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**ISYE-560 Facilities Planning and Design Project 1**

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Submitted by

**Fouzan Abdullah Z1978719**

**Mohammed Abdul Lateef Khan Z1972887**

**Abdullah Omar Ahmed Z1983986**

**Abdul Mubasheer Mohammed Z1977859**

**MASTER OF SCIENCE**

**DEPARTMENT OF INDUSTRIAL AND SYSTEMS ENGINEERING**

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# **List of Figures and**

# **List of Tables, if applicable**

# **Executive Summary**

**Data Description**

Summarize the data. The purpose of this is to make sure that you understand the data correctly.

* + Descriptive analytics on the data (average, standard deviation, range)
  + Issues in the data and how you decided to resolve it

Data is given in an excel format. There are 5 sheets describing the following:

* Demand – The daily demand for 10 products is given in numbers
* The operation sequence of each of the 10 product is given
* Times per Operation – This is the most detailed data given. In this the times of operation are given for each product and there are 10 readings for each operation for each product. There are garbage values as well which will need to be cleaned for an accurate representation of the operation times.
* Defect Rate – For each operation, a defect rate of the respective machine is given. This will need to be taken into account when calculating the operation time for each successfully processed part.
* BOM – Bill of Materials for the product is given. There are three levels for this product.

Steps for Data Cleaning:

1. The demand data is analyzed. Average, min, max are calculated. The negative values are replaced by the average value for that part.
2. We will take the maximum demand numbers for our working calculations.
3. For operation times, we have 10 samples of each operation for each part. We will take the maximum operation time for that part.

We will consider the times per operation includes setup time also.

1. We will arrange the respective operation times under each operation in routing logic.
2. From routing logic we also made the relationship diagram to form configurations and figure out the overlaps between machines.
3. Two clusters are formed with four part processes getting overlapped. For breaking the overlap we have duplicated the machines (since we already have a higher number of machines).
4. The clusters formed are: Wash (M3), Drill (M5), Lathe 2(M2), Mill (M6) and Oven (M7) for cluster 1 and Drill (M4) & Lathe (M1) for cluster 2. Duplicated machines are Wash (M3), Drill (M5), Mill (M6) and Oven (M7).

**Methodology** – Describe all the methods you used to develop the different production configurations.

* + You do not need to detail the steps of any algorithms. You do need to briefly describe the techniques your group decided to use
  + Include any transformations of the data to a format for a clustering algorithm, etc. (i.e. part-machine matrix)

# **Analysis of Results**

# **Recommendations and Next Steps**

* + Clearly identify your recommendations and the reasons why
  + Include the next steps for the project and any data that you will need

# **Appendix (optional)**

* + This section can contain extra information that you can reference to (i.e. detailed steps of Rank Order Clustering)