Roll No. : BM : 206

Exam No. :

THE SHETKARI SHIKSHAN MANDAL
SANGLI

THE SHETKARI SHIKSHAN MANDAL, SANGLI
Group of Institiute

Institute Name : BSCOER Narhe Pune Dept : Mechanical

Certificate

This is to certify that,

Mr. / Miss. Santosh Manik Mhetre

has successfully completed the term work in

Subject Industrial Engineering

as per the syllabus of Pune University during the

academic year 2018 - 2019

Sem. VIII th

Date :

Staff Member

Head of Department

THE SHETKARI SHIKSHAN MANDAL, SANGLI

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Name of the Institute : BSCOER, Narhe Campus : Narhe

Subject : Industrial Engineering

TSSM'S
BHIVRABAI SAWANT COLLEGE OF ENGINEERING & RESEARCH,
NARHE, PUNE-41

Department of Mechanical Engineering

Practical / TW report

Subject : IE.

Experiment / TW NO: 1

Name of Experiment / TW: Case study Based on method-study

Name of Student: Santosh Manik Mhetre. **Roll no:** BM.206

Class: BE-C **Year:** 2018-19

Conducted on :

Expected Date of Submission:

Actual Date of Submission:

Activity	Maximum Marks	Marks Obtained
Attendance	02	
Punctuality	02	
Quality of TW	03	
Oral	03	
Total	10	09

Checked By (Name of Faculty) : Prof. V.V. Mahindarkar.

Remarks;

Signature (Faculty)

TSSM
Page No. :

Tittle :- Case study based Assignment on method study.

Method study :- It is the process of subjecting work to systematic critical sorating to make it more effective and/or more efficient. It's one of the key's to acheving productivity improvement.

It was originally designed for the analysis & improvement of repetitive manual work but it can be used for all types of activity at all levels of an organisation.

The process is often seen as a linear, described by its main steps of :-

1] Select :- The work to be studied.

2] Record :- All the relevent facts about the present method.

3] Examine :- The facts critically & in ordered sequences, using the techniques best suited to the purpose.

4] Develop :- The most practical economic & effective method having due regard to all contingent circumstances.

5] Define :- The new method so that it can always be identified.

6] Install :- The method as standard practice.

7] maintain :- The method by regular routine checks.

Productivity improvement in Automobile industry by using method study.

Introduction: The work presented here is done in an automobile industry which engaged in making automobile parts such as engine cover, battery, tyre etc. this work takes intivative to implement method study technique to improve the work process in order to meet the customer demand.

Methodology:- The objective of present study is to improve the productivity in automobile industry by material handling system with the help of method study the company selected has been established in 1981 & is manufacturing plastic components of automobile parts such as engine cover, battery etc. During the study it was found that there were some in efficiencies related to material flow & overall material handling system to reach this given objectives the following specific methodology was adopted.

Method Study:- It is the first of two main division of method study & concened with the way in which were is done method study is essentially used for finding better way's of doing work. It is a technique for cost reduction. the philosophy of method study is that there is a better way of doing a job its technique for improing efficiency of every type of work ranging from that of complete factors.

Sr. No	Detail	Before implementation	After implementation.
1	No. of product produced in week	80×7 = 560	84×7 = 588
2	No. of product produced in month	80×30 = 2400	84×30 = 2520
3	No. of product produced in years	2400×12 = 28800	250×12 = 30240
4	Profit per years	28800×450 = = 12,960,000	30240×450 = = 13,608,000

conclusion :-

From the above discussion it can be concluded that the process can be improved based on method study work procedure & proper utilisation of machines & material it will improve the current process by reducing the transportation & reducing the works fatigue. After implementing the suggested improvement ideas the firm is able to increase its productivity.

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NARHE, PUNE-41

Department of Mechanical Engineering

Practical / TW report

Subject : IE

Experiment / TW NO: 2

Name of Experiment / TW: Hands on Assignment on application of work measurement techniques

Name of Student: Santosh Manik Mhetre. Roll no: BM: 206

Class: BE-C Year: 2018:19

Conducted on :

Expected Date of Submission:

Actual Date of Submission:

Activity	Maximum Marks	Marks Obtained
Attendance	02	02
Punctuality	02	02
Quality of TW	03	03
Oral	03	03
Total	10	10

Checked By (Name of Faculty) : Prof. V.V. Mahindrakar

Remarks;

Signature (Faculty)

Tittle: Hands on Assignment on application of work measurement techniques.

Defn.- It is the application of technique designed to establish the time taken for a qualified worker carry out a specificied Job at a defined level of performance

work measurement: 1) find out the different elements of the production.
2) find out the taken by each element
3) find the standard time for performing the production process

objectives & use of work measurement:
1) plan power planing
2) Production planning & scheduling
3) estimating productions cost
4) cost basis reduction & control
5) Rational basis for incentives
6) Performance apprisale
7) Traning of employes
8) comparing alternative methods
9) Accepting new order
10) fixing the selling cost.

Technique / ~~methods~~ / Type of WM:-
work measurement:- ① Historical Data Method
(2) time study
(3) work sampling
(4) synthesis Method
(5) Predetermined motion Time system (PMTS)

method of measurement:-

1) Historical data method:- Historical data method uses the past-performance data. Here past performa standards.

2) Time study: Time study with help of stop watch is the mo econommonly used work measurment method. Th technique was developed by Frederit win stew Taylor (1856-1 Time study procedure consists of the following steps
1) select the job to be timed
2) Standardize the method of doing the job.
3) select the worker to be studied.
4) Record the necessary details for the job & conditions of the j
5) find alt the time taken to every single element keep provisions for relaxation etc.

3) work sampling:- work sampling method was original developed by leonard Henry caleb Tiffett (1902-1985) in Britain in 1934 in this technique the work are observed many times at random its done to find out for how much time the worker is actually on the job. It checks how long the is working & how much time he is not work (idle time) work sampling method involves falowing there main steps.

4) Synthesis method: In synthesis method, the full job is first devided into element. then the time taken to do each element of the jobis foundout & synthesised this gives the total time taken for doing the full job is found

From previous time studies so this technique gives importance to post-time studies of similar job it also uses standard data.

Standard data is the normal time taken for doing routine jobs standard data is easy available for routine job like fitting screw, drilling holes etc so there is no need of calculating these times repeatedly most companies use standard data. They do not want time doing studies for all elements of the job.

For example a job publishing of book contains four elements viz typing, editing, printing & binding. The time taken for doing each elements is first round out suppose typing take 60 days editing take 30 days, printing take 20 days & binding takes 10 days. Then the time taken to do all the elements are totaled that is it.
take 60+30+20+10 = 100 days publish a book. This information is taken from previous time studies or other printing jobs or from the standard data.

Procedure For conducting stop watch time study

1) Selection of task to be timed
2) Standarize the method at working
3) Select the operator for study
4) Record the details
5) Break the take into element
6) Determine number of cycles to be measure
   It is important to determine & measure the number of cycle that nuds to be observed to arrive at accurate average time. A guide for two number of cycles to be timed based

on total number of minutes per cycle is shaon in below.

minuts/ Percycle	TO 0.1	TO 0.25	TO 0.50	TO 0.75	TO 1.0	TO 2	To 5	To 10	To 20	To 40	To
No. of cycle Recommended	200	100	60	60	30	20	15	10	8	5	

Determine standard rating

Skill			Effort		
+0.15	A_1	Superskill	+0.13	A_1	Superskill
+0.13	A_2		+0.12	A_2	
+0.11	B_1	Excellent	+0.10	B_1	Exellent
+0.08	B_2		+0.08	B_2	
+008	C_1	Boad	+0.05	C	Good
+0.03	C_2		+0.02	C_2	
0.00	D	Average	0.00	D	Averge
-0.05	E_1	fair	-0.04	E_1	Pair
-0.10	E_2		-0.08	E_2	
-0.16	F_1	poor	-0.12	f_1	poor
-0.22	f_2		-0.77	f_2	

BSA rating for the the selected work

Criteria	Rating	Numerical value
Skill	B_2	+0.2
effort	B_2	+0.02
Condition	C	+0.02
Consistancy	C	+0.01

Therefore performance rating factor.
$= 1 + 0.03 + 0.02 + 0.01 = 1.13 = 13.3\%$.

8) Calculate the Normal time :-
The observed time cannot be the actual time required to perform the whole for worker
Normal time = observed time x Rating.

10) Determine the allowances : A worker can not work all the day continously will received time for rest going for toilet, drinking water, etc. unavoidable delays may occer due to tool breakage etc. this extratime is known as allowances

11) Determine the standard time. - The standard time is the sum of Normal time & allowances. thus it is calculated or bellow

Standard time = Normal time + Allowances

observed time	Rating factour	Relaxation allowance	contigency allowance
Base time.			
Standard time.			

equipments used to measure time during stop watch :
1) Digital or electronics stop watch
2) observation board
3) observation sheet
4) Stationary Pen, Penal, Eraser, Calculator

Time study form

fatique allowances = 4.1.
personal allowances = 5.1.
mental staing = 5.1.
Atmospheric allowances = 5.1.
Total allowances = 19.1.

critical	Rating	Numerical value
skill	A1	+0.15
effort	D1	+0.1
condition	C	+0.02
consistancy	D	00

Performance Rating factor = 1 + 0.15 + 0.1 + 0.02 = 1.27

Time study form

Date
Time study Engineer
product - sheet metal Tray
operations

Description
No. of cycle
Standard time. = 19.63 min
found

element description	observed time			At (min)	Pr	Nt	Allowances	St = N Allowance
marking	2.5	2.1	2.22	2.23	2.31	1.27	2.93	19	3.49
cutting	6.2	6	6.1	59	6.02	1.27	7.65	19	9.10
pressing	2.3	2	2.1	2.1	2.14	1.27	2.72	19	3.23
finishing	2.4	2.1	2.8	3	2.52	1.27	3.20	19	3.81
						Total		19.6

Conclusion:- After performing time for sheet metal job it found that there some unnecessary moment which leads to consume extra time After performing time study standard time for the job established

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NARHE, PUNE-41

Department of Mechanical Engineering

Practical / TW report

Subject : IE

Experiment / TW NO: 3

Name of Experiment / TW: Assignment on simulation of Routing & Scheduling model

Name of Student: Santosh Manik Mhetre Roll no: BM: 206

Class: BE-C Year: 2018-2019

Conducted on :

Expected Date of Submission:

Actual Date of Submission:

Activity	Maximum Marks	Marks Obtained
Attendance	02	02
Punctuality	02	02
Quality of TW	03	03
Oral	03	02
Total	10	09

Checked By (Name of Faculty) : Prof. V.V. Mahinderkar.

Remarks;

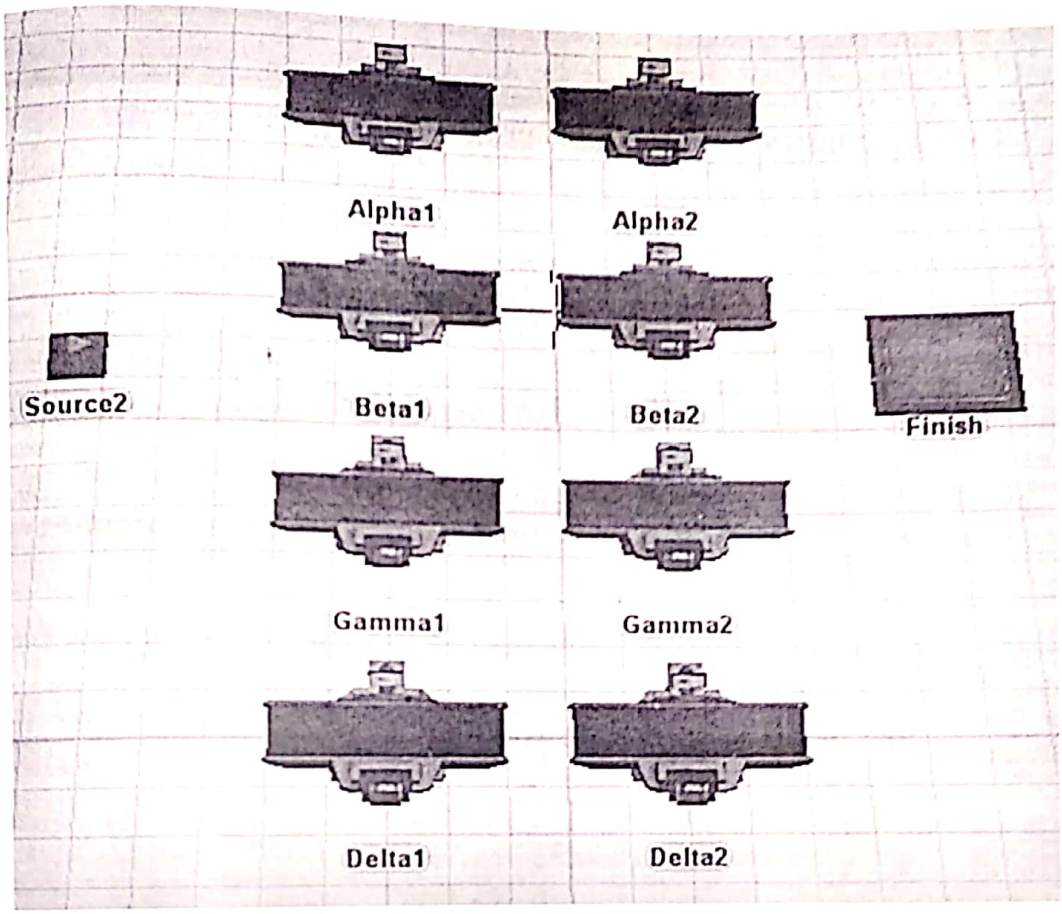
Signature (Faculty)

Experiment No: 1

Aim: Assignment on simulation of Routing & Scheduling Model

Software : Flexsim 2018.

Problem statement: Do the simulation for Routing & Scheduling of given plant layout in FlexSim 2018. Use the following resources, task executers and parameters. Build a model that uses lists for routing items in a simple job shop model. The following image shows the basic layout, namely a source, 8 processors, and a finish queue.



As the image shows, there are basically four types of operations:

- Alpha - 2 Stations
- Beta - 2 Stations
- Gamma - 2 Stations
- Delta - 2 Stations

In this model we will have 3 different types of products, designated by item type. Each type has a unique sequence of operations that must be performed on the part before it is finished. The following table shows the manufacturing steps required for each type.

