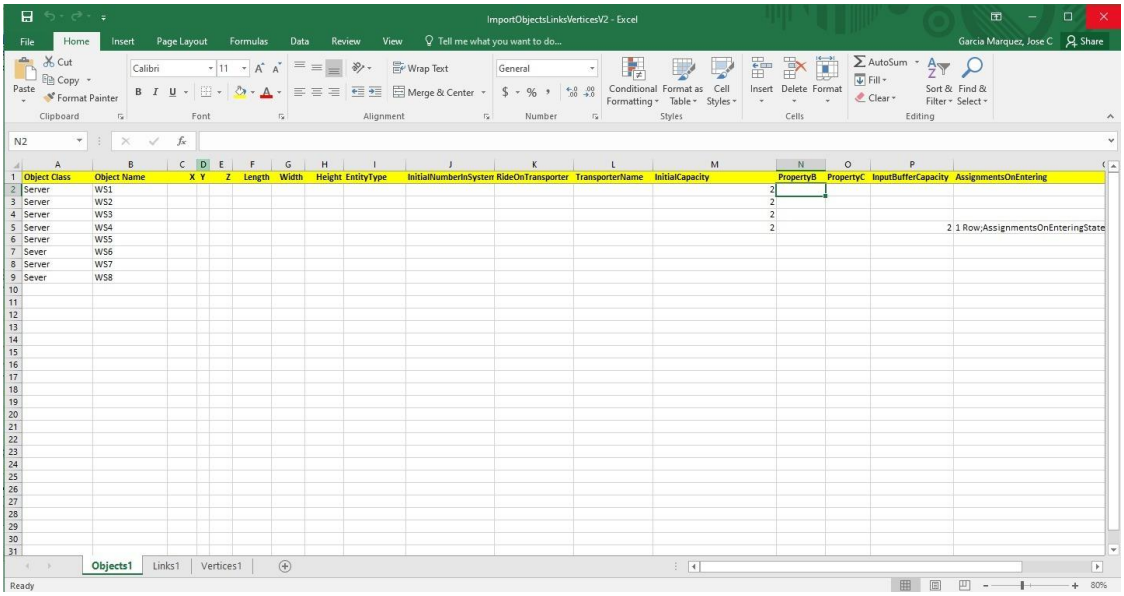


Figure 2.34: Excel Spreadsheet with Initial Capacity property added.

After this. it is possible to import data from Excel spreadsheets containing the data from the Device level to SIMIO by exporting the data from MATLAB to an Excel file and running discrete event simulations.

Chapter 3: Case Study

This chapter will cover the case study showcasing the proposed Cyber-Physical Production System, a short explanation of what genetic algorithms are and the output obtained from the Genetic Algorithm.

3.1 Description of Case Study

The use case selected to demonstrate the proposed methodology is a painting shop. It is a flexible job shop composed of four workcenters, and each workcenter consists of two identical machines placed in parallel. Each machine is composed of a spray-painting robot controlled by a PLC and an HMI. Moreover, each workcenter has an area allocated for the WIP to wait for a specific cure time. A total number of ten different types of jobs is considered for this specific scenario. The production sequences and processing times are specified in Table 3.1. This table specifies the required processes per job type, where *m* and *p,* specifies the machine where the part must be processed on, and the task processing time, respectively. Figure 3.1 shows the Factory Digital Twin Job shop representation that allows the administrator to test different machine configurations without having to alter the real system.

Table 3.1: Job and Machine Processing Times

	Machine Processing Times (p)							
Job(m)	M1	M2	M3	M4	M5	M6	M7	M8
1	**30**	**60**	**27.5**	**70**	**0**	**0**	**20**	**55**
2	**0**	**0**	**32.5**	**45**	**25**	**60**	**30**	**65**
3	**35**	**65**	**30**	**55**	**25**	**60**	**0**	**0**
4	**0**	**0**	**30**	**50**	**27.5**	**60**	**27.5**	**52.5**
5	**0**	**0**	**25**	**47.5**	**22.5**	**60**	**32.5**	**65.5**
6	**30**	**52.5**	**27.5**	**57.5**	**0**	**0**	**27.5**	**55**
7	**30**	**62.5**	**32.5**	**60**	**32.5**	**52.5**	**25**	**50**
8	**32.5**	**60**	**25**	**55**	**25**	**50**	**30**	**50**
9	**0**	**0**	**30**	**55**	**25**	**52.5**	**27.5**	**62.5**
10	**35**	**65**	**37.5**	**70**	**32.5**	**55**	**32.5**	**47.5**

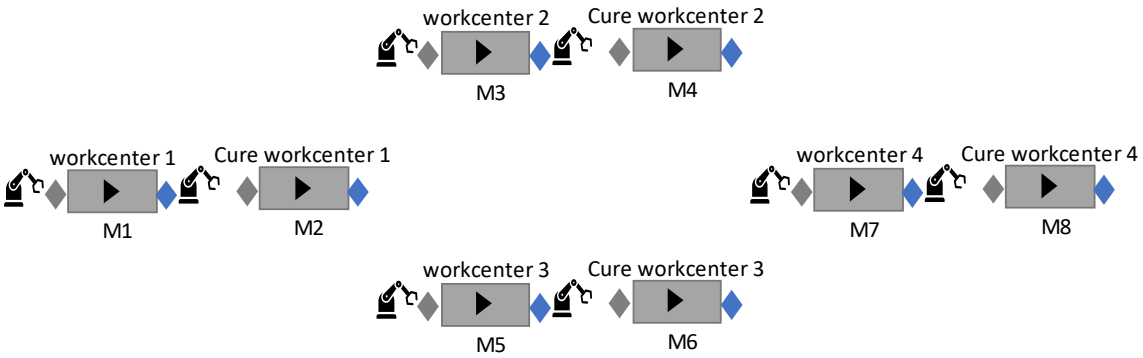


Figure 3.1: Job shop layout

The data shown in Table 3.1 was used as an input for the Genetic Algorithm in MATLAB. A genetic algorithm is a method that solves optimization problems that can be either constrained or unconstrained [7]. The GA was implemented to obtain the optimal production sequence. The best solution that allows the minimal makespan is shown in Figure 3.2:

M1[7,3,8,6,10,1]	M2[7,3,8,6,10,1]
M3[2,9,4,7,3,5,6,8,10,1]	M4[2,9,4,7,3,5,6,8,10,1]
M5[2,9,4,7,5,3,8,10]	M6[2,9,4,7,5,3,8,10]
M7[2,9,6,7,5,4,1,8,10]	M8[2,9,6,7,5,4,1,8,10]

Figure 3.2: optimal production sequence

The new sequence can be simulated in SIMIO to obtain the schedule, shown in Figure 3.3. The total makespan was 499.8 minutes which ran from 7:00am to 8:33pm.

