IQRA NATIONAL UNIVERSITY

SPRING 2020 Final-Term Examination

Course Name	Course Code	Max. Marks	Max. Time	Date	Instructor
Business Process Engineering	SEE-306	50	6 Hours 9-3 PM	23rd June, 2020	Aasma Khan

Name	Aman ullah
Id	14303
Semester	5th
Department	BS(SE)

- **Attempt all questions.**
- **Marks will be given as per the DEPTH of the answer, not LENGTH.**

Question No: 01 (4+3+8)

a) Define General Process Chart and how it characterizes the process?

Answer No.1:

Process chart:

Summarizes the current process the redesigned process and the expected improvements.

Graphical representation of the sequence of steps or tasks (workflow) constituting of process from new material through to the finished product. It serves as a tool for examining the process in detail to identify area of possible improvement.

How it Characterize the process:

Characterizes the process by

- The number of activities per category

- The amount of time spent in each activity category
- The percentage of the total processing time spent on each category

b) List disadvantages of Process Activity Chart

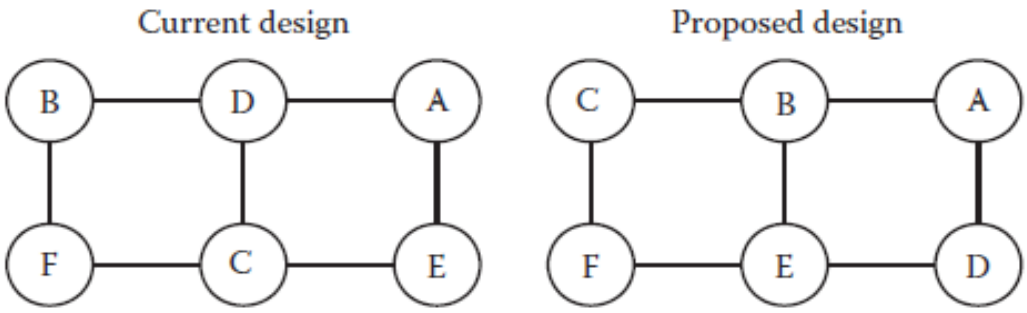
Answer No.1:

Disadvantages

a. Only considers average activity times
b. If the process includes several variants with different paths (i.e. multiple paths through the process) each variant needs its own activity chart
c. Cannot depict parallel activities

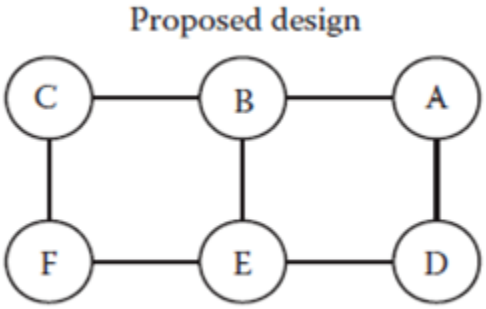
c) Compute Load Distance (LD) scores for the below given current and proposed designs and identify which design is the better one;

Figure 1 Two Designs



Answer No.1:

Proposed design is better than current design



	A	B	C	D	E	F
A		20		20		80
B			10		75	
C				15		90
D					70	

Figure 2 Load Matrix

Table

LD calculation for two design

		Current Design		Proposed Design	
Centers	Load	Distance	LD Score	Distance	LD Score
(A,B)	20	2	40	1	20
(A,D)	20	1	20	1	20
(A,F)	80	3	240	3	240
(B,C)	10	2	20	1	10
(B,E)	75	3	225	1	75
(C,D)	15	1	15	3	45
(D,F)	90	1	90	1	90
(D,E)	70	2	140	1	70
Total			790		570

Question No: 02 (5+10)

a. The observation periods for 3, 6, 5, and 2 jobs are 10, 20, 20, and 10 min, respectively. In other words, the WIP was 3 jobs for 10 min, 6 jobs for 20 min, 5 jobs for 20 min, and 2 jobs for 10 min. Then, calculate the average WIP?