Sequence of material flow

Sr. No	Item Type 1	Item Type 2	Item Type 3
1	Alpha	Gamma	Beta
2	Beta	Delta	Alpha
3	Gamma	Beta	Beta
4	Delta	Gamma	Alpha
5	Finish	Delta	Delta
6	--	Beta	Gamma
7	--	Finish	Delta
8	--	--	Finish

Colour indicator for the different type of product

Sr. No	Item Type 1	Item Type 2	Item Type 3
1	Green	Red	Blue

Sr. No.	Task Executers / Resources	Parameters
1.	Source	Input is unlimited.
2.	Alpha	QTY:1 at time and process time :5 minutes
3.	Queue	Qty :1 capacity 1000 units
4.	Beta	QTY:1 at time and process time :10 minutes.
5.	Queue	Qty :1 capacity 1000
6.	Gamma	QTY:1 at time and process time :15 minutes.
7.	Queue	Qty :1 capacity 1000
8.	Delta	QTY:1 at time and process time :5 minutes.
9.	Sink 1	output
10.	Sink 2	output
11.	Sink 3	output

Run model for 48 hours. (24*60 =1440minutes)

Find:

1) Total Part arrived and dispatched.

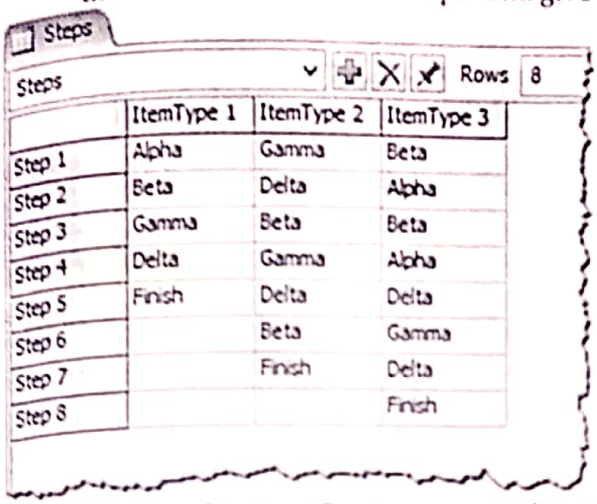
2) Average time required for part to dispatch.

3) Average work in progress.

Procedure:

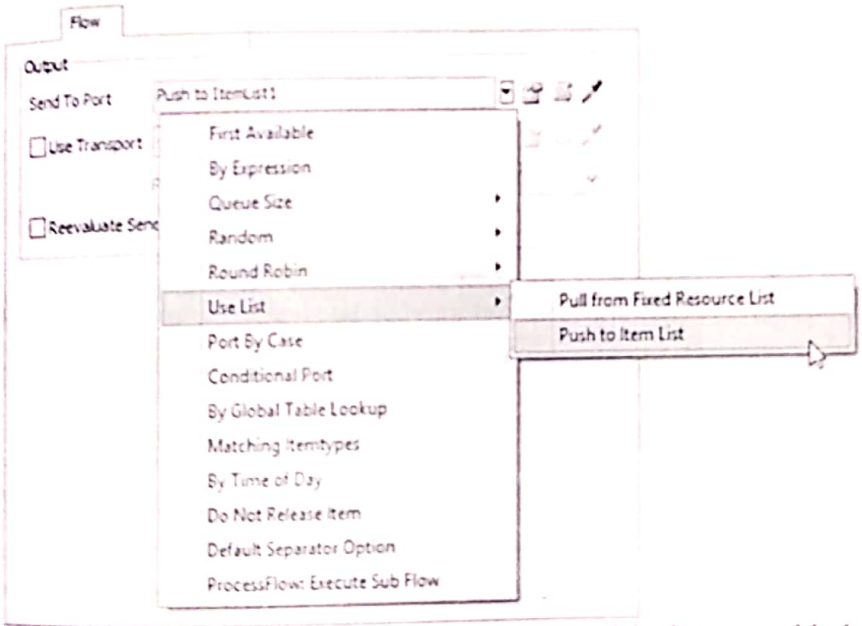
Model Building Steps

1. **Add an Item List** - In the **Toolbox**, press the button and choose **Global List > Item List**from the drop-down menu. This will add an Item List to the model. For now you can close the List properties window.
2. **Add the Steps Table** - In the **Toolbox**, press the button and choose **Global Table** from the drop-down menu. In the table view, define the name of the table as "Steps" and give it the following data:

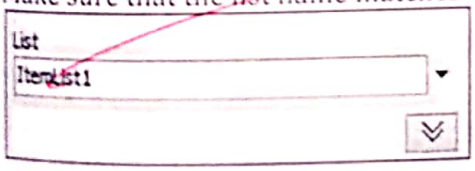


	ItemType 1	ItemType 2	ItemType 3
Step 1	Alpha	Gamma	Beta
Step 2	Beta	Delta	Alpha
Step 3	Gamma	Beta	Beta
Step 4	Delta	Gamma	Alpha
Step 5	Finish	Delta	Delta
Step 6		Beta	Gamma
Step 7		Finish	Delta
Step 8			Finish

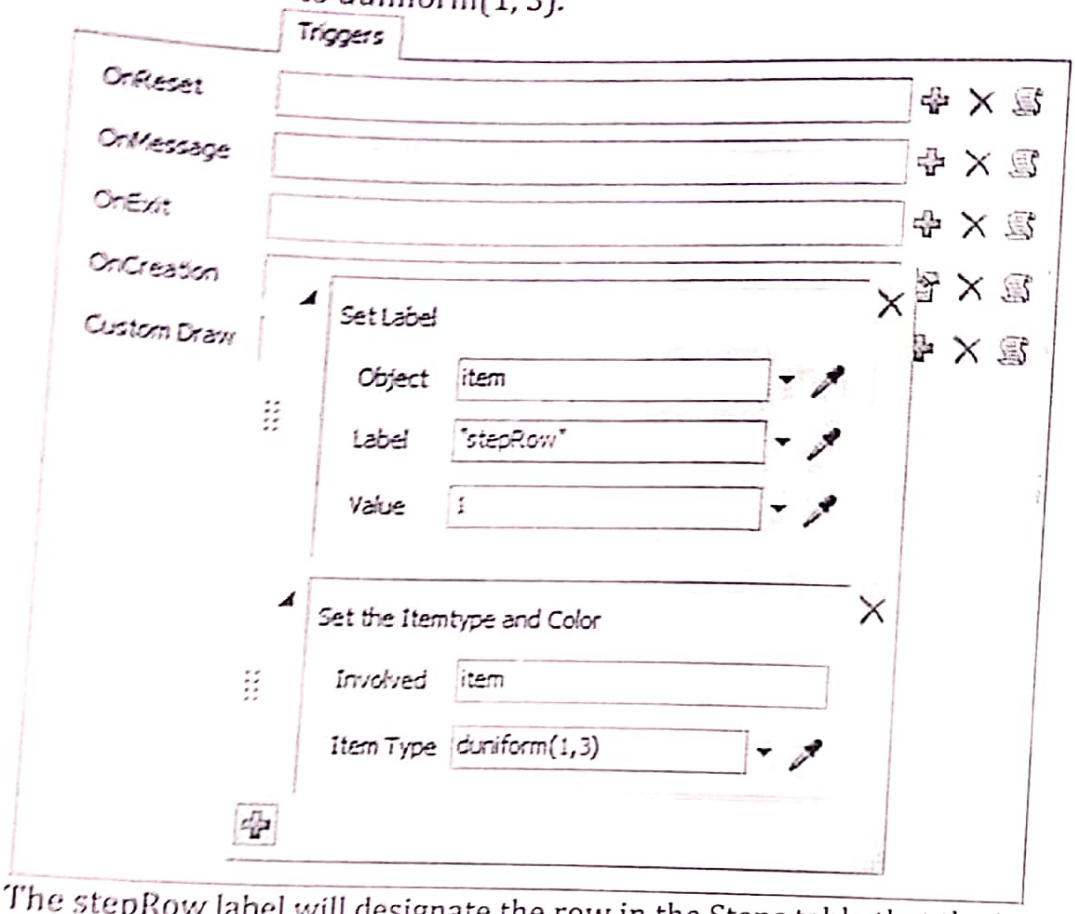
3. **Create a Source** - Create a source object in your model.
4. **Define Source Properties** - Double-click on the source.
    1. Give the source an **Inter-Arrivaltime** of exponential(0, 30, 0).
    2. Select the **Flow** tab. Under **Send To Port**, press the drop-down button and choose **Use List > Push to Item List**.



Make sure that the list name matches the name of the list you added.

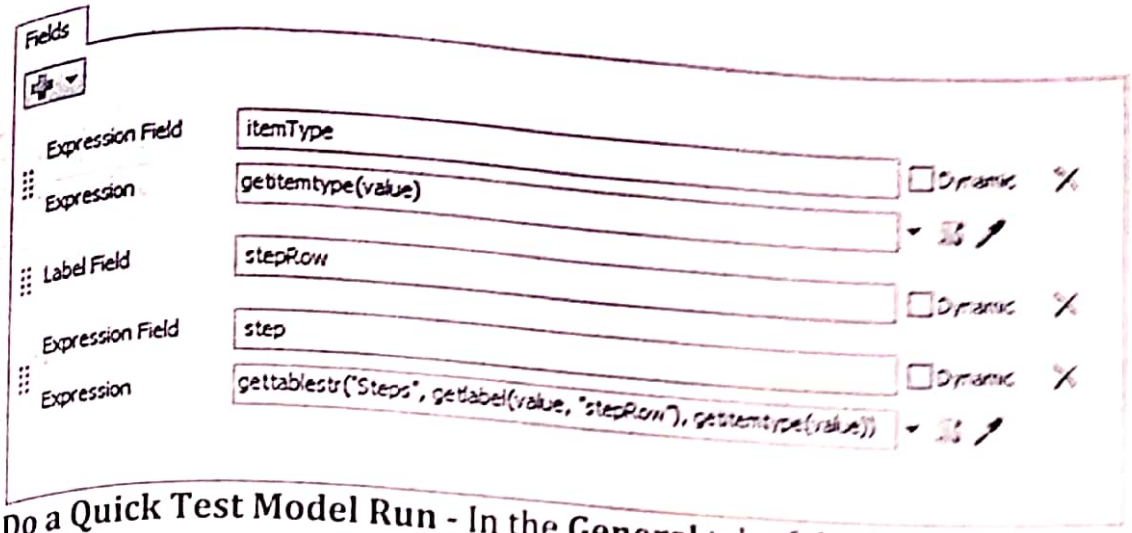


3. Select the **Triggers** tab in the Source properties. In the **OnCreation**, add triggers to set a label named stepRow to 1, and set item type and color to duniform(1, 3).

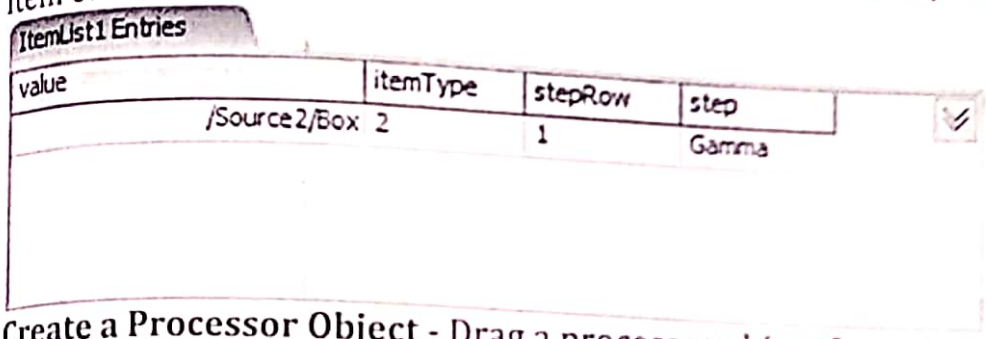


The stepRow label will designate the row in the Steps table that the item is currently on. After each operation, the stepRow label will be incremented.

5. **Define List Fields** - Go back to the Item List's properties (double-click the Item List in the ToolBox). For this model we will use the following fields:
   - **stepRow** - This field will reference the current stepRow label on the item. We'll use this to prioritize items who are further into their process (ORDER BY stepRow DESC).
   - **step** - This field will reference the name of the current step that the item is on, e.g. Alpha, Beta, Gamma, or Delta. We will use it to match against the station that will pull from the list.
   - **itemType** - This field will not be used in any queries. Rather it will be used to better visualize the items that are on the list.
4. In the Item List's **Fields** tab, remove all fields but itemType
5. Add a **Label** field named stepRow.
6. Add an **Expression** field and give it the expression gettablestr("Steps", getlabel(value, "stepRow"), getitemtype(value)).
   In expression fields you use "value" to access the primary value on the list. This expression gets a value from the Steps table (gettablestr("Steps", ...) where the row is the item's current stepRow (getlabel(value, "stepRow")), and the column is the item's type (getitemtype(value))
7. Press **Apply** in the List properties window.

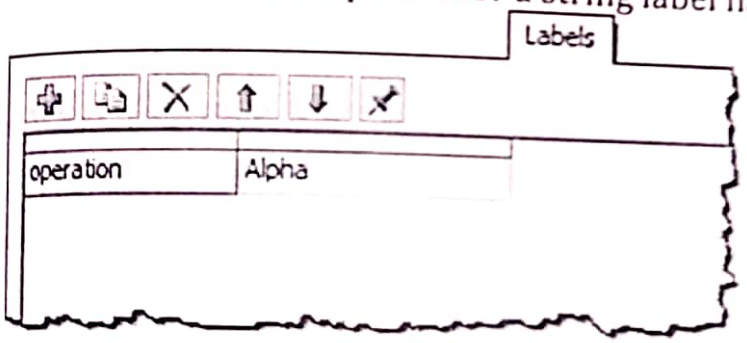


Do a Quick Test Model Run - In the **General** tab of the List properties, click **View Entries...** to open a window showing current entries on the list. Reset and run the model just to test that the source is properly assigning the data and pushing the item onto the list. After the source's first inter-arrival time has expired, the list should get an item on it.