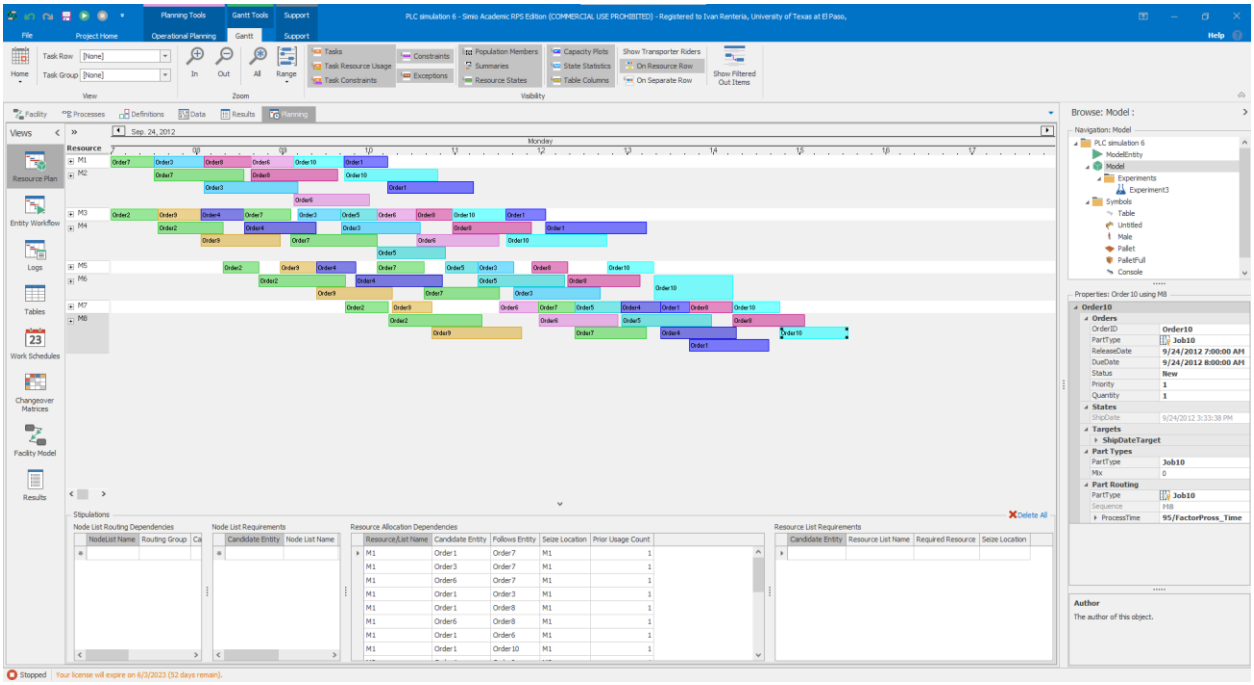


Figure 3.3: optimal production sequence tested in SIMIO.

Chapter 4: Conclusion and future work

4.1 Conclusions

This thesis aimed to develop and demonstrate a framework proposition that could monitor, simulate, analyze and control production. This work showcased a laboratory set-up that proved the proposed framework. This work also demonstrated how to integrate the system. This included the HMI and the building blocks of the ladder diagram program that are necessary to accomplish the framework's proposed functionality, which included provisions to send and receive data between the device, control and information levels. In addition to the ladder diagram program, methods to receive and send data with MATLAB were also demonstrated, including the capabilities of transmitting data, receiving data and exporting and importing the data to an Excel file.

Furthermore, it was shown how to communicate the device and optimization level by incorporating a SIMIO user extension. Finally, this work presented a case study demonstrating the Factory Digital Twin/Genetic Algorithm block. The addition of all these components and the

inclusion of a Genetic Algorithm and SIMIO provides significant advantages. For instance, we can use the Genetic Algorithm to minimize the makespan of the facility and simulate the resulting schedule in SIMIO to test the impact of the new configuration before altering the device level. Moreover, the addition of SIMIO to the framework adds the capacity to consider the variability of the system. This software addition could also be helpful in testing other heuristic scheduling algorithms and for system experimentation.

In conclusion, this research proved the concept of a Cyber-Physical Production System framework. This work can also be used as a guide to help integrate and assemble similar frameworks by implementing the different functional blocks shown in this work, which could be incorporated into future Industry 4.0 projects.

4.2 FUTURE WORK

This framework could be incorporated to optimize energy usage by implementing additional methods that would consider the current machine usage and turning off the machines that do not significantly impact production. Moreover, there could be more improvements added to the system. For instance, adding Wi-Fi modules to connect the devices in the system would be a great addition to upgrading from a physical connection to a wireless solution. An additional framework level incorporating cloud technology can also be included to store production data and control the production floor remotely.

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[7] Papanicolaou, Catherine G., and I. C. Papantoniou. *Optimum Design of Textile-reinforced Concrete as Integrated Formwork in Slabs*. 1 Jan. 2016, doi.org/10.1016/b978-1-78242-446-8.00012-4.

