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COURSE NAME: OPERATION RESEARCH

REG ID: 14480

SUBMITTED TO SIR SAIFULLAH JAN

SEMESTER 4TH

SECTION A

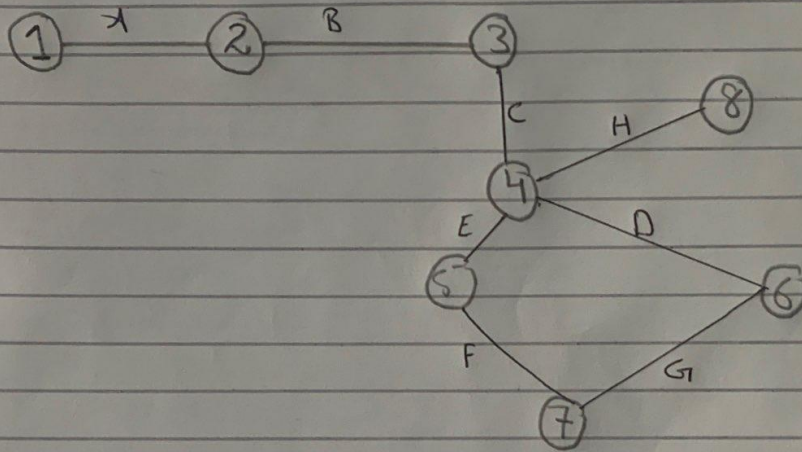
DEPARTMENT OF SOFTWARE ENGINEERING

Name: Abdul Salam

ID: 14480

Q2:

a. Construct the project network.



Q. 2.

(b): Find the expected duration and variance for each activity.

Soln: Expected duration:

$$\text{Mean} = \frac{t_o + 4t_m + t_p}{6}$$

$$\text{Variance} = \sigma^2 = \frac{(t_o - t_p)^2}{6}$$

$$\text{Mean: (A)} = \frac{4 + 4(5) + 12}{6} = \frac{36}{6} = 6$$

$$(B) = \frac{2 + 3(4) + 4}{6} = \frac{13}{6} = 3$$

$$(C) = \frac{6 + 4(8) + 22}{6} = \frac{60}{6} = 10$$

$$(D) = \frac{4 + 4(6) + 8}{6} = \frac{36}{6} = 6$$

$$(E) = \frac{3 + 4(4) + 5}{6} = \frac{24}{6} = 4$$

$$(F) = \frac{2 + 4(4) + 6}{6} = \frac{24}{6} = 4$$

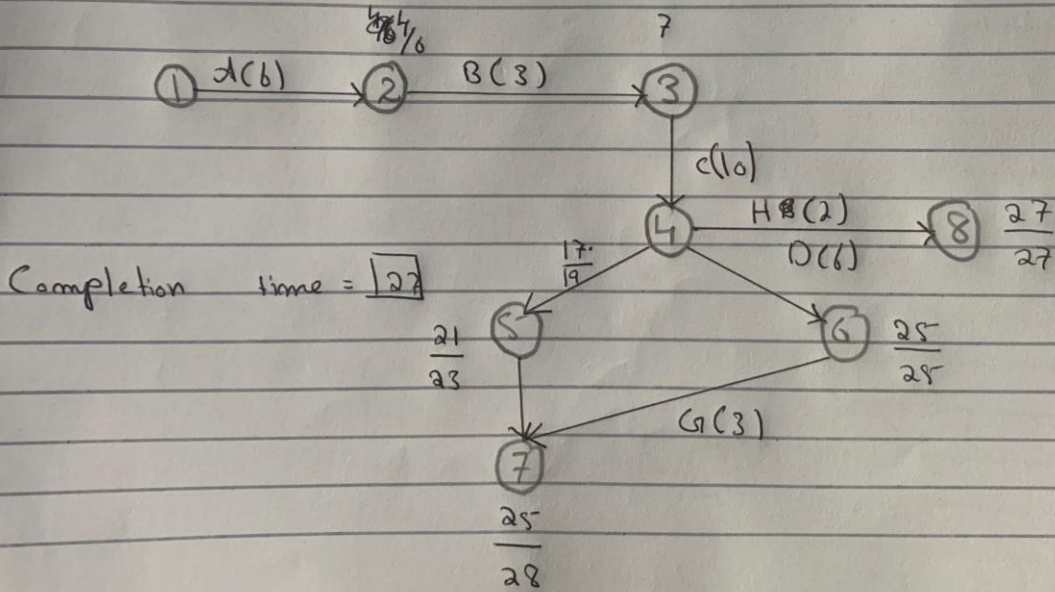
$$(G) = \frac{2 + 3(9) + 4}{6} = \frac{18}{6} = 3$$