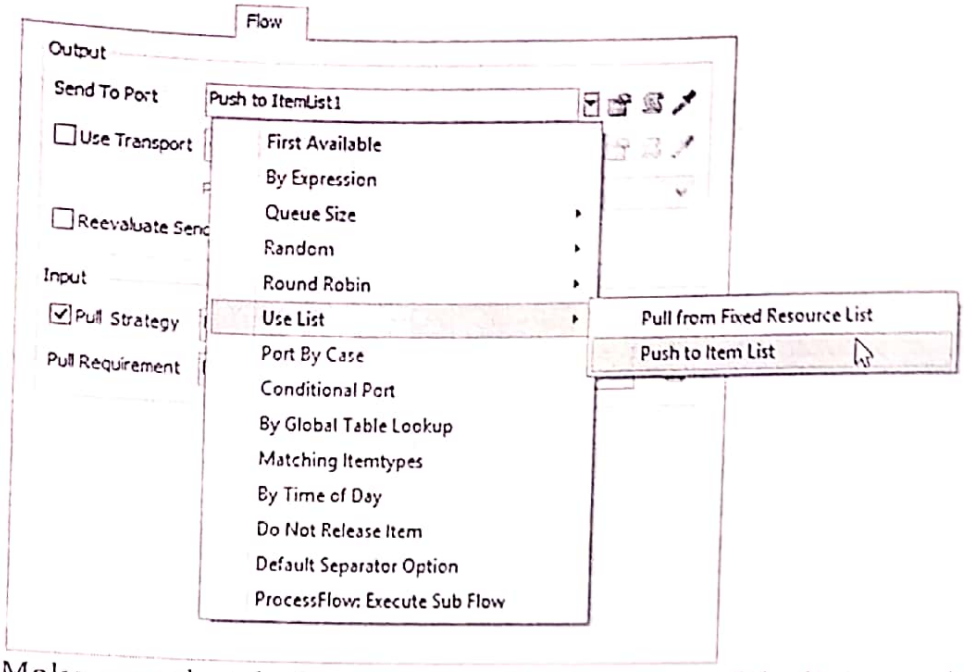


Create a Processor Object - Drag a processor object from the library into the model.
Define Processor Properties - Double-click on the processor.

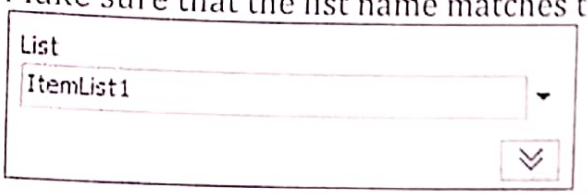
0. Name the process Alpha1
1. Give the processor a string label named operation. Set the value to Alpha.



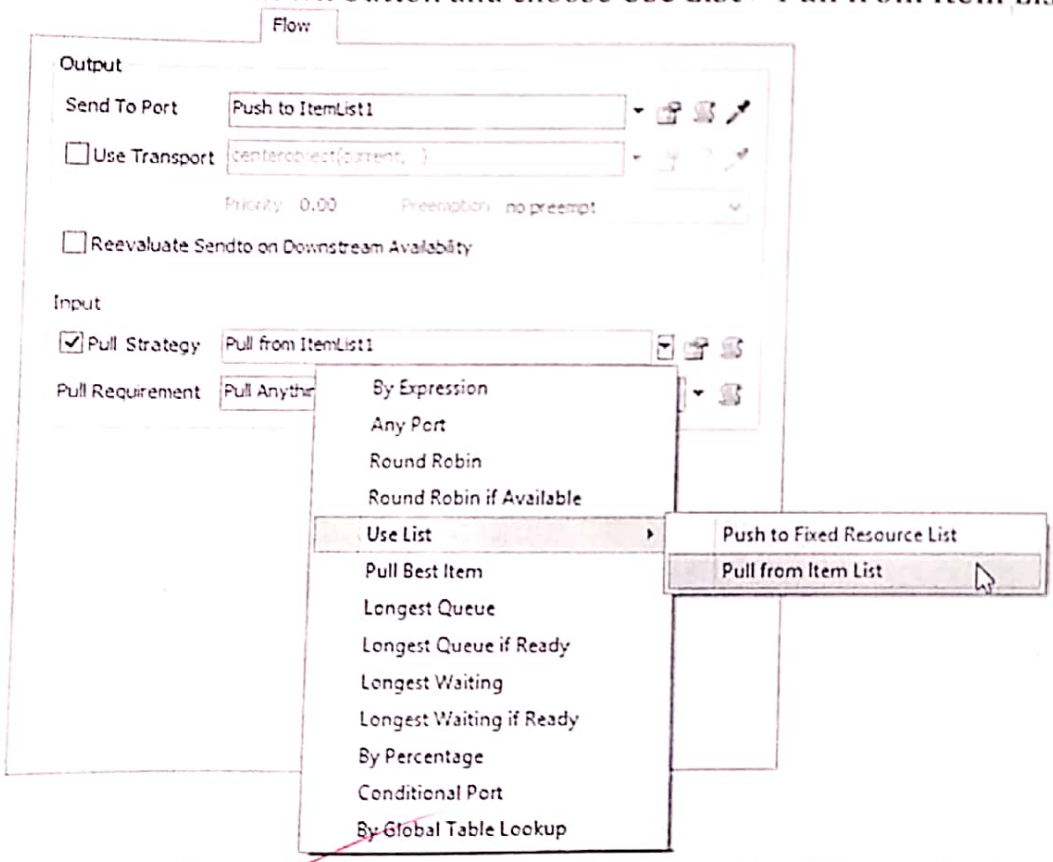
2. Select the **Flow** tab. Under **Send To Port**, press the drop-down button and choose **Use List > Push to Item List.**



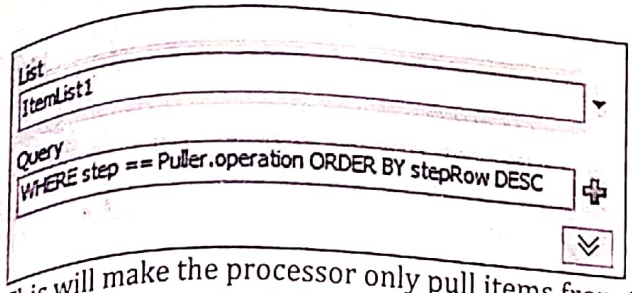
Make sure that the list name matches the name of the list you added.



3. In the **Input** pane, check **Pull**, then under **Pull Strategy**, press the drop-down button and choose **Use List > Pull from Item List**.

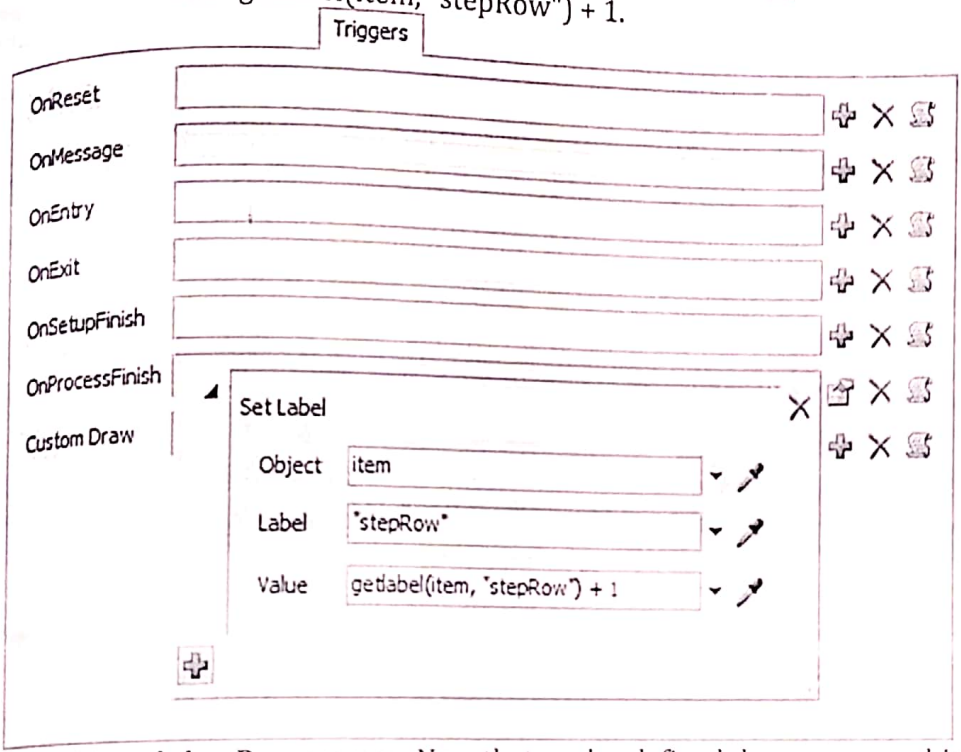


Make sure that the list name matches the name of the list you added, and define the **Query**as WHERE step == Puller.operation ORDER BY stepRow DESC.



This will make the processor only pull items from the list whose step field matches the processor's operation label. It will also prioritize items with the highest stepRow label, i.e. items that are further along in their steps.

4. Select the **Triggers** tab. In **OnProcessFinish**, add a trigger to set the stepRow label. In the **Value** field for the trigger, enter the code getlabel(item, "stepRow") + 1.



Define Remaining Processors - Now that you've defined the processor object, you can copy/paste the other processors from that object. Define a second Alpha processor (copy/paste it). Define two Betas, two Gammas, and two Deltas by copy/pasting the original processor, and change the pasted objects' operation label to its corresponding operation (Beta, Gamma or Delta).

Add a Finish Queue - Drag a queue from the library. The queue will have much of the same properties as the processors. It will be the queue to dump the items when they reach their Finish step.

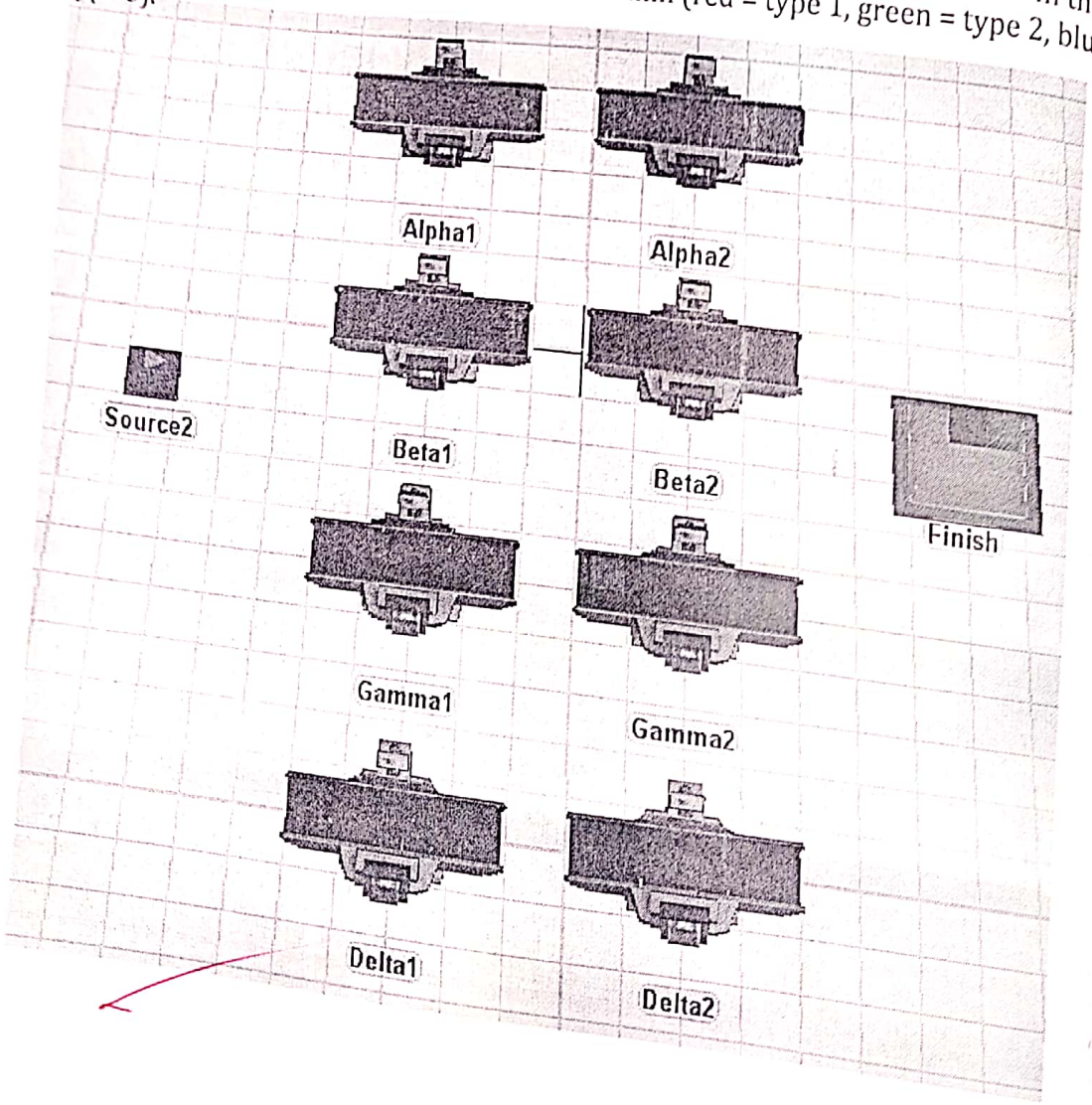
0. Name the queue Finish
1. Give it an operation label with the value Finish
2. In its **Flow** tab, check **Pull** and under the **Pull Strategy** choose **Use List > Pull from Item List**.
3. Define the pull query as WHERE step == Puller.operation. We don't need to prioritize here because it's essentially a sink.