Appendix

A1.1 MATLAB COMMUNICATIONS CODE

```
%% Cell 1 -receive Data From floor PLC2(active machines)
t=tcpip('192.168.0.1', 2000, 'Networkrole', 'server');
fopen(t);
C = 1;
Dev1 = 0;
Dev2 = 0;
Dev3 = 0;
DataToExcel = [];

while C==1
%Available = t.BytesAvailable;
%pause(1)
data=fread(t,1);
%data
%Available;
if data == 0
    DataToExcel = [1;1;1;1;1;1;1;1];
elseif data == 1
    disp('Device 1 on')
    DataToExcel = [2;1;1;1;1;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 2
    disp('Device 2 on')
    DataToExcel = [1;2;1;1;1;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 3
    disp('Device 1,2 on')
    DataToExcel = [2;2;1;1;1;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 4
    disp('Device 3 on')
    DataToExcel = [1;1;2;1;1;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 5
    disp('Device 1,3 on')
    DataToExcel = [2;1;2;1;1;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
```

```
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 6
    disp('Device 2,3 on')
    DataToExcel = [1;2;2;1;1;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 7
    disp('Device 1,2,3 on')
    DataToExcel = [2;2;2;1;1;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 8
    disp('Device 4 on')
    DataToExcel = [1;1;1;2;1;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 9
    disp('Device 1,4 on')
    DataToExcel = [2;1;1;2;1;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 10
    disp('Device 2,4 on')
    DataToExcel = [1;2;1;2;1;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 11
    disp('Device 1,2,4 on')
    DataToExcel = [2;2;1;2;1;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 12
    disp('Device 3,4 on')
    DataToExcel = [1;1;2;2;1;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 13
    disp('Device 1,3,4 on')
    DataToExcel = [2;1;2;2;1;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
```

```
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 14
    disp('Device 2,3,4 on')
    DataToExcel = [1;1;2;2;1;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 15
    disp('Device 1,2,3,4 on')
    DataToExcel = [2;2;2;2;1;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 16
    disp('Device 5 on')
    DataToExcel = [1;1;1;1;2;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 17
    disp('Device 1,5 on')
    DataToExcel = [2;1;1;1;2;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 18
    disp('Device 2,5 on')
    DataToExcel = [1;2;1;1;2;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 19
    disp('Device 1,2,5 on')
    DataToExcel = [2;2;1;1;2;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 20
    disp('Device 3,5 on')
    DataToExcel = [1;1;2;1;2;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 21
    disp('Device 1,3,5 on')
    DataToExcel = [2;1;2;1;2;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 22
    disp('Device 2,3,5 on')
    DataToExcel = [1;2;2;1;2;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 23
    disp('Device 1,2,3,5 on')
    DataToExcel = [2;2;2;1;2;1;1;1];
    x
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 24
    disp('Device 4,5 on')
    DataToExcel = [1;1;1;2;2;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 25
    disp('Device 1,4,5 on')
    DataToExcel = [2;1;1;2;2;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 26
    disp('Device 2,4,5 on')
    DataToExcel = [1;2;1;2;2;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 27
    disp('Device 1,2,4,5 on')
    DataToExcel = [2;2;1;2;2;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 28
    disp('Device 3,4,5 on')
    DataToExcel = [1;1;2;2;2;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 29
    disp('Device 3,4,5 on')
    DataToExcel = [2;1;2;2;2;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 30
    disp('Device 2,3,4,5 on')
    DataToExcel = [1;2;2;2;2;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 31
    disp('Device 1,2,3,4,5 on')
    DataToExcel = [2;2;2;2;2;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 32
    disp('Device 6 on')
    DataToExcel = [1;1;1;1;1;2;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 33
    disp('Device 1,6 on')
    DataToExcel = [2;1;1;1;1;2;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 34
    disp('Device 2,6 on')
    DataToExcel = [1;2;1;1;1;2;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 35
    disp('Device 1,2,6 on')
    DataToExcel = [2;2;1;1;1;2;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 36
    disp('Device 3,6 on')
    DataToExcel = [1;1;2;1;1;2;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 37
    disp('Device 1,3,6 on')
    DataToExcel = [2;1;2;1;1;2;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 38
    disp('Device 2,3,6 on')
    DataToExcel = [1;2;2;1;1;2;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 39
    disp('Device 1,2,3,6 on')
    DataToExcel = [2;2;2;1;1;2;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 40
    disp('Device 4,6 on')
    DataToExcel = [1;1;1;2;1;2;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 41
    disp('Device 1,4,6 on')
    DataToExcel = [2;1;1;2;1;2;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 42
    disp('Device 2,4,6 on')
    DataToExcel = [1;2;1;2;1;2;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 43
    disp('Device 1,2,4,6 on')
    DataToExcel = [2;2;1;2;1;2;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 44
    disp('Device 3,4,6 on')
    DataToExcel = [1;1;2;2;1;2;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 45
    disp('Device 1,3,4,6 on')
    DataToExcel = [2;1;2;2;1;2;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 46
    disp('Device 2,3,4,6 on')
    DataToExcel = [1;   2;  2;  2;  1;  2;  1;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 47
    disp('Device 1,2,3,4,6 on')
    DataToExcel = [2;   2;  2;  2;  1;  2;  1;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 48
    disp('Device 5,6 on')
    DataToExcel = [1;   1;  1;  1;  2;  2;  1;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 49
    disp('Device 1,5,6 on')
    DataToExcel = [2;   1;  1;  1;  2;  2;  1;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 50
    disp('Device 2,5,6 on')
    DataToExcel = [1;   2;  1;  1;  2;  2;  1;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 51
    disp('Device 1,2,5,6 on')
    DataToExcel = [2;   2;  1;  1;  2;  2;  1;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 52
    disp('Device 3,5,6 on')
    DataToExcel = [1;   1;  2;  1;  2;  2;  1;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 53
    disp('Device 1,3,5,6 on')
    DataToExcel = [2;   1;  2;  1;  2;  2;  1;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 54
    disp('Device 2,3,5,6 on')
    DataToExcel = [1;   2;  2;  1;  2;  2;  1;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 55
    disp('Device 1,2,3,5,6 on')
    DataToExcel = [2;   2;  2;  1;  2;  2;  1;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 56
    disp('Device 4,5,6 on')