$$(H) = \frac{5 + 4(7) + 15}{6} = \frac{48}{6} = 8$$

Q. 2.

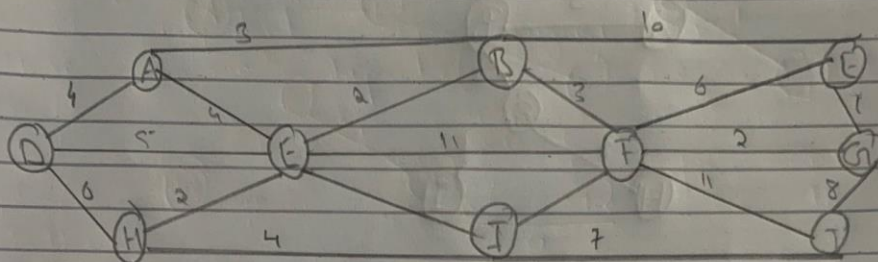
C, Find the critical path & expected project completion time.

Critical Path.



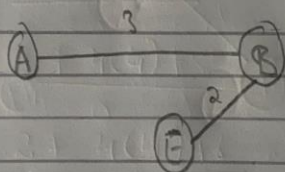
Q.8: For the following graph, find the minimum spanning tree using Prim's algorithm.

Ans:

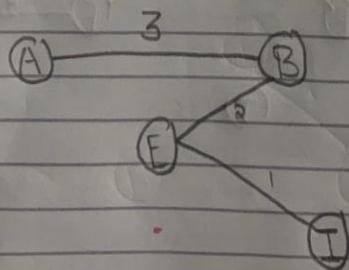


∴ First we select A vertex as root node and will look for lowest cost edge which is A-3-B

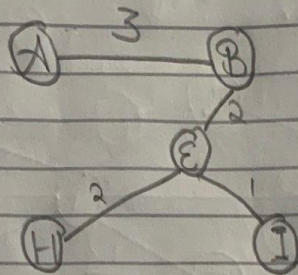
Now A-B-B as a node the lowest is B-2-E



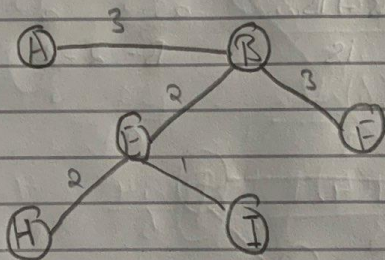
Now A-3-B-2-E Tree is formed. and again as a node we will look for now edge least cost now edge is E-1-I



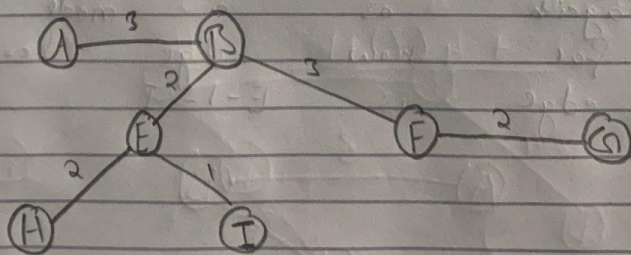
Now again A-B-E-I as mode
least cost new edge is
E-2-H



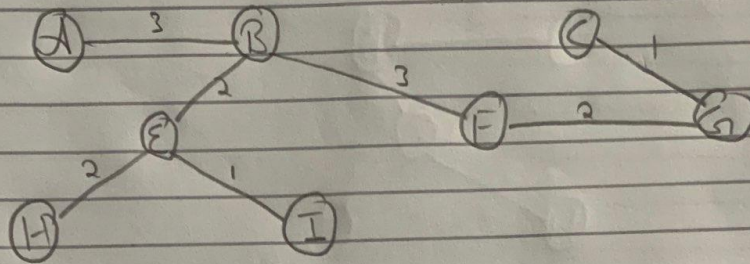
Now again A-B-E-I and E-2-H
as a mode least cost edge
is B-3-F and 1-3-F we can
take any one let's take B-3-F