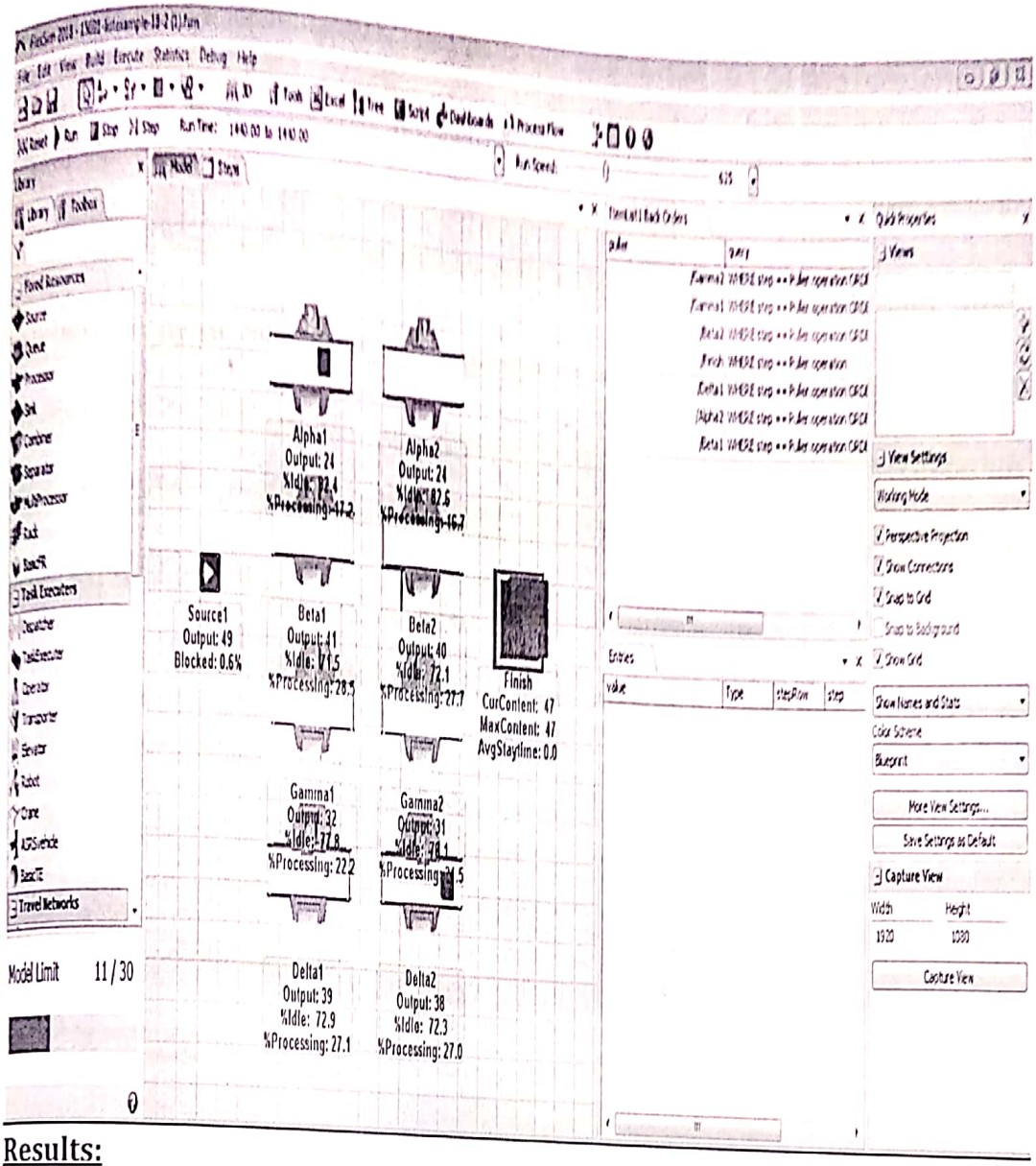
Run the Model - Now you should be able to reset and run the model. You may also want to go back to the Item List and view its back orders. Right-click on the list in the **Toolbox**, and select **View Back Orders**.

ItemList1 Back Orders

puller	query	requested	required
/Alpha1	WHERE step == Puller.operation ORDER BY stepRow DESC	1	1
/Alpha2	WHERE step == Puller.operation ORDER BY stepRow DESC	1	1
/Beta1	WHERE step == Puller.operation ORDER BY stepRow DESC	1	1
/Beta2	WHERE step == Puller.operation ORDER BY stepRow DESC	1	1
/Gamma1	WHERE step == Puller.operation ORDER BY stepRow DESC	1	1
/Gamma2	WHERE step == Puller.operation ORDER BY stepRow DESC	1	1
/Delta1	WHERE step == Puller.operation ORDER BY stepRow DESC	1	1
/Delta2	WHERE step == Puller.operation ORDER BY stepRow DESC	1	1
/Finish	WHERE step == Puller.operation	1	1

As the model runs you should see items moving through the various processors in the order defined in their associated Steps table column (red = type 1, green = type 2, blue = type 3).





Results:

Objectives	Result:
Total Part Arrived	
Total Part dispatched	
Average time required to dispatched the part	
Average work in progress	

Conclusion.

Plant manufactures 3 kinds of product, having 8 processor (alpha, beta, gamma and delta). It is difficult to schedule the sequence of flow of material manually. Simulation software plays important role in this to schedule the flow without creating any bottleneck. Here, types of product are only three, if number of types of product get increased then complexity will increase. in such situation simulation software will play a important role.

TSSM'S

BHIVRABAI SAWANT COLLEGE OF ENGINEERING & RESEARCH,
NARHE, PUNE-41

Department of Mechanical Engineering

Practical / TW report

Subject : IE

Experiment / TW NO: 4

Name of Experiment / TW: Assianment on analysis service operation & capacity planing.

Name of Student: Santosh Manik Mhetre Roll no: BM:206

Class: BE-C Year: 2018-19

Conducted on :

Expected Date of Submission:

Actual Date of Submission:

Activity	Maximum Marks	Marks Obtained
Attendance	02	02
Punctuality	02	02
Quality of TW	03	03
Oral	03	02
Total	10	09

Checked By (Name of Faculty) : Prof. V. V. Mahinderkar

Remarks;

Signature (Faculty)

Experiment No: 2

Aim: Assignment on analysis Service Operation for Capacity Planning.

Software : Flexsim 2018.

Problem statement: Do the analysis of given plant layout for capacity planning in FlexSim 2018. Use the following resources, task executers and parameters.

Sr. No.	Task Executers / Resources	Parameters
1.	Part	Arrival time time uniform (5,7) minutes .
2.	Processor 1	QTY:1 at time and process time :10 minute
3.	Processor 2,3,4	Qty :1 for each capacity 1000, process time uniform (7,12) minutes each
4.	Processor 5,6,7	Qty :1 for each capacity 1000, process time uniform (12,25) minutes each
5.	Operator	Qty :4

Run model for 24 hours. (24*60 =1440minutes)

Find:

1) Total Part arrived and dispatched.

2) Average time required for part to dispatch.

3) Average work in progress.

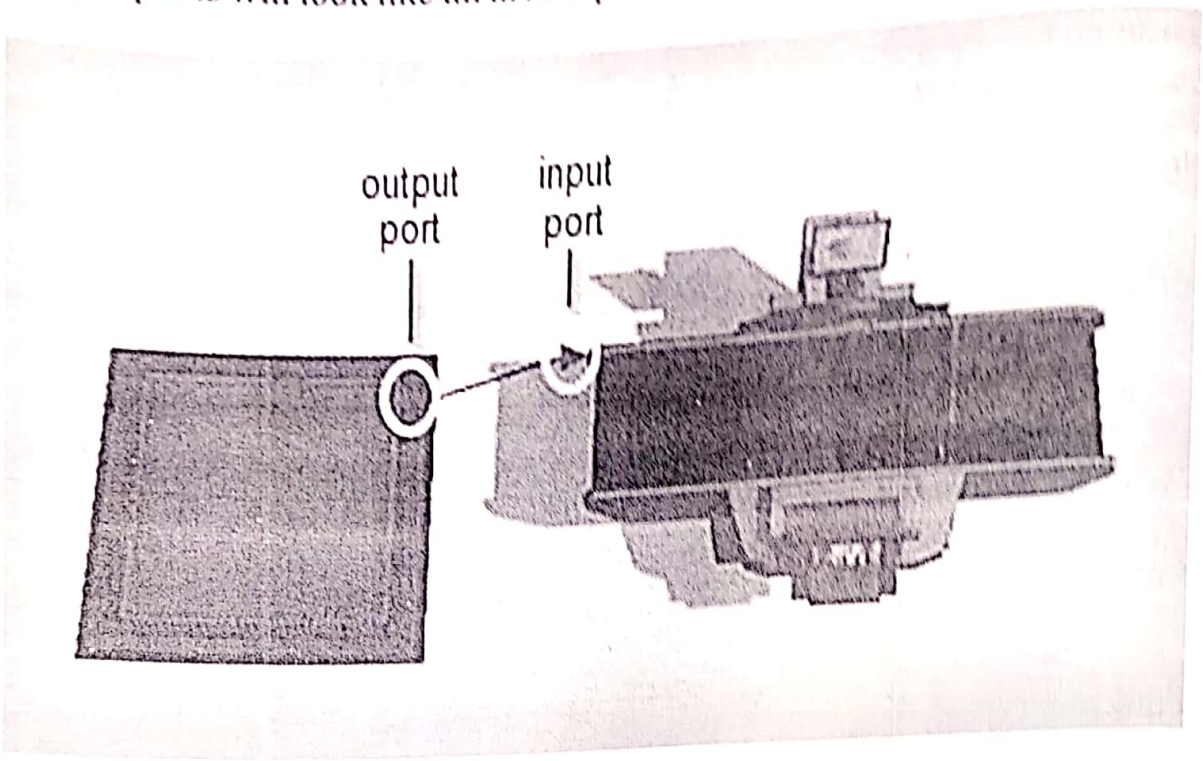
4) Machine utilization.

5) Find out the capacity of to produce good in 1440 minutes.

Procedure:

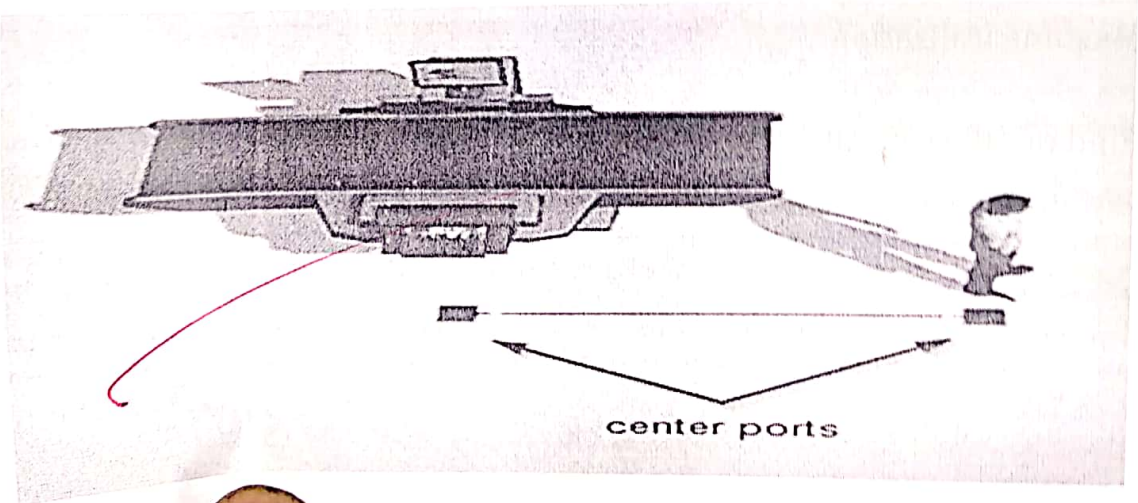
Input / Output Ports (A-Connects)

Input/output ports are graphically represented as a small red or green triangle. Input ports will look like an arrow pointing in toward the object. Output ports will look like an arrow pointing away from the object.



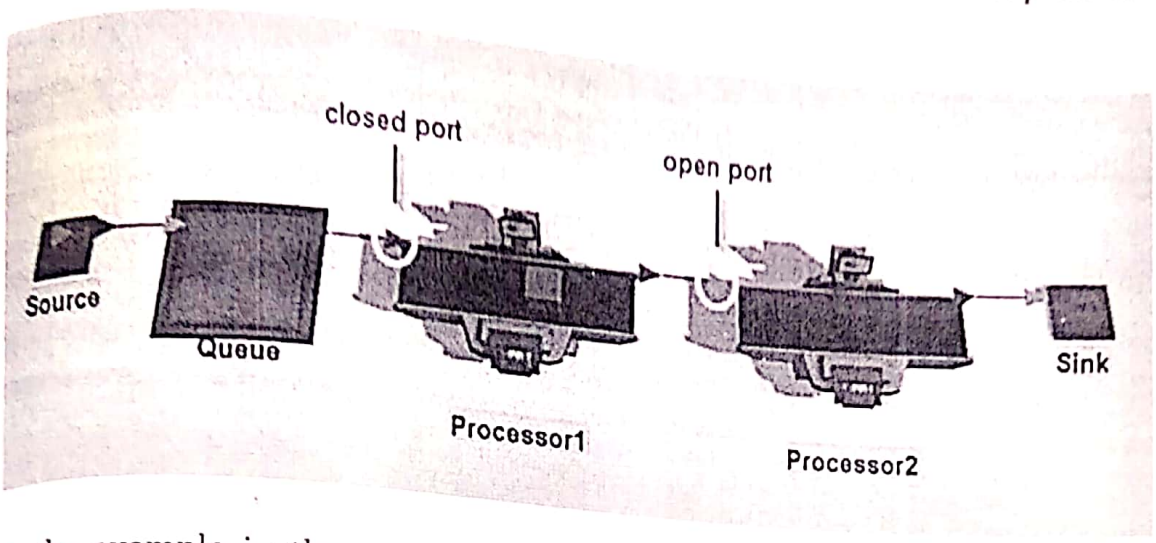
Center Ports (S-Connects)

Center ports are usually used to connect task executers to fixed resources, but they can connect any two objects that need to reference each other. When the center ports of two objects are connected, it creates an abstract reference point between those two objects. Center ports enable objects to communicate or interact in complex ways:



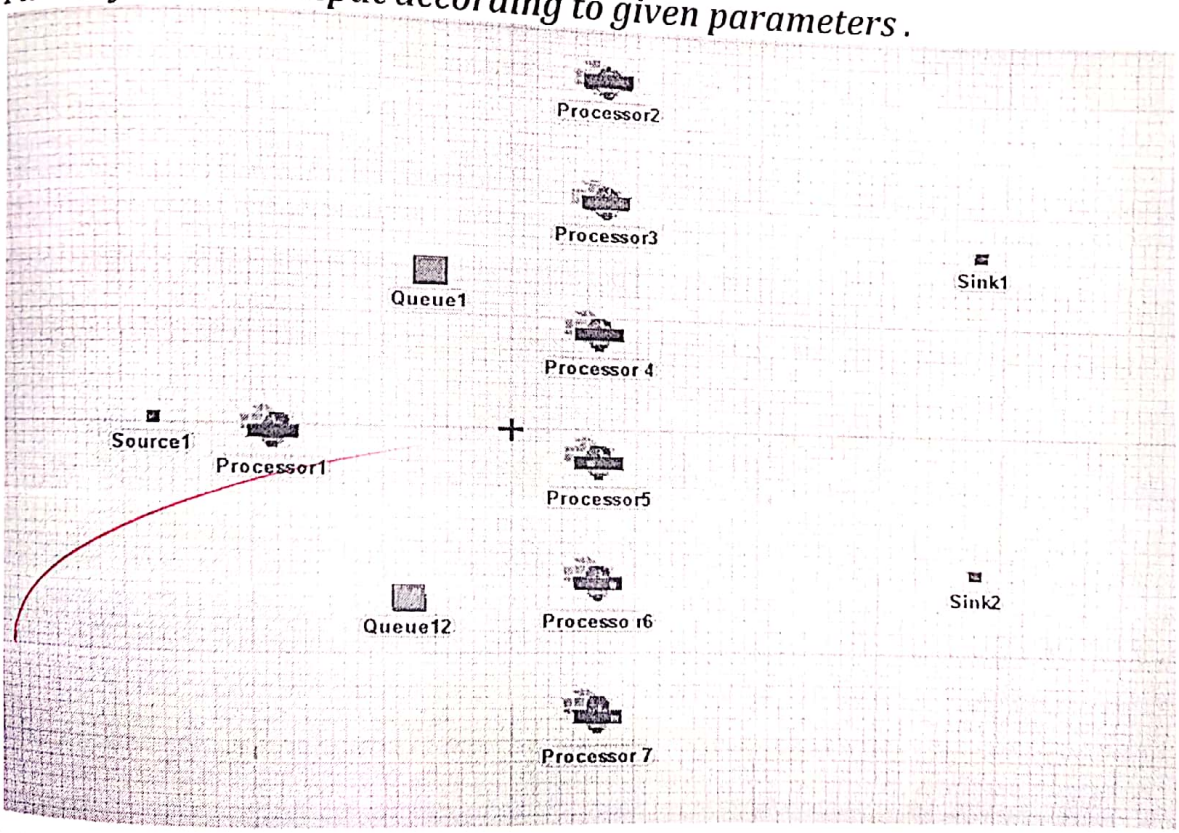
Open and Closed Ports

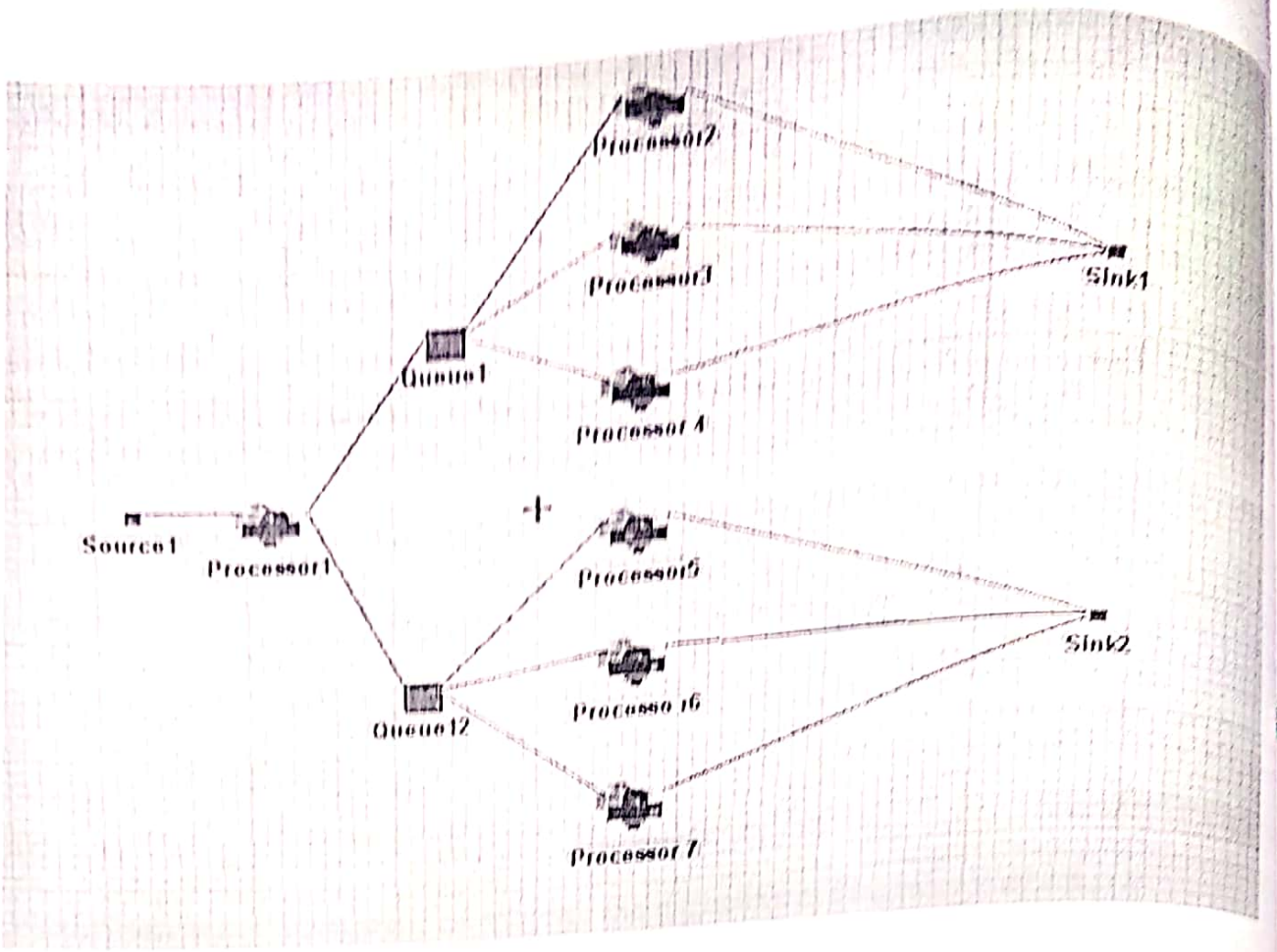
Another important concept you should understand about ports is how to know when a port is open or closed and why. Simply put, an open port is ready to push or pull flow items. A closed port is not ready to push or pull flow items. During a simulation run, open ports are green and red ports are closed:



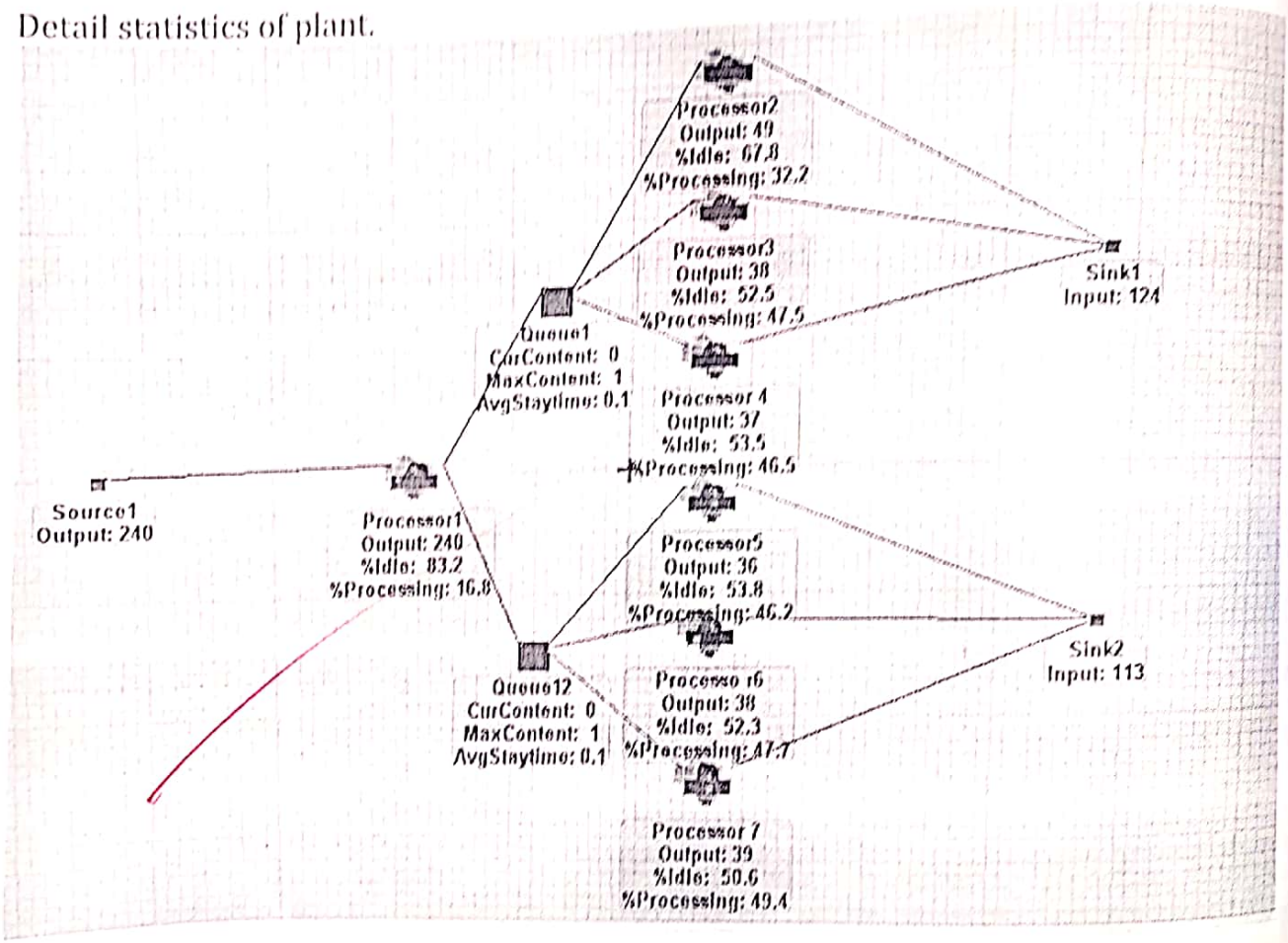
In the example in the previous image, the first processor's input port is closed because it is processing a flow item and cannot accept any more items. The second processor's input port is open because it is available to process flow items.

Plant layout and output according to given parameters .





Detail statistics of plant.



Results:

Objectives	Before
Total Part Arrived	240
Total Part dispatched/capacity of plant.	237
Average time required to dispatched the part	1440/237 =
Average work in progress	240-237=
Processor1	16.8 %
Processor 2	32.2 %
Processor 3	47.5 %
Processor 4	46.5 %
Processor 5	46.2 %
Processor 6	47.7 %
Processor 7	49.4%

Conclusion.

With help of simulation software it is very easy to analyse plant layout. Percentage utilization of each processor affects on the capacity of plant. Percentage utilization of given plant is near to 50%.It means that if plant is fully utilized up to its capacity then production can be increased twice as of now.

TSSM'S

BHIVRABAI SAWANT COLLEGE OF ENGINEERING & RESEARCH,
NARHE, PUNE-41

Department of Mechanical Engineering

Practical / TW report

Subject : IE.

Experiment / TW NO: 5

Name of Experiment / TW: Case study based on supply chain model

Name of Student: Santosh Manik Mhetre

Roll no: BM-206

Class: BE C

Year: 2018-19

Conducted on :

Expected Date of Submission:

Actual Date of Submission:

Activity	Maximum Marks	Marks Obtained
Attendance	02	02
Punctuality	02	02
Quality of TW	03	03
Oral	03	03
Total	10	10

Checked By (Name of Faculty) : Prof. V.V. Mahinderkar.

Remarks;

Signature (Faculty)

TSSM
Page No. :

Tittle: Case study based on supply chain model.

Aim: Case study of supply chain management of DELL computers.

Introduction:- It is a bussiness practice that has been employed in order to give an effective service to customers & to make the bussiness suitainable by considering all the aspects from the suppliers to consumers its main objective to fullfill customer demands by adding value to the products & service.

Dell is a computer technology corporation that develops repairs & support. Dell has released that supply chain is becoming more & more important for the success of today's bussiness world.

Scope of study: Here in this study the supply chain process that are utilised by DELL will be taken into consideration which is known to be one of the best in world

Supply chain of DELL:-

Suppliers → PC Dealers → Distribution → Retailer, Reseller → final customer.

Indirect PC Value chain

Suppliers → Dell → final customer

Direct PC Value chain

Dell has a different bussiness model than its competitors which can be identified as direct model' in this model DELL sells its PC directly to customers without using a retaill channel therefore it creates a direct relationship with each individual customer which they have segmented into groups to make it eaiserto approach

Mainly there are 3 customer segments which can be illustrated as large organisation, small & mediym busniess & personal consumer

The other aspect that make Dell's supply chain unique is the build to order strategy. According to this once the order is placed by the customer all configuration details are sent to the manufacturing floor & then the assembly of PC begins once the customer is built & all the software are downloaded it will be shipped to customer by using 3PL.

Supply chain activities involved in managerial levels:-

for the supply chain to be strategically effective it has to be implemented in all the levels of DELL. strategic, tactical & operational supply chain practies are being made use of in the strategic level desicions will be made regarding the whole organisation considering the supply chain. These decision are critical since it reflects the overall corporate strategy of the company.

Senior management of DELL is giving the strategic direction when considering the product that the company should manfacturing & other to their customers especially the customer segments are identified

The middle level management team has responsibility of this. There is more significance when it comes to the operational level. All the supply chain activities in Dell are done throughly by this customer.

The Role of supply chain in maximising profit in Dell:-

Dell is able to sustain a competitive advantage over competitors in the computer industry because of an extemly efficient supply chain. Asso Dell has been able to achieve suppriar profit in the industry since they area a knowlegeable in area of information, communitations web technologies etc

DELL implement Just in Time (JIT) inventory system which operate on only six days of inventory.

DELL is also having strategic allances with other companies to have their products sold on DELL's direct selling distribution channel.

The value chain of DELL:-

Inbound logistics → operation → out-bound logistics → marketing & sales services → collection services * productivity * ordering.

① Time * quality expectation * on time delivery
② request * over fullfillment * customer pickup * customer locking
③ Processing * Transaction
* self return ① plant scheduling
② plant capacity
③ proximity to plant

According to this value chain plays a vital role in their demand analysis which can't be considered as the as always since there are visible occasions when their some prices go down drastically.

TSSM
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Conclusion :-

Even though it is said to be that their refation is deep with customer in the srilankan content it quid visible that the service is not the greatest among all infact DELL is losing its market share with the rising other PC procedure which is quiet evident in recent share price of DELL

Having a direct relation with customer is good strategy but considering big customers who are going to be retailers in that context can be threat to this supply chain.

TSSM'S

BHIVRABAI SAWANT COLLEGE OF ENGINEERING & RESEARCH,
NARHE, PUNE-41

Department of Mechanical Engineering

Practical / TW report

Subject : IE

Experiment / TW NO: 6

Name of Experiment / TW: Analysis of selected plant layout modeling & simulation for Bottleneck

Name of Student: Santosh Manik Mhetre.

Roll no: BM 206

Class: BE-C.

Year: 2018-19

Conducted on :

Expected Date of Submission:

Actual Date of Submission:

Activity	Maximum Marks	Marks Obtained
Attendance	02	02
Punctuality	02	02
Quality of TW	03	03
Oral	03	02
Total	10	09

Checked By (Name of Faculty) : Prof. V.V. Mahinderkar.

Remarks;

Signature (Faculty)

Experiment No: 3

Aim: Analysis of selected plant layout modelling and simulation for bottleneck /line balancing

Software : Flexsim 2018.

Problem statement: Do the analysis of given plant layout in FlexSim 2018. Use the following resources, task executers and parameters.