    DataToExcel = [1;   1;  1;  2;  2;  2;  1;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 57
    disp('Device 1,4,5,6 on')
    DataToExcel = [2;   1;  1;  2;  2;  2;  1;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 58
    disp('Device 2,4,5,6 on')
    DataToExcel = [1;   2;  1;  2;  2;  2;  1;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 59
    disp('Device 1,2,4,5,6 on')
    DataToExcel = [2;   2;  1;  2;  2;  2;  1;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 60
    disp('Device 3,4,5,6 on')
    DataToExcel = [1;   1;  2;  2;  2;  2;  1;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 61
    disp('Device 1,3,4,5,6 on')
    DataToExcel = [2;   1;  2;  2;  2;  2;  1;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 62
    disp('Device 2,3,4,5,6 on')
    DataToExcel = [1;   2;  2;  2;  2;  2;  1;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 63
    disp('Device 1,2,3,4,5,6 on')
    DataToExcel = [2;   2;  2;  2;  2;  2;  1;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 64
    disp('Device 7 on')
    DataToExcel = [1;   1;  1;  1;  1;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 65
    disp('Device 1,7 on')
    DataToExcel = [2;   1;  1;  1;  1;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 66
    disp('Device 2,7 on')
    DataToExcel = [1;   2;  1;  1;  1;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 67
    disp('Device 1,2,7 on')
    DataToExcel = [2;   2;  1;  1;  1;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 68
    disp('Device 3,7 on')
    DataToExcel = [1;   1;  2;  1;  1;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 69
    disp('Device 1,3,7 on')
    DataToExcel = [2;   1;  2;  1;  1;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 70
    disp('Device 2,3,7 on')
    DataToExcel = [1;   2;  2;  1;  1;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 71
    disp('Device 1,2,3,7 on')
    DataToExcel = [2;   2;  2;  1;  1;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 72
    disp('Device 4,7 on')
    DataToExcel = [1;   1;  1;  2;  1;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 73
    disp('Device 1,4,,7 on')
    DataToExcel = [2;   1;  1;  2;  1;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 74
    disp('Device 2,4,7 on')
    DataToExcel = [1;   2;  1;  2;  1;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 75
    disp('Device 1,2,4,7 on')
    DataToExcel = [2;   2;  1;  2;  1;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 76
    disp('Device 3,4,7 on')
    DataToExcel = [1;   1;  2;  2;  1;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 77
    disp('Device 1,3,4,7 on')
    DataToExcel = [2;   1;  2;  2;  1;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 78
    disp('Device 2,3,4,7 on')
    DataToExcel = [1;   2;  2;  2;  1;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 79
    disp('Device 2,3,4,7 on')
    DataToExcel = [2;   2;  2;  2;  1;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 80
    disp('Device 5,7 on')
    DataToExcel = [1;   1;  1;  1;  2;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 81
    disp('Device 1,5,7 on')
    DataToExcel = [2;   1;  1;  1;  2;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 82
    disp('Device 2,5,7 on')
    DataToExcel = [1;   2;  1;  1;  2;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 83
    disp('Device 1,2,5,7 on')
    DataToExcel = [2;   2;  1;  1;  2;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 84
    disp('Device 3,5,7 on')
    DataToExcel = [1;   1;  2;  1;  2;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 85
    disp('Device 1,3,5,7 on')
    DataToExcel = [2;   1;  2;  1;  2;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 86
    disp('Device 2,3,5,7 on')
    DataToExcel = [1;   2;  2;  1;  2;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 87
    disp('Device 1,2,3,5,7 on')
    DataToExcel = [2;   2;  2;  1;  2;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 88
    disp('Device 4,5,7 on')
    DataToExcel = [1;   1;  1;  2;  2;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 89
    disp('Device 1,4,5,7 on')
    DataToExcel = [2;   1;  1;  2;  2;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 90
    disp('Device 2,4,5,7 on')
    DataToExcel = [1;   2;  1;  2;  2;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 91
    disp('Device 1,2,4,5,7 on')
    DataToExcel = [2;   2;  1;  2;  2;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 92
    disp('Device 3,4,5,7 on')
    DataToExcel = [1;   1;  2;  2;  2;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 93
    disp('Device 1,3,4,5,7 on')
    DataToExcel = [2;   1;  2;  2;  2;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 94
    disp('Device 2,3,4,5,7 on')
    DataToExcel = [1;   2;  2;  2;  2;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 95
    disp('Device 1,2,3,4,5,7 on')
    DataToExcel = [2;   2;  2;  2;  2;  1;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 96
    disp('Device 6,7 on')
    DataToExcel = [1;   1;  1;  1;  1;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 97
    disp('Device 1,6,7 on')
    DataToExcel = [2;   1;  1;  1;  1;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 98
    disp('Device 2,6,7 on')
    DataToExcel = [1;   2;  1;  1;  1;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 99
    disp('Device 1,2,6,7 on')
    DataToExcel = [2;   2;  1;  1;  1;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 100
    disp('Device 3,6,7 on')
    DataToExcel = [1;   1;  2;  1;  1;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 101
    disp('Device 1,3,6,7 on')
    DataToExcel = [2;   1;  2;  1;  1;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 102
    disp('Device 2,3,6,7 on')
    DataToExcel = [1;   2;  2;  1;  1;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 103
    disp('Device 1,2,3,6,7 on')
    DataToExcel = [2;   2;  2;  1;  1;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 104
    disp('Device 4,6,7 on')
    DataToExcel = [1;   1;  1;  2;  1;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 105
    disp('Device 1,4,6,7 on')
    DataToExcel = [2;   1;  1;  2;  1;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 106
    disp('Device 2,4,6,7 on')
    DataToExcel = [1;   2;  1;  2;  1;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 107
    disp('Device 1,2,4,6,7 on')
    DataToExcel = [2;   2;  1;  2;  1;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 108
    disp('Device 3,4,6,7 on')
    DataToExcel = [1;   1;  2;  2;  2;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 109
    disp('Device 1,3,4,6,7 on')
    DataToExcel = [2;   1;  2;  2;  1;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 110
    disp('Device 2,3,4,6,7 on')
    DataToExcel = [1;   2;  2;  2;  1;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 111
    disp('Device 1,2,3,4,6,7 on')
    DataToExcel = [2;   2;  2;  2;  1;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 112