Answer No.2:

Part (a)

Calculation the average WIP

$$\text{Average WIP} = \frac{(3*10) + (6*20) + (5*20) + (2*10)}{10+20+20+10}$$

$$= 4.5 \text{ Jobs}$$

Part(B)

b. A process management team has studied a process and has developed the flowchart in Figure 3. The team also has determined that the expected waiting and processing times (in minutes) corresponding to each activity in the process are as shown in Table 1.
    i. Calculate the average CT for this process.
    ii. Calculate the CT efficiency.

Activity	Waiting Time (Min)	Processing Time (Min)
A	20	12
B	15	18
C	5	30
D	12	17
E	3	12
F	5	25
G	8	7
H	5	10
I	15	25
J	5	20
K	4	10

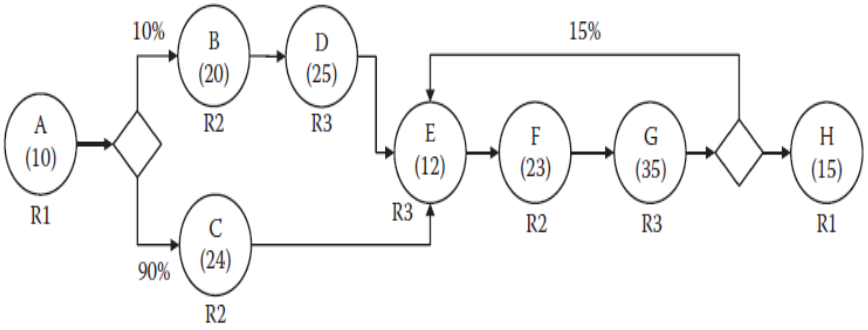


Figure 3 Process Flow Chart

Answer No.2:

Part (b)

Activity	waiting time	processing time	activity time
A	20	12	32
B	15	18	33
C	5	30	35
D	12	17	29
E	3	12	15
F	5	25	30
G	8	7	15
H	5	10	15
I	15	25	
J	5	20	
K	4	10	

Process time = 12+ (0.1+18) + (0.9*30)+17+1.5(12+25+7)+10

= 12+1.8+27+17+66+10

= **133.8**

Calculate the average of CT for this process:

10+ (0.9*24) + (0.1*20) +25+1.5(12+23+35) +15

=10+21.6+2+25+105+15

=**178.6 min**

CT efficiency = 133.8/178.6

= **0.749**

Question No: 03 (10)

Analyse capacity needs and utilization with the help of below given data and fill the given table using respective formulas;

Activity	Processing Time (Min)	Resource Requirements	Number of Jobs
A	2	R1	1
B	5	R1	0.3
C	8	R2	1
D	3	R2	1.1
E	4	R2	1.1
Inspection	4	—	1.1
F	2	R1	1
G	4	R3	1
H	2	R3	1

Answer No.3:

Pool capacity calculation

Resource	Unit Load(Min)	Unit Capacity Jobs/min	Available Resources	Pool Capacity Jobs/min
R1	2+5*0.3+2=5.5	1/5.5	2	2/5.5=0.36
R2	8+1.1*(3+4)=15.7	1/15.7	2	2/15.7=0.13
R3	4+2=6	1/6	1	1.6=0.17

Question No 04: (10)

List the steps for TOC Methodology.

Answer No.4:

Steps for TOC (**Theory of Constraints**) methodology:

These are the steps for TOC methodology.

1. **Identify the system's constraints**
2. **Determine how to exploit the constraints**

   Choose decision/ranking rules for processing jobs in bottleneck
3. **Subordinate everything to the decisions in step 2**
4. **Elevate the constraints to improve performance**

   For example, increasing bottleneck capacity through investments in new equipment or labor
5. **If the current constraints are eliminated return to step 1**

   Don't loose inertia, continuous improvement is necessary!

Good Luck ☺