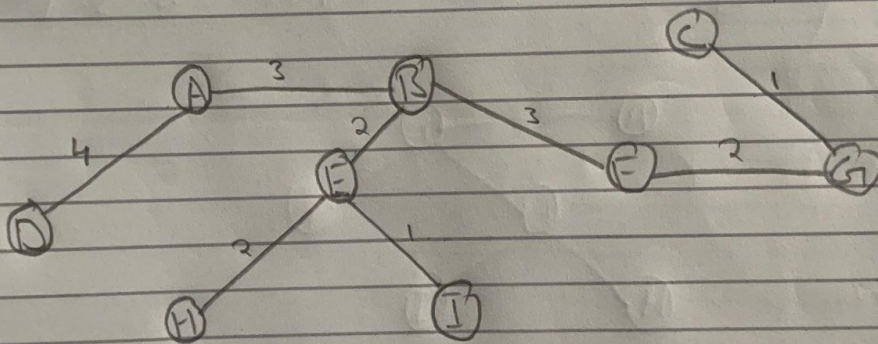
Now least cost new edge is
F-2-G



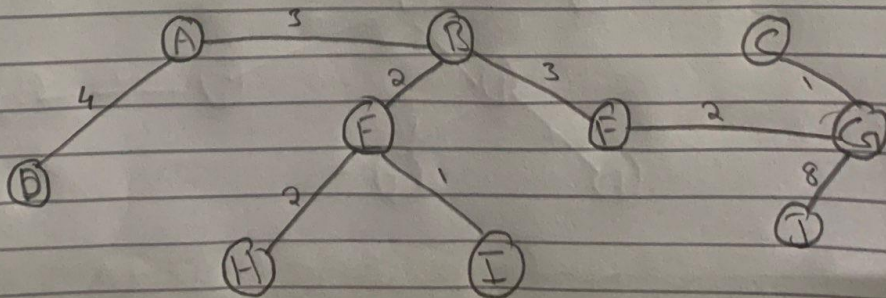
Now least cost new edge is
G-1-C



Now take ~~two~~ least cost new edge
edge A-4-D



Now least cost new edge is
G-8-J

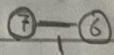


Q.4. Find the minimum spanning tree using Kruskal's algorithm.

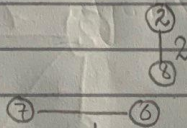
Solution:

Now pick all edges one by one from sorted list of edges.

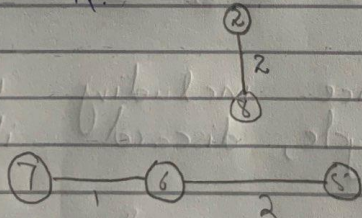
1. Pick edge 7-6: No cycle is formed, include it.



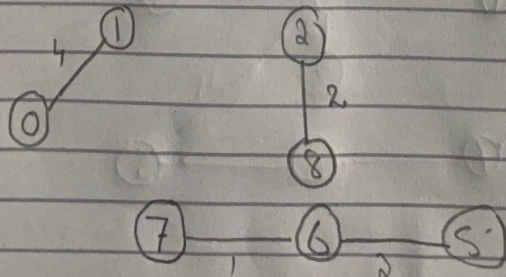
2. Pick edge 8-2: No cycle is formed, include it.



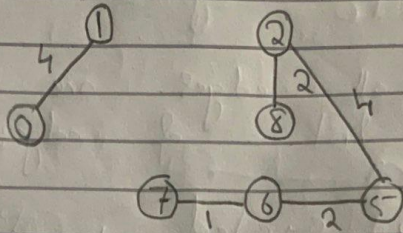
3. Pick edge 6-5: No cycle is formed, include it.