    disp('Device 5,6,7 on')
    DataToExcel = [1;   1;  1;  1;  2;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 113
    disp('Device 1,5,6,7 on')
    DataToExcel = [2;   1;  1;  1;  2;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 114
    disp('Device 2,5,6,7 on')
    DataToExcel = [1;   2;  1;  1;  2;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 115
    disp('Device 1,2,5,6,7 on')
    DataToExcel = [2;   2;  1;  1;  2;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 116
    disp('Device 3,5,6,7 on')
    DataToExcel = [1;   1;  2;  1;  2;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 117
    disp('Device 1,3,5,6,7 on')
    DataToExcel = [2;   1;  2;  1;  2;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 118
    disp('Device 2,3,5,6,7 on')
    DataToExcel = [1;   2;  2;  1;  2;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 119
    disp('Device 1,2,3,5,6,7 on')
    DataToExcel = [2;   2;  2;  1;  2;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 120
    disp('Device 4,5,6,7 on')
    DataToExcel = [1;   1;  1;  2;  2;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 121
    disp('Device 1,4,5,6,7 on')
    DataToExcel = [2;   1;  1;  2;  2;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 122
    disp('Device 2,4,5,6,7 on')
    DataToExcel = [1;   2;  1;  2;  2;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 123
    disp('Device 1,2,4,5,6,7 on')
    DataToExcel = [2;   2;  1;  2;  2;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 124
    disp('Device 3,4,5,6,7 on')
    DataToExcel = [1;   1;  2;  2;  2;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 125
    disp('Device 1,3,4,5,6,7 on')
    DataToExcel = [2;   1;  2;  2;  2;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 126
    disp('Device 2,3,4,5,6,7 on')
    DataToExcel = [1;   2;  2;  2;  2;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 127
    disp('Device 1,2,3,4,5,6,7 on')
    DataToExcel = [2;   2;  2;  2;  2;  2;  2;  1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 128
    disp('Device 8 on')
    DataToExcel = [1;   1;  1;  1;  1;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 129
    disp('Device 1,8 on')
    DataToExcel = [2;   1;  1;  1;  1;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 130
    disp('Device 2,8 on')
    DataToExcel = [1;   2;  1;  1;  1;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 131
    disp('Device 1,2,8 on')
    DataToExcel = [2;   2;  1;  1;  1;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 132
    disp('Device 3,8 on')
    DataToExcel = [1;   1;  2;  1;  1;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 133
    disp('Device 1,3,8 on')
    DataToExcel = [2;   1;  2;  1;  1;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 134
    disp('Device 2,3,8 on')
    DataToExcel = [1;   2;  2;  1;  1;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 135
    disp('Device 1,2,3,8 on')
    DataToExcel = [2;   2;  2;  1;  1;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 136
    disp('Device 4,8 on')
    DataToExcel = [1;   1;  1;  2;  1;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 137
    disp('Device 1,4,8 on')
    DataToExcel = [2;   1;  1;  2;  1;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 138
    disp('Device 2,4,8 on')
    DataToExcel = [1;   2;  1;  2;  1;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 139
    disp('Device 1,2,4,8 on')
    DataToExcel = [2;   2;  1;  2;  1;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 140
    disp('Device 3,4,8 on')
    DataToExcel = [1;   1;  2;  2;  1;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 141
    disp('Device 1,3,4,8 on')
    DataToExcel = [2;   1;  2;  2;  1;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 142
    disp('Device 2,3,4,8 on')
    DataToExcel = [1;   2;  2;  2;  1;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 143
    disp('Device 1,2,3,4,8 on')
    DataToExcel = [2;   2;  2;  2;  1;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 144
    disp('Device 5,8 on')
    DataToExcel = [1;   1;  1;  1;  2;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 145
    disp('Device 1,5,8 on')
    DataToExcel = [2;   1;  1;  1;  2;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 146
    disp('Device 2,5,8 on')
    DataToExcel = [1;   2;  1;  1;  2;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 147
    disp('Device 1,2,5,8 on')
    DataToExcel = [2;   2;  1;  1;  2;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 148
    disp('Device 3,5,8 on')
    DataToExcel = [1;   1;  2;  1;  2;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 149
    disp('Device 1,3,5,8 on')
    DataToExcel = [2;   1;  2;  1;  2;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 150
    disp('Device 2,3,5,8 on')
    DataToExcel = [1;   2;  2;  1;  2;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 151
    disp('Device 1,2,3,5,8 on')
    DataToExcel = [2;   2;  2;  1;  2;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 152
    disp('Device 4,5,8 on')
    DataToExcel = [1;   1;  1;  2;  2;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 153
    disp('Device 1,4,5,8 on')
    DataToExcel = [2;   1;  1;  2;  2;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 154
    disp('Device 2,4,5,8 on')
    DataToExcel = [1;   2;  1;  2;  2;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 155
    disp('Device 1,2,4,5,8 on')
    DataToExcel = [2;   2;  1;  2;  2;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 156
    disp('Device 3,4,5,8 on')
    DataToExcel = [1;   1;  2;  2;  2;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 157
    disp('Device 1,3,4,5,8 on')
    DataToExcel = [2;   1;  2;  2;  2;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 158
    disp('Device 2,3,4,5,8 on')
    DataToExcel = [1;   2;  2;  2;  2;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 159
    disp('Device 1,2,3,4,5,8 on')
    DataToExcel = [2;   2;  2;  2;  2;  1;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 160
    disp('Device 6,8 on')
    DataToExcel = [1;   1;  1;  1;  1;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 161
    disp('Device 1,6,8 on')
    DataToExcel = [2;   1;  1;  1;  1;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 162
    disp('Device 2,6,8 on')
    DataToExcel = [1;   2;  1;  1;  1;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 163
    disp('Device 1,2,6,8 on')
    DataToExcel = [2;   2;  1;  1;  1;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 164
    disp('Device 3,6,8 on')
    DataToExcel = [1;   1;  2;  1;  1;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 165
    disp('Device 1,3,6,8 on')
    DataToExcel = [2;   1;  2;  1;  1;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 166
    disp('Device 2,3,6,8 on')
    DataToExcel = [1;   2;  2;  1;  1;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 167
    disp('Device 1,2,3,6,8 on')