Sr. No.	Task Executers / Resources	Parameters
1.	Source	Input is unlimited
2.	Lathe	QTY:1 at time and process time :10 minute
3.	Queue	Qty :1 capacity 1000
4.	CNC	QTY:1 at time and process time :5 minute
5.	Queue	Qty :1 capacity 1000
6.	Drill	QTY:1 at time and process time :7 minute
7.	Queue	Qty :1 capacity 1000
8.	Mill	QTY:1 at time and process time :15 minute
9.	Transporter	QTY:1 at time
10.	Sink	output

Assign operator for the each Processor. (Lathe, Drill, Mill ,CNC)

Run model for 48 hours. (48*60 =2880minutes)

Find:

1) Total Part arrived and dispatched.

2) Average time required for part to dispatch.

3) Average work in progress.

4) Check for bottleneck.

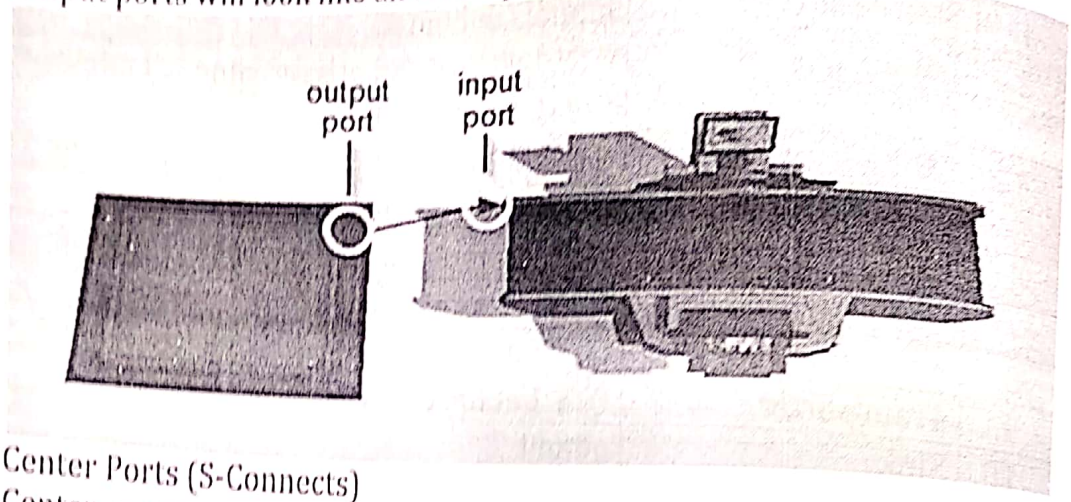
5) If bottleneck is there then suggest solution.

Procedure:

Input / Output Ports (A-Connects)

Input/output ports are the most common types of port connections. These ports are usually used to connect two fixed resources together so that they can exchange flow items. The output port of an upstream object is connected to the input port of a downstream object. An output port is where the flow item exits the object and an input port is where the flow item enters the object.

Input/output ports are graphically represented as a small red or green triangle. Input ports will look like an arrow pointing in toward the object. Output ports will look like an arrow pointing away from the object.



Center Ports (S-Connects)

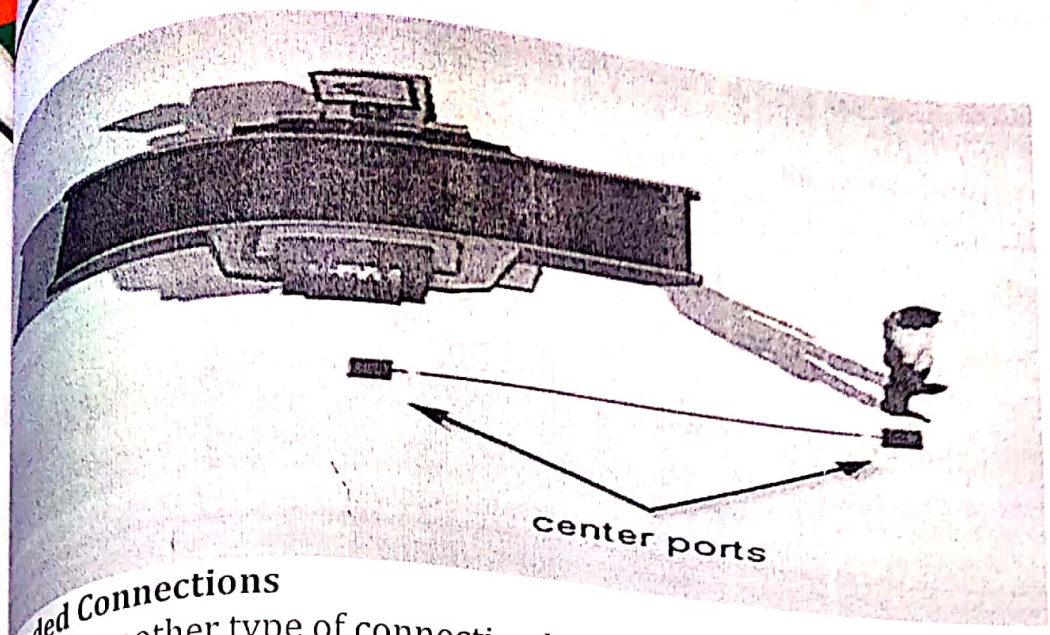
Center ports are usually used to connect task executers to fixed resources, but they can connect any two objects that need to reference each other. When the center ports of two objects are connected, it creates an abstract reference point between those two objects. Center ports enable objects to communicate or interact in complex ways:

Transporting flow items - Fixed resources can use the task executers connected to their center ports to transport flow items to a downstream fixed resource.

Setting up and processing - Some fixed resources have setup and processing times (processors, combiners, separators, multi-processors). These objects can require the presence of a task executer connected to their center ports during setup and processing times.

General reference - Objects can have center port connections in order to communicate with or reference each other.

In FlexSim, center ports are graphically represented as a red square:



tended Connections

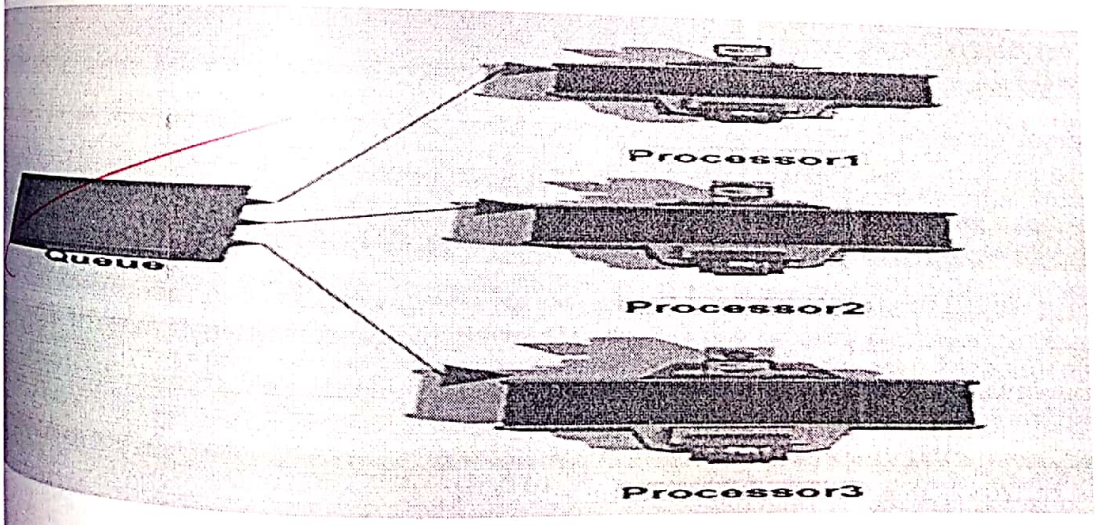
exSim has another type of connection known as an extended connection. ly network node and traffic control objects can use extended nnections. You might possibly use extended connections to build travel works, but you will probably only use them in rare circumstances. For reason, this chapter will focus primarily on input/output and center t connections.

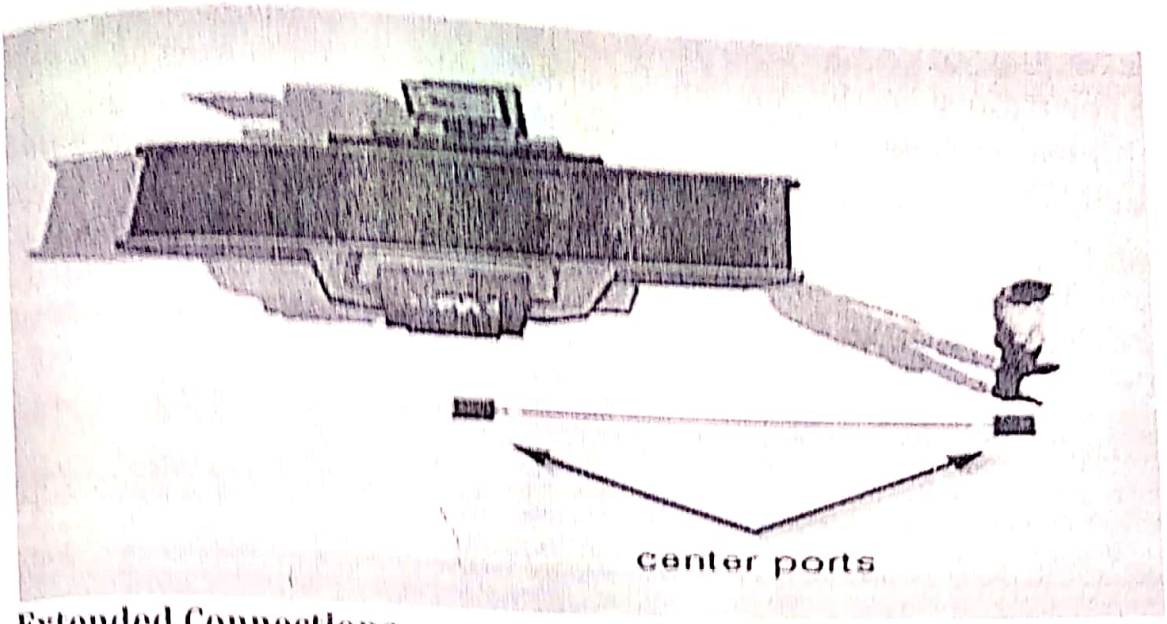
t Rankings

u need to understand how ports are ranked in FlexSim if you want to use rts to create certain types of flows such as round robin, random, nditional, etc. See Common Types of Flows for more information.

ery time you create a port connection between two objects, FlexSim tomatically assigns a rank to that connection. The first port connection u make will have a rank of 1, the second will have a rank of 2, etc.

r example, the queue in the following image has three output ports. The tput port going to Processor1 is ranked 1, the output port to Processor2 anked 2, and the output port to Processor3 is ranked 3. Notice that the tput ports are visually arranged on the queue according to their ranking der:





Extended Connections

FlexSim has another type of connection known as an extended connection. Only network node and traffic control objects can use extended connections. You might possibly use extended connections to build travel networks, but you will probably only use them in rare circumstances. For that reason, this chapter will focus primarily on input/output and center port connections.

Port Rankings

You need to understand how ports are ranked in FlexSim if you want to use ports to create certain types of flows such as round robin, random, conditional, etc. See Common Types of Flows for more information.

Every time you create a port connection between two objects, FlexSim automatically assigns a rank to that connection. The first port connection you make will have a rank of 1, the second will have a rank of 2, etc.

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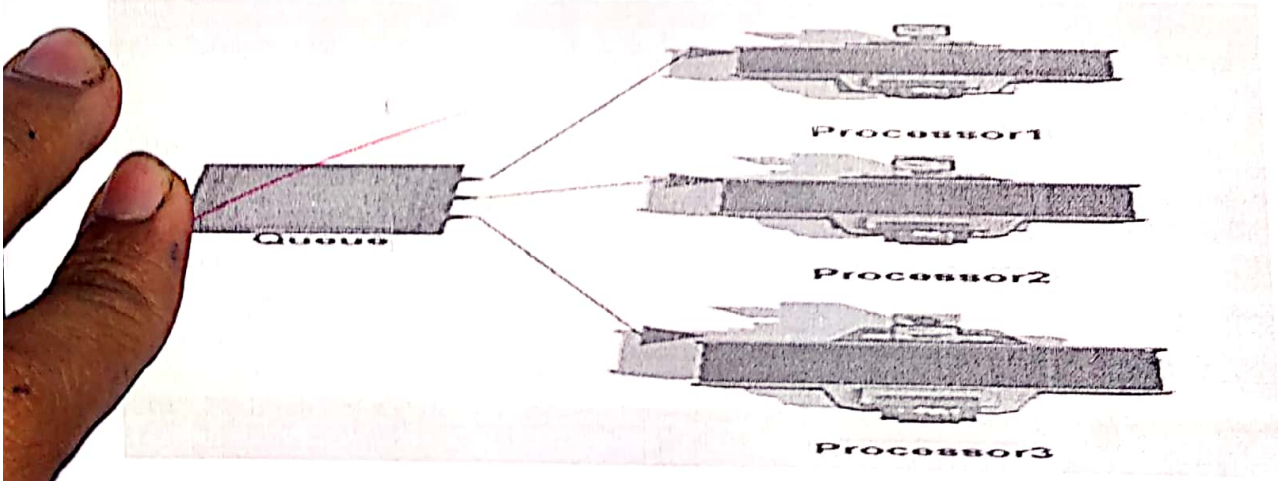
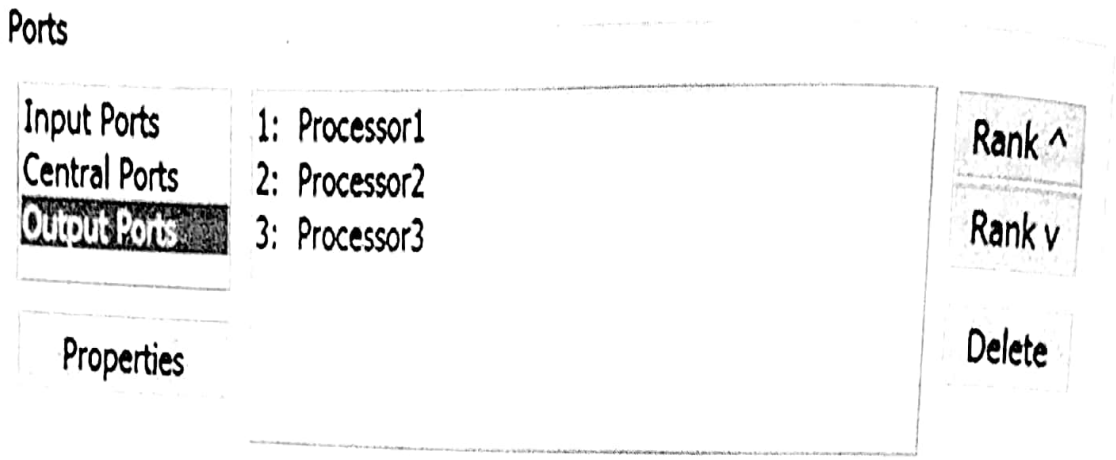