4. Pick edge 0-1: No cycle is formed, include it.

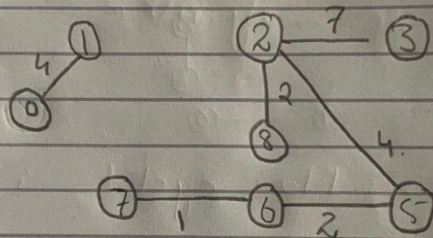


5. Pick edge 2-5: No cycle is formed, include it.



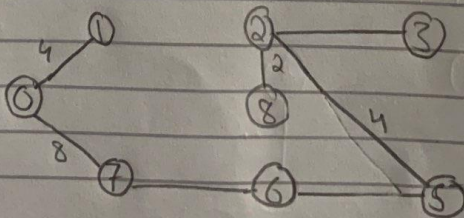
6. Pick edge 8-6: Since including this edge results in cycles, discard it.

7. Pick edge 2-3: No cycle is formed, include it.



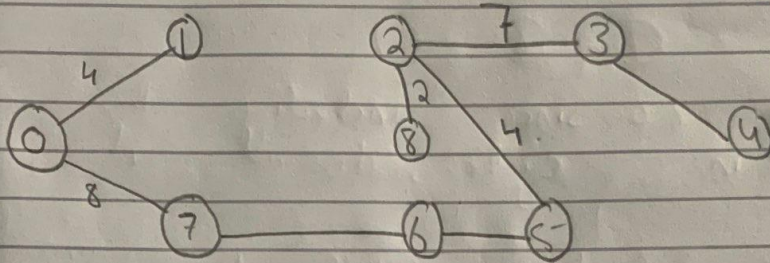
8. Pick edge 7-8: Since including this edge results in cycle, discard it.

9. Pick edge 0-7: No cycle is formed, include it.



10. Pick edge 1-2: Since including this edge results in cycle, discard it.

11. Pick edge: 3-4. No cycle is formed, include it.



Since the number of edges included equals $(V-1)$, the algorithm stops here.

Q.5- How Operation Research will ^{help} you in your personal career life?

Ans. You have the opportunity to solve real world problems. These issues are important to organizations and have an impact. In areas such as health care, public policy, resource management, and disaster ~~relief~~ relief, you can change people's lives for the better.

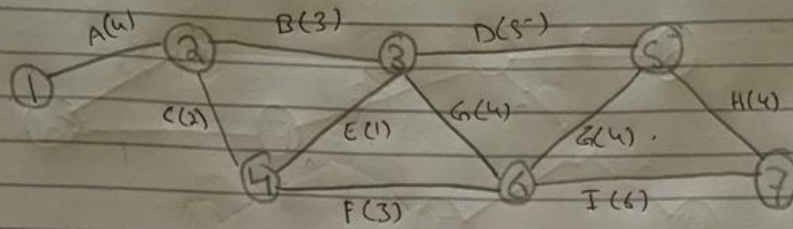
You can use your analytical skills and creativity, whether it's behind your math, software engineering, computer science, or industry such as healthcare, manufacturing, finance, government or the military, there's a job in Operation research for you.

You become an expert in better skills. The Operation Research troubleshooting, creating models, and setting up an analyst that shows better options and results - helps you make better personal and professional decisions, as illustrated by John S. Hammond's best seller smart choices.

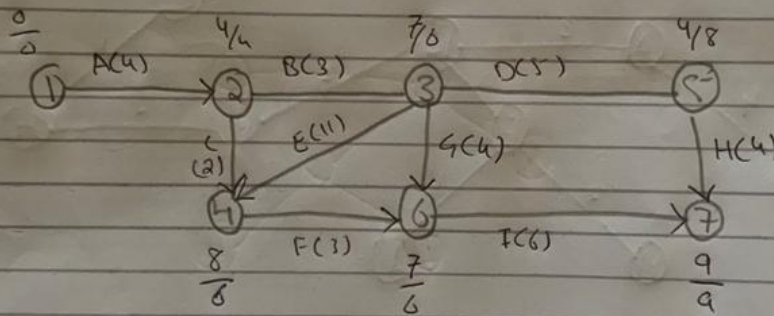
The end.

Q.1

Answer a; calculate the cpm network.



b; Determine the critical path and project completion time.



we know that

$$ES_j = \max(ES_i + D_{ij})$$

For node 1 = $ES_1 = 0$

node 2 = $0 + 4 = 4$

node 3 = $4 + 3 = 7$

node 4 = $3 + 1 = 4$

node 5 = $3 + 5 = 8$

node 6 = $3 + 4 = 7$

node 7 = $5 + 4 = 9$

The end.