    DataToExcel = [2;   2;  2;  1;  1;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 168
    disp('Device 4,6,8 on')
    DataToExcel = [1;   1;  1;  2;  1;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 169
    disp('Device 1,4,6,8 on')
    DataToExcel = [2;   1;  1;  2;  1;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 170
    disp('Device 2,4,6,8 on')
    DataToExcel = [1;   2;  1;  2;  1;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 171
    disp('Device 1,2,4,6,8 on')
    DataToExcel = [2;   2;  1;  2;  1;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 172
    disp('Device 3,4,6,8 on')
    DataToExcel = [1;   1;  2;  2;  1;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 173
    disp('Device 1,3,4,6,8 on')
    DataToExcel = [2;   1;  2;  2;  1;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 174
    disp('Device 2,3,4,6,8 on')
    DataToExcel = [1;   2;  2;  2;  1;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 175
    disp('Device 1,2,3,4,6,8 on')
    DataToExcel = [2;   2;  2;  2;  1;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 176
    disp('Device 5,6,8 on')
    DataToExcel = [1;   1;  1;  1;  2;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 177
    disp('Device 1,5,6,8 on')
    DataToExcel = [2;   1;  1;  1;  2;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 178
    disp('Device 2,5,6,8 on')
    DataToExcel = [1;   2;  1;  1;  2;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 179
    disp('Device 1,2,5,6,8 on')
    DataToExcel = [2;   2;  1;  1;  2;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 180
    disp('Device 3,5,6,8 on')
    DataToExcel = [1;   1;  2;  1;  2;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 181
    disp('Device 1,3,5,6,8 on')
    DataToExcel = [2;   1;  2;  1;  2;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 182
    disp('Device 2,3,5,6,8 on')
    DataToExcel = [1;   2;  2;  1;  2;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 183
    disp('Device 1,2,3,5,6,8 on')
    DataToExcel = [2;   2;  2;  1;  2;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 184
    disp('Device 4,5,6,8 on')
    DataToExcel = [1;   1;  1;  2;  2;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 185
    disp('Device 1,4,5,6,8 on')
    DataToExcel = [2;   1;  1;  2;  2;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 186
    disp('Device 2,4,5,6,8 on')
    DataToExcel = [1;   2;  1;  2;  2;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 187
    disp('Device 1,2,4,5,6,8 on')
    DataToExcel = [2;   2;  1;  2;  2;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 188
    disp('Device 3,4,5,6,8 on')
    DataToExcel = [1;   1;  2;  2;  2;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 189
    disp('Device 1,3,4,5,6,8 on')
    DataToExcel = [2;   1;  2;  2;  2;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 190
    disp('Device 2,3,4,5,6,8 on')
    DataToExcel = [1;   2;  2;  2;  2;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 191
    disp('Device 1,2,3,4,5,6,8 on')
    DataToExcel = [2;   2;  2;  2;  2;  2;  1;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 192
    disp('Device 7,8 on')
    DataToExcel = [1;   1;  1;  1;  1;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 193
    disp('Device 1,7,8 on')
    DataToExcel = [2;   1;  1;  1;  1;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 194
    disp('Device 2,7,8 on')
    DataToExcel = [1;   2;  1;  1;  1;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 195
    disp('Device 1,2,7,8 on')
    DataToExcel = [2;   2;  1;  1;  1;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 196
    disp('Device 3,7,8 on')
    DataToExcel = [1;   1;  2;  1;  1;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 197
    disp('Device 1,3,7,8 on')
    DataToExcel = [2;   1;  2;  1;  1;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 198
    disp('Device 2,3,7,8 on')
    DataToExcel = [1;   2;  2;  1;  1;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 199
    disp('Device 1,2,3,7,8 on')
    DataToExcel = [2;   2;  2;  1;  1;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 200
    disp('Device 4,7,8 on')
    DataToExcel = [1;   1;  1;  2;  1;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 201
    disp('Device 1,4,7,8 on')
    DataToExcel = [2;   1;  1;  2;  1;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 202
    disp('Device 2,4,7,8 on')
    DataToExcel = [1;   2;  1;  2;  1;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 203
    disp('Device 1,2,4,7,8 on')
    DataToExcel = [2;   2;  1;  2;  1;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 204
    disp('Device 3,4,7,8 on')
    DataToExcel = [1;   1;  2;  2;  1;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 205
    disp('Device 1,3,4,7,8 on')
    DataToExcel = [2;   1;  2;  2;  1;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 206
    disp('Device 2,3,4,7,8 on')
    DataToExcel = [1;   2;  2;  2;  1;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 207
    disp('Device 1,2,3,4,7,8 on')
    DataToExcel = [2;   2;  2;  2;  1;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 208
    disp('Device 5,7,8 on')
    DataToExcel = [1;   1;  1;  1;  2;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 209
    disp('Device 1,5,7,8 on')
    DataToExcel = [2;   1;  1;  1;  2;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 210
    disp('Device 2,5,7,8 on')
    DataToExcel = [1;   2;  1;  1;  2;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 211
    disp('Device 1,2,5,7,8 on')
    DataToExcel = [2;   2;  1;  1;  2;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 212
    disp('Device 3,5,7,8 on')
    DataToExcel = [1;   1;  2;  1;  2;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 213
    disp('Device 1,3,5,7,8 on')
    DataToExcel = [2;   1;  2;  1;  2;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
```

```
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 214
    disp('Device 2,3,5,7,8 on')
    DataToExcel = [1;   2;  2;  1;  2;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 215
    disp('Device 1,2,3,5,7,8 on')
    DataToExcel = [2;   2;  2;  1;  2;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 216
    disp('Device 4,5,7,8 on')
    DataToExcel = [1;   1;  1;  2;  2;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 217
    disp('Device 1,4,5,7,8 on')
    DataToExcel = [2;   1;  1;  2;  2;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 218
    disp('Device 2,4,5,7,8 on')
    DataToExcel = [1;   2;  1;  2;  2;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 219
    disp('Device 1,2,4,5,7,8 on')
    DataToExcel = [2;   2;  1;  2;  2;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 220
    disp('Device 3,4,5,7,8 on')
    DataToExcel = [1;   1;  2;  2;  2;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 221
    disp('Device 1,3,4,5,7,8 on')
    DataToExcel = [2;   1;  2;  2;  2;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