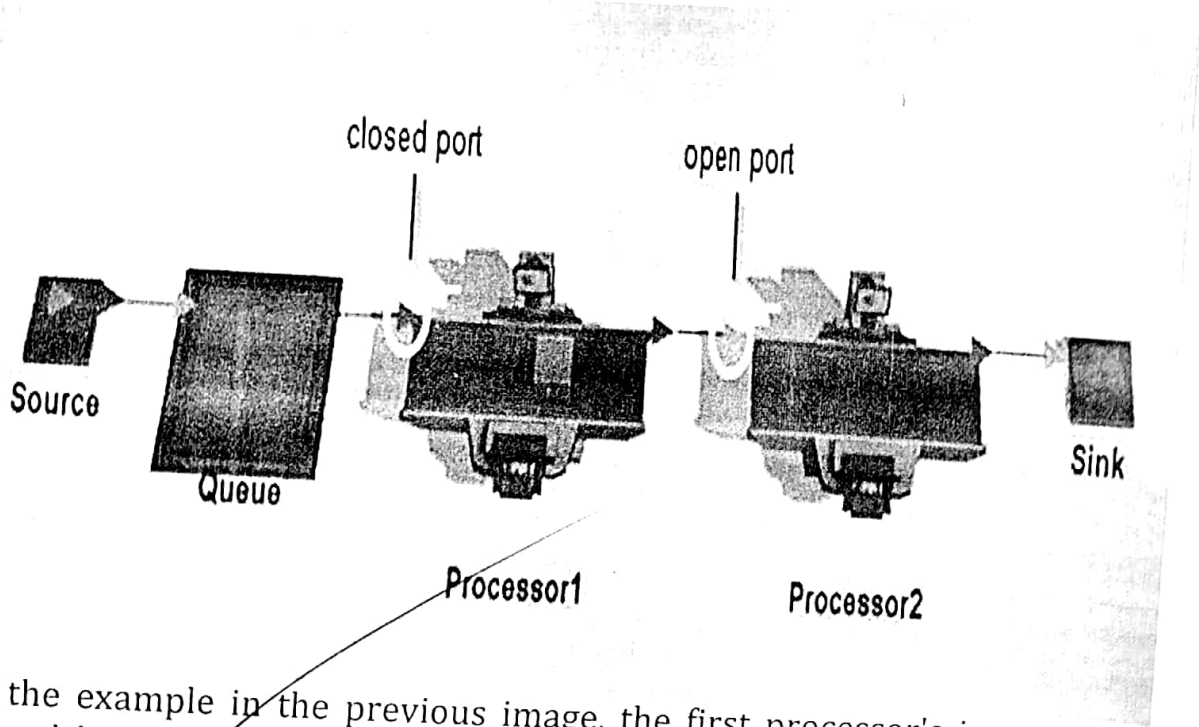
You could also view the port rankings by double-clicking the queue to open its properties window. On the General tab in the Ports group, click the Output Ports to view the rankings:



See Changing Port Rankings for more information.

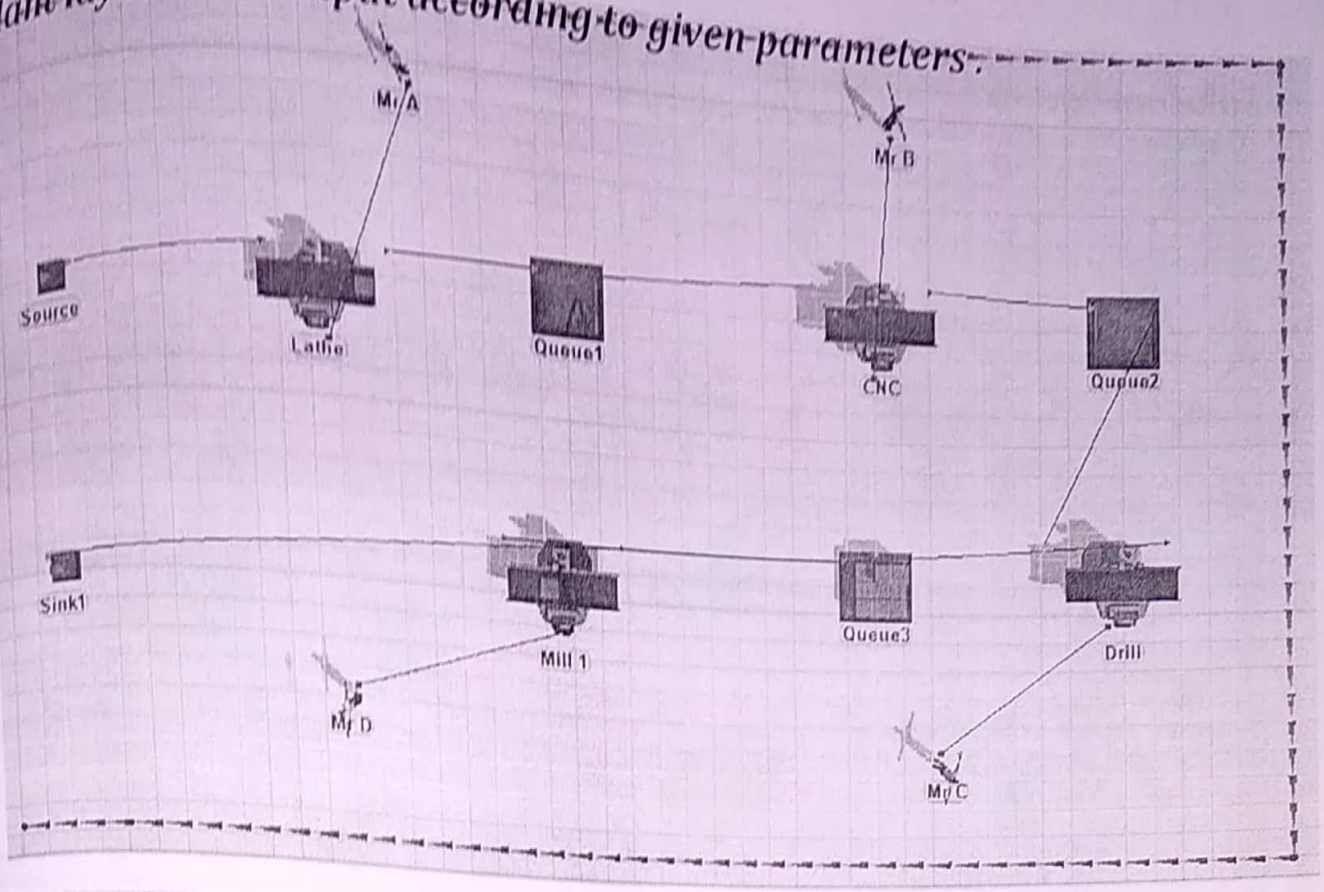
Open and Closed Ports

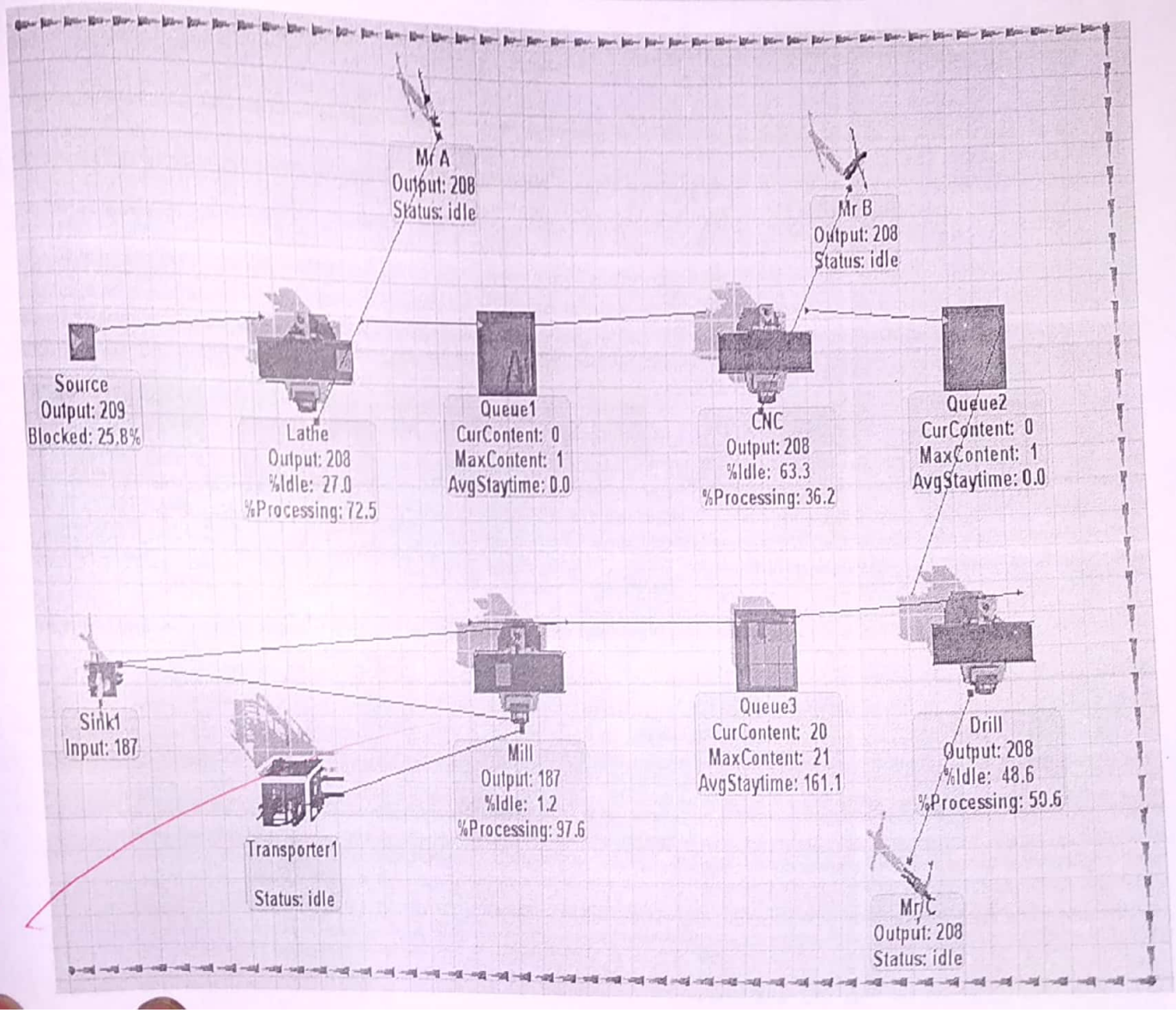
Another important concept you should understand about ports is how to know when a port is open or closed and why. Simply put, an open port is ready to push or pull flow items. A closed port is not ready to push or pull flow items. During a simulation run, open ports are green and red ports are closed:



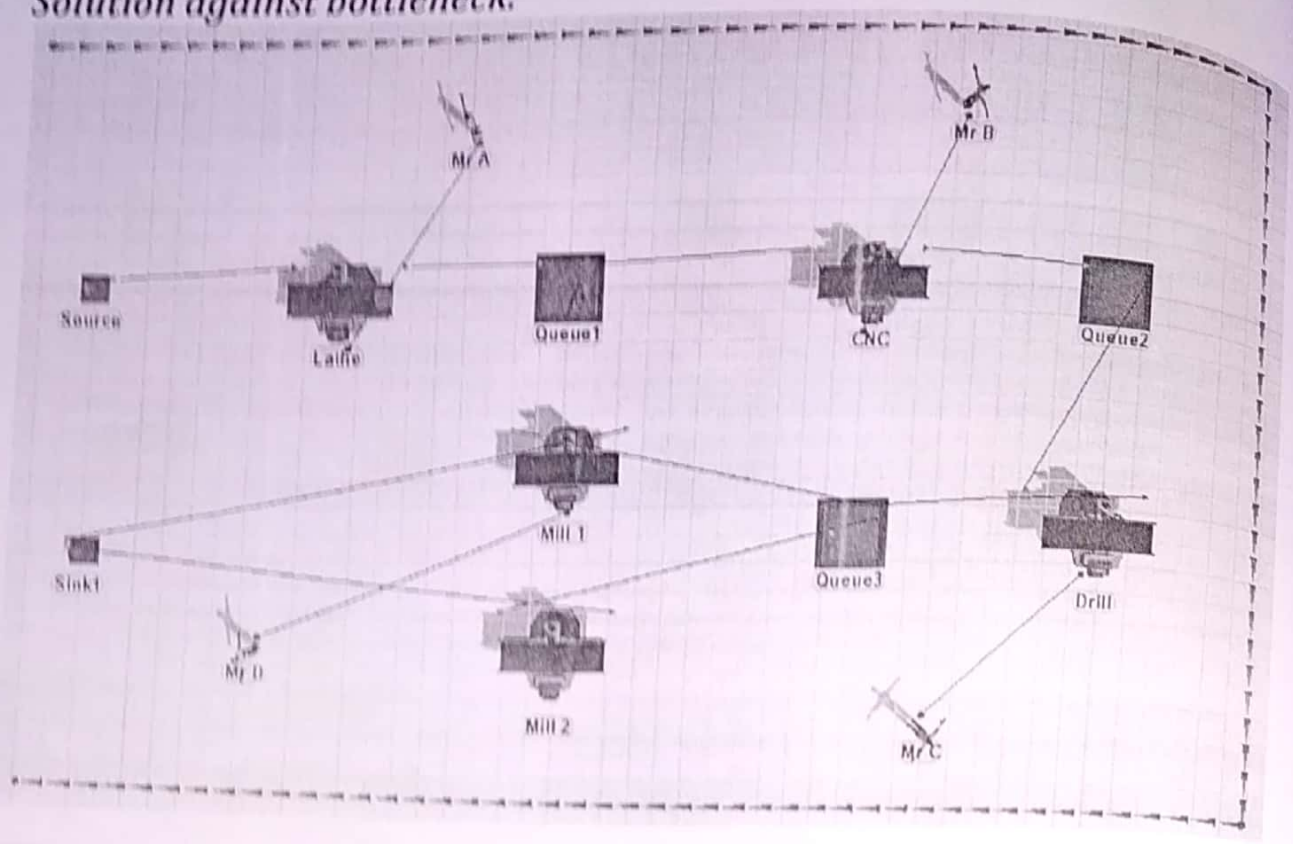
In the example in the previous image, the first processor's input port is closed because it is processing a flow item and cannot accept any more items. The second processor's input port is open because it is available to process flow items.