```

```
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 222
    disp('Device 2,3,4,5,7,8 on')
    DataToExcel = [1;   2;  2;  2;  2;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 223
    disp('Device 1,2,3,4,5,7,8 on')
    DataToExcel = [2;   2;  2;  2;  2;  1;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 224
    disp('Device 6,7,8 on')
    DataToExcel = [1;   1;  1;  1;  1;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 225
    disp('Device 1,6,7,8 on')
    DataToExcel = [2;   1;  1;  1;  1;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 226
    disp('Device 2,6,7,8 on')
    DataToExcel = [1;   2;  1;  1;  1;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 227
    disp('Device 1,2,6,7,8 on')
    DataToExcel = [2;   2;  1;  1;  1;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 228
    disp('Device 3,6,7,8 on')
    DataToExcel = [1;   1;  2;  1;  1;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 229
    disp('Device 1,3,6,7,8 on')
    DataToExcel = [2;   1;  2;  1;  1;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 230
    disp('Device 2,3,6,7,8 on')
    DataToExcel = [1;   2;  2;  1;  1;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 231
    disp('Device 1,2,3,6,7,8 on')
    DataToExcel = [2;   2;  2;  1;  1;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 232
    disp('Device 4,6,7,8 on')
    DataToExcel = [1;   1;  1;  2;  1;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 233
    disp('Device 1,4,6,7,8 on')
    DataToExcel = [2;   1;  1;  2;  1;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 234
    disp('Device 2,4,6,7,8 on')
    DataToExcel = [1;   2;  1;  2;  1;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 235
    disp('Device 1,2,4,6,7,8 on')
    DataToExcel = [2;   2;  1;  2;  1;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 236
    disp('Device 3,4,6,7,8 on')
    DataToExcel = [1;   1;  2;  2;  1;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 237
    disp('Device 1,3,4,6,7,8 on')
    DataToExcel = [2;   1;  2;  2;  1;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 238
    disp('Device 2,3,4,6,7,8 on')
    DataToExcel = [1;   2;  2;  2;  1;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 239
    disp('Device 1,2,3,4,6,7,8 on')
    DataToExcel = [2;   2;  2;  2;  1;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 240
    disp('Device 5,6,7,8 on')
    DataToExcel = [1;   1;  1;  1;  2;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 241
    disp('Device 1,5,6,7,8 on')
    DataToExcel = [2;   1;  1;  1;  2;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 242
    disp('Device 2,5,6,7,8 on')
    DataToExcel = [1;   2;  1;  1;  2;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 243
    disp('Device 1,2,5,6,7,8 on')
    DataToExcel = [2;   2;  1;  1;  2;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 244
    disp('Device 3,5,6,7,8 on')
    DataToExcel = [1;   1;  2;  1;  2;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 245
    disp('Device 1,3,5,6,7,8 on')
    DataToExcel = [2;   1;  2;  1;  2;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 246
    disp('Device 2,3,5,6,7,8 on')
    DataToExcel = [1;   2;  2;  1;  2;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 247
    disp('Device 1,2,3,5,6,7,8 on')
    DataToExcel = [2;   2;  2;  1;  2;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 248
    disp('Device 4,5,6,7,8 on')
    DataToExcel = [1;   1;  1;  2;  2;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 249
    disp('Device 1,4,5,6,7,8 on')
    DataToExcel = [2;   1;  1;  2;  2;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 250
    disp('Device 2,4,5,6,7,8 on')
    DataToExcel = [1;   2;  1;  2;  2;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 251
    disp('Device 1,2,4,5,6,7,8 on')
    DataToExcel = [2;   2;  1;  2;  2;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 252
    disp('Device 3,4,5,6,7,8 on')
    DataToExcel = [1;   1;  2;  2;  2;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 253
    disp('Device 1,3,4,5,6,7,8 on')
    DataToExcel = [2;   1;  2;  2;  2;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 254
    disp('Device 2,3,4,5,6,7,8 on')
    DataToExcel = [1;   2;  2;  2;  2;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');
elseif data == 255
    disp('Device 1,2,3,4,5,6,7,8 on')
    DataToExcel = [2;   2;  2;  2;  2;  2;  2;  2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M9');



end


end

%data=fread(t,1);
%data;

%while t.BytesAvailable == 0
%    pause(1)
%end
%data=fread(t,1);
%data;

%% Cell 2 -Update Capacities of stations
t=tcpip('192.168.0.1', 2000, 'Networkrole', 'server');
fopen(t);
data=fread(t,1);
data
empty
if data == 1
disp('Actual capacity for station 1 is (1)')
 DataToExcel = [1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M2');
 %2
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M3:M3');
 %3
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M4:M4');
 %4
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
```

```
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M5:M5');
 elseif data == 2
    disp('Actual capacity for station 2 is (1)')
    DataToExcel = [1];
 %1
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M2');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M3:M3');
 %3
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M4:M4');
 %4
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M5:M5');
elseif data == 3
    disp('Actual capacity for station 1,2 is (1)')
    DataToExcel = [1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M2');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M3:M3');
 %3
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M4:M4');
 %4
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M5:M5');
 elseif data == 4
    disp('Actual capacity for station 3 is (1)')
    DataToExcel = [1];
%1
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M2');
%2
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M3:M3');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M4:M4');
%4
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
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```
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M5:M5');

elseif data == 5
    disp('Actual capacity for station 1,3 is (1)')
    DataToExcel = [1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M2');
%
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M3:M3');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M4:M4');
%
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M5:M5');

elseif data == 6
    disp('Actual capacity for station 2,3 is (1)')
    DataToExcel = [1];
%
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M2');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M3:M3');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M4:M4');
%
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M5:M5');

elseif data == 7
    disp('Actual capacity for station 1,2,3 is (1)')
    DataToExcel = [1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M2');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M3:M3');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
```

```
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M4:M4');
 %
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M5:M5');

elseif data == 8
    disp('Actual capacity for station 4 is (1)')
     DataToExcel = [1];
 %
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M2');
 %
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M3:M3');
 %
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M4:M4');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M5:M5');

elseif data == 9
    disp('Actual capacity for station 1,4 is (1)')
 DataToExcel = [1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M2');
 %
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M3:M3');
 %
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M4:M4');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M5:M5');

elseif data == 10
    disp('Actual capacity for station 2,4 is (1)')
 DataToExcel = [1];
 %
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M2');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
```

```
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M3:M3');
 %
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M4:M4');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M5:M5');

elseif data == 11
    disp('Actual capacity for station 1,2,4 is (1)')
 DataToExcel = [1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M2');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M3:M3');
 %
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M4:M4');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M5:M5');

elseif data == 12
    disp('Actual capacity for station 3,4 is (1)')
 DataToExcel = [1];
 %
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M2');
 %
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M3:M3');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M4:M4');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M5:M5');

elseif data == 13
    disp('Actual capacity for station 1,3,4 is (1)')
 DataToExcel = [1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
```

```
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M2');
 %
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M3:M3');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M4:M4');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M5:M5');

elseif data == 14
    disp('Actual capacity for station 2,3,4 is (1)')
 DataToExcel = [1];
 %
xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M2');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M3:M3');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M4:M4');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M5:M5');

elseif data == 15
    disp('Actual capacity for station 1,2,3,4 is (1)')
 DataToExcel = [1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M2');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M3:M3');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M4:M4');

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M5:M5');


end
```

```
%% Cell 3 -Send data Back to PLC
t=tcpip('192.168.0.1', 2000, 'Networkrole', 'server');
fopen(t);
data =
xlsread('C:\Users\jcgarciamarquez\Documents\Excel_To_Matlab\ExcelProject.xlsx
','Sheet1', 'A1:A9');
disp(data)
A=data(1,1)
B=data(2,1)
C=data(3,1)
D=data(4,1)
E=data(5,1)
F=data(6,1)
G=data(7,1)
H=data(8,1)

b = data(1,1)
%disp(b)

An= [];
A= [b];
C=[1,2,3];
disp(A)

fwrite(t,A);
fwrite(t,B);
fwrite(t,C);
fwrite(t,D);
%fwrite(t,E);
%fwrite(t,F);
%fwrite(t,G);
%fwrite(t,H);

%% Cell 4 - Aquirie Active Stations
t=tcpip('192.168.0.1', 2000, 'Networkrole', 'server');
fopen(t);
C = 1;
Dev1 = 0;
Dev2 = 0;
Dev3 = 0;
DataToExcel = [];

while C==1
%Available = t.BytesAvailable;
%pause(1)
data=fread(t,1);
%data
%Available;
if data == 0
    DataToExcel = [1;1;1;1];
elseif data == 1
    disp('Station 1 Active')
    DataToExcel = [2;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
```

```
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M5');
elseif data == 2
    disp('Station 2 Active')
    DataToExcel = [1;2;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M5');
elseif data == 3
    disp('Device 1,2 Active')
    DataToExcel = [2;2;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M5');
elseif data == 4
    disp('Station 3 Active')
    DataToExcel = [1;1;2;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M5');
elseif data == 5
    disp('Station 1,3 Active')
    DataToExcel = [2;1;2;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M5');
elseif data == 6
    disp('Station 2,3 Active')
    DataToExcel = [1;2;2;1;1;1;1;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M5');
elseif data == 7
    disp('Station 1,2,3 Active')
    DataToExcel = [2;2;2;1];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M5');
elseif data == 8
    disp('Station 4 Active')
    DataToExcel = [1;1;1;2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M5');
elseif data == 9
    disp('Station 1,4 Active')
    DataToExcel = [2;1;1;2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
```

```
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M5');
elseif data == 10
    disp('Station 2,4 Active')
    DataToExcel = [1;2;1;2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M5');
elseif data == 11
    disp('Station 1,2,4 Active')
    DataToExcel = [2;2;1;2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M5');
elseif data == 12
    disp('Station 3,4 Fully Active')
    DataToExcel = [1;1;2;2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M5');
elseif data == 13
    disp('Station 1,3,4 Active')
    DataToExcel = [2;1;2;2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M5');
elseif data == 14
    disp('Station 2,3,4 Active')
    DataToExcel = [1;2;2;2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M5');
elseif data == 15
    disp('Station 1,2,3,4 Active')
    DataToExcel = [2;2;2;2];

xlswrite('C:\Users\jcgarciamarquez\Documents\SimioUserExtensions\ImportObject
sFromExcelUsingEPPlus-master\ImportObjectsFromExcelUsingEPPlus-
master\Data\ImportObjectsLinksVerticesV2.xlsx',DataToExcel,'M2:M5');
end
end
```

Vita

Jose Carlos Garcia Marquez Basaldua was born in Durango and graduated from Instituto Tecnológico y de Estudios Superiores de Monterrey, Campus Toluca. In the fall of 2014, he enrolled in Electrical and Computer Engineering, obtaining his bachelor's in 2021 at The University of Texas at El Paso. After graduating, he pursued a master's in Manufacturing Engineering at the same University. During this time, he became a research assistant. He researched PLCs and SCADA systems with the Industrial, Manufacturing and Systems department while working as an intern for First Texas Products. A company that focuses on Metal detectors and security devices, where he gained first-hand experience testing components and devices.