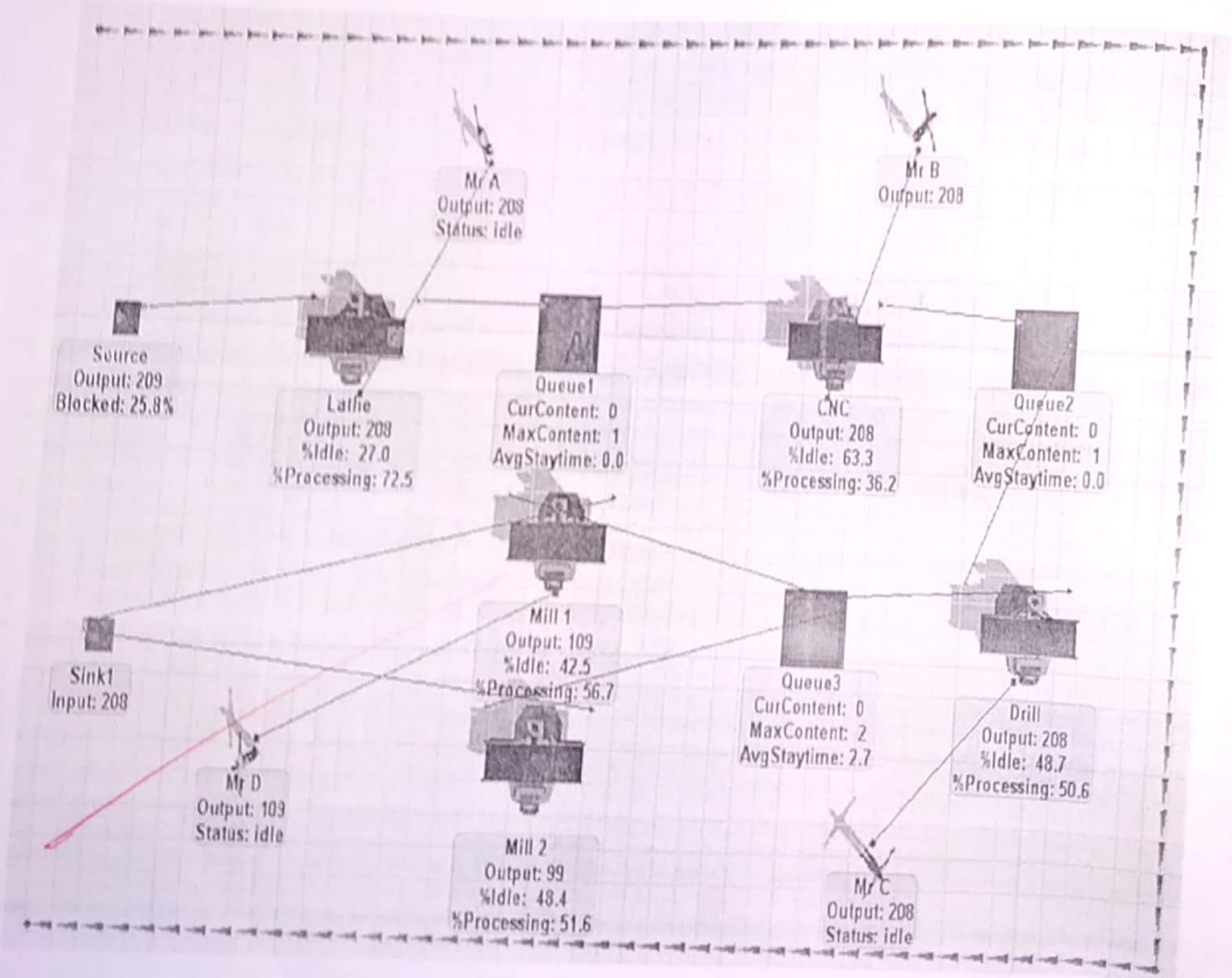
Plant layout and output according to given parameters:





Solution against bottleneck.





Results:

Sr. No.	Before	After
Total Part Arrived	209	209
Total Part dispatched	187	208
Average time required to dispatched the part	2880/187	2880/208
Average work in progress	209-187	209-208
Bottleneck is occurred at milling machine	Mill 1	Bottleneck is eliminated

There is no bottleneck at milling after adding mill 2.

Conclusion.

With help of simulation software it is very easy to analyse plant layout. Also Bottleneck can be identified easily. Initially bottleneck is occurred at mill 1. After adding mill 2 bottleneck is eliminated. But in real life situation cost factor of milling machine must be consider to minimise the cost of production.

TSSM'S
BHIVRABAI SAWANT COLLEGE OF ENGINEERING & RESEARCH,
NARHE, PUNE-41

Department of Mechanical Engineering

Practical / TW report

Subject : IE.

Experiment / TW NO: 7

Name of Experiment / TW: Case study based on cost Revenue model analysis.

Name of Student: Santosh Manik Mhetre

Class: BE-C. Roll no: BM-206

Conducted on : Year: 2018-19

Expected Date of Submission:

Actual Date of Submission:

Activity	Maximum Marks	Marks Obtained
Attendance	02	
Punctuality	02	
Quality of TW	03	
Oral	03	
Total	10	09

Checked By (Name of Faculty) : Prof. V.V. Mahinderkar.

Remarks;

Signature (Faculty)

TSSM
Page No. :

Aim: Case study Based on cost revenue model analysis.

Introduction: Cost Benefit Analysis (CBA) is a method of evaluating the net economic impact of a public project typically involve public investment, but in principle the same methodology is applicable to variety of interventions for example subsidies for private project reforms in regulation new tariffs the aim of CBA is to determine where a project is desirable from the point of view of social welfare by means of the algebric sum of the time discounted economic costs & benefits of the project.

This technique is based on:-
a) Forecasting the economic effects of a project
b) quantifying by means of appropriate measuring procedure.
c) monetising them, wherever possible, using conventional technique for monetering the economic effects.

Mainstps involved are:-

step 1: Identification of project, technical & demand analyse

step 2: financial analysis

step 3: calculation of the accumulated generated cash

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Summary:-

In the following case study we have learnt about Reducing labour costs using Industrial Engineering Techniques.

Process	Inspect model	painting	Inspect	cone.	movable	Inspect die	Lamination
amount of work	760	1000	144	-	140	440	1717
No. of operator	4	5	(2)	-	1	5	11
pitch time	175	200	144	200	140	88	156

Balance efficiency = $\frac{\text{total work content}}{\text{pitch time} \times \text{No. of operator}}$

Balance $\eta = \frac{11524.1}{200 \times 94} = 61.3\%$

Balance loss = 38.7%

pitch time = 200 sec

No. of operators = 94

Operation Ratio of Different machines & operator.

1] Conveyor A = 5.5%

2] Conveyor B = 31.7%

3] Equipment A = 56.3%

4] Operator A = 29.0%

5] Operator B = 30.5%

Source: MAYNARD'S INDUSTRIAL ENGINEERING HANDBOOK

CHAPTER 2.9
CASE STUDY: REDUCING LABOR COSTS USING INDUSTRIAL ENGINEERING TECHNIQUES

Shoichi Saito
JMA Consultants Inc.
Tokyo, Japan

To achieve productivity improvements in manufacturing companies, application of new technology or adoption of mass production may not always be possible. The most practical approach is to attack the work process itself—that is, review and redesign the operations and apply automation and mechanization. In such cases, a productivity audit employing industrial engineering (IE) techniques is used for evaluating the existing manufacturing situation and identifying the potential for increased productivity. Additional industrial engineering methods are applied to develop improvement opportunities.

In this chapter, we introduce various industrial engineering techniques and use a case study to show how these techniques are applied in practice. The case study presented is from Company A, a bathtub manufacturer. The improvement process began with an audit of the current productivity situation. Then, following a master plan, productivity improvement actions were taken one by one. The result was a 20 percent reduction in cost after a two-year project. Because it is not possible to cover all aspects of the project in this chapter, the focus will be on the activities aimed at the reduction of labor cost. We also explain how the scope of the application of industrial engineering techniques is expanding.

INTRODUCTION

Productivity improvement measures can be roughly classified into four groups: (1) redesign of operations, (2) automation and mechanization, (3) use of mass production, and (4) application of new technology—each of which can be effective in specific situations. However, in practice, the opportunities to apply appropriate new technology may be few. In addition, with increased diversification of customer demands resulting in more product models, fewer products can be made in volumes large enough to justify mass production. Consequently, when it comes to productivity improvements in manufacturing companies, the approach that is usually the most effective is to focus on the work process itself. Improvements are then made through redesign of the operations and application of automation and/or mechanization.

performance output/hour	Process
55 %.	post painting cooling booth
68%.	setting dies
58%.	Lamination carving booth
80%.	casting curing booth

Estimation of total productivity improvement.

Parameter	Present level	Estimated level
manufacturing Methods	100%.	133%.
Performance factour	76%.	90%.
utilization factour (plan Manage)	100%.	103%.

TSSM'S

BHIVRABAI SAWANT COLLEGE OF ENGINEERING & RESEARCH,
NARHE, PUNE-41

Department of Mechanical Engineering

Practical / TW report

bject : IE.

periment / TW NO: 8

me of Experiment / TW: Assignment on industrial safety audit of selected work measurement

ame of Student: Santosh Manik Mhatre Roll no: BM:206

lass: BE-C Year: 2018:19

onducted on :

xpected Date of Submission:

ctual Date of Submission:

Activity	Maximum Marks	Marks Obtained
Attendance	02	02
Punctuality	02	02
Quality of TW	03	03
Oral	03	02
Total	10	09

Checked By (Name of Faculty) : Prof. V.V. Mahindarkar

Remarks;

Signature (Faculty)

TSSM
Page No. :

Aim:- Assignment on industrial safety audit of selected work measurement.

workplace
Building
inspection checklist
Room number & names

Department
Inspection Date
Inspection team 1. 2 3
min 2 people:- safety coordinator/team manager

Instructions: this inspections from supplies to areas such as lecture teachers teaching room, libraries, offices, kitchens & common rooms, corridors and reception space use workplace inspection checklist for laboratories, science stores etc, workplace inspection checklist for cold rooms, tissue laborating etc.

If the item is not relevent for ~~that~~ particular area, write NA (not applicable) in the check box. If these are no problems under a particular area write NA. If there is a problem put cross in the check box (X) & in comments a brief description what is wrong. If you do sort it out immediately, still describe the problem & what you did & tick the relevent box. After the inspection send the checklist to your line manager who will track the action & send a copy to the drive safety & health coordinator section.

Item	No Action	Action Amber	Urgent action Red	comments
slip strips & fall	✓			
1] Floor & stairs in good conditions & have even slf (no cracks or holes)	✓	—	—	No comments
2] Carpeting is securely fitted with no loose ends	✓	—	—	
3] Area is generally tide & the floor free of clutter	✓	—	—	
4] Area spills cleaned up immediately by everyone.	✓	—	—	
5] Do water machine leak	×	✓	✓	There is no leakage.
6] Are there any trailoring loads that poste a trip hazardus	×	×	✓	There is no trailory loads pose a trip hazardus
7] walkway landings & corridor clear of obstructions & trip hazardus	✓	—	—	—

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Page No. :

Is there enough storage space & shelling is available	✓	—	—	—
Are waste disposal facilites suitable for the area	×	×	✓	yes
Do stairwells have securly fixed handrails			✓	It is important securly fixed handrails
Fire safety				
Are all employees & contractor fully aware to block or store material in front of or behind firo exits	✓	—	—	—
Fire doors & exits clearly marked, kept clear on both side at outtime never left open	✓	—	—	—
Fire exting uishes present in marked locations & disp an current inspection label	✓	—	—	—
Emergency exit in Place & Show correct routes with no conflicting signge	—	✓	—	It is important to show correct route

15] can final fire exit doors be opened from inside	✓	–	–	–
16] fire doors should not be usedyed open battery operated door lock are permitted	✓	–	–	–
17] Are fire door viewing panels kept clear paper covering on the corridor side of viewing panels is permitted	–	✓	–	
18] Is the emergency fire & evacuation procedure disp^{n}.	✓	–	–	–
19] Are the alarm signals available. & not too loud	✓	–	–	–
20] Have employess been inducted in the fire evacuating procedure in the event of an emergency.	–	–	✓	The employee has been emergency
21] Is the assembly point signal clear & visible.	–	–	✓	The assemble point is easily visible
22] Are there fire marshals on each floor / area	✓	–	–	–

23] Does the building have a fire liaison officer	✓	—	—	—
24] DO kitchens contain a fire blanket	✓	—	—	—
25] Are personal emergency evacuation plans in place for people with disabilities.	✓	—	—	—
Equipment				
26] Projection screens are securely fixed to the wall	✓	—	—	—
27] In general electrical equipment bears a current inspected, tested, labelled & is not obviously	✓	—	—	—
28] All power sockets & switch are in good condn	✓	—	—	—
29] microwave ovens have been regularly tested for leaks	✓	—	—	—
30] Extension leads are not over heated or daily chained	✓	—	—	—

31] Furniture is stable & undamaged	✓	—	—	—
32] All office workstations have been assessed by the user	✓	—	—	—
33] Each filing cabinet can only have one drawer open at a time.	✓	—	—	—
34] There is no unwanted consolete or damged equipment	✓	—	—	—
35] mannual handling aids are in good conditions inspected & labelled.	✓	—	—	—
36] Is lighting adequate & operational	—	✓	—	Yes. lighting is adequate
37] Sufficient plug socket Broken sockets or overload.	✓	—	—	—
38] Air conditioning is adequate & blows in the correct dir° the thermostate is fully function	✓	—	—	—

39] Air conditioning is adequate & blows in the correct dir the thermostate it fully function	✓	—	—	—
40] windows are suitable & not draught, closure & safety catches are working correctly.	✓	—	—	—
41] Blinds are fully functional are not broken or missing section	—	✓	—	It is fully functional & not broken
42] Layout of furniture area is adequate & allows to high or overloaded	✓	—	—	—
43] The doors are fully functional & fully operations	✓	—	—	—
44] Is there any asbestos containing materials in the area	—	✓	—	is there any asbestos containing any material.
45] Are noise level adequately controlled	—	—	✓	yes, noise level adequate controlled.
46] walls showing damage dampers or mould	✓	—	—	—
47] waste showowing damage dampness or mould	—	✓	—	walls does not have any damage.

48	Waste removed adequate Recycling Bins provided	✓	—	—	—
49	Accomodation for clothing suitable hangers, coat rack.	✓	—	—	—
50	Furniture is stable & not damaged.	✓	—	—	—

conclusion:- In this experiment we studied about industrial safety audit for a selected work environment.

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