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BRAC UNIVERSITY
Department of Computer Science and Engineering

Examination: Quiz
Duration: 25 minutes

Semester: Fall 2022
Total Marks: 20

Name: Ahmed Shakib Reza	ID: 21101219	SECTION: 10
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CSE221: Algorithms

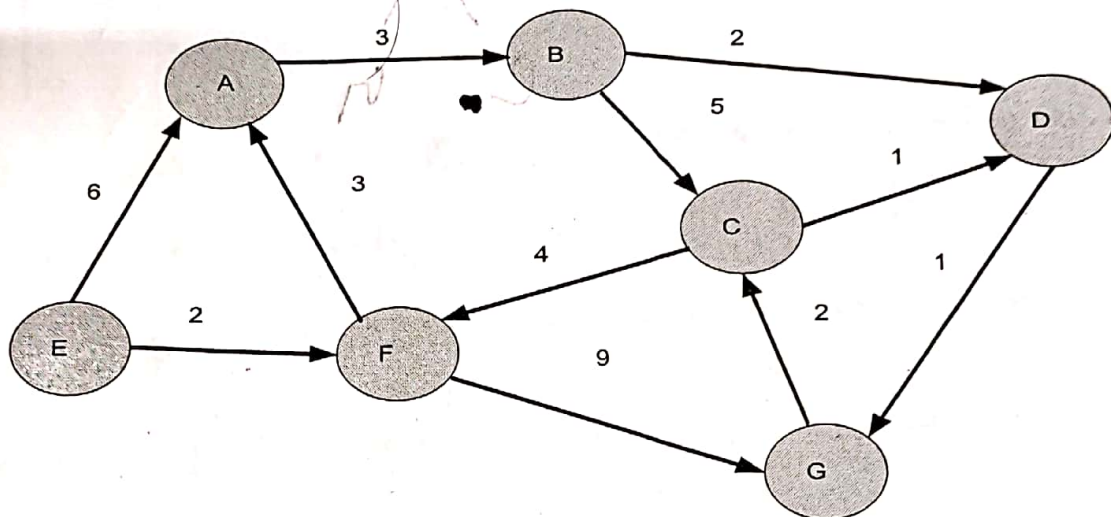
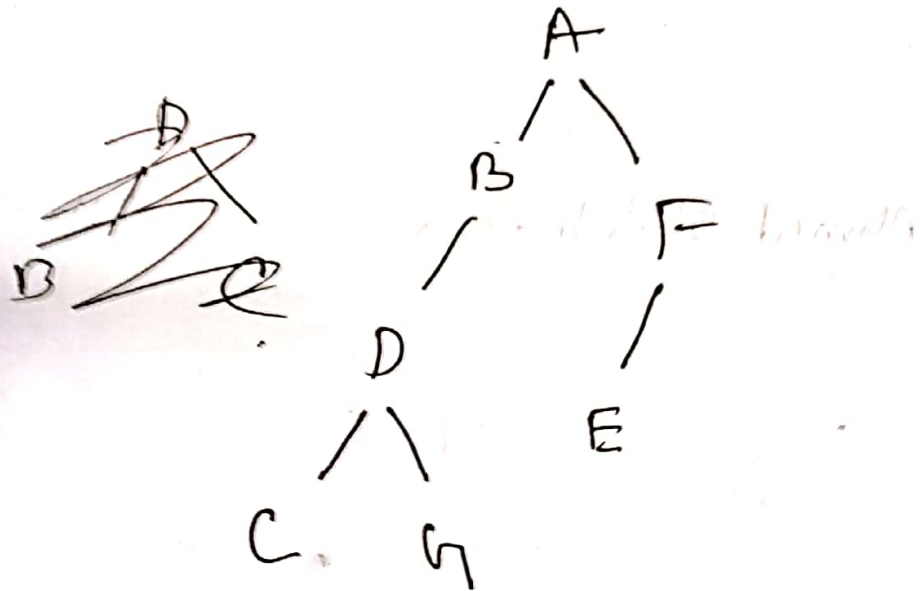


Fig 1: Map of Unknown city

1. Suppose, you are an engineer and you are given the task of moving a very special kind of material from one laboratory to another. The caveat is that the materials start to decay very quickly when it's outside the laboratory environment. After calculating the lifespan of the material, you found out that the material can last up to 9 hours outside. Now find out if it is possible to move the material from E to G using the appropriate algorithm. Demonstrate your work with sufficient data.
2. Suppose now you are hired by the national road construction company and you are given the task to connect all the places of the city in a manner that the people of the city need to travel less time using the minimum number of roads. You also have the authority to change the direction of the roads. Now solve the task using a suitable algorithm and demonstrate your work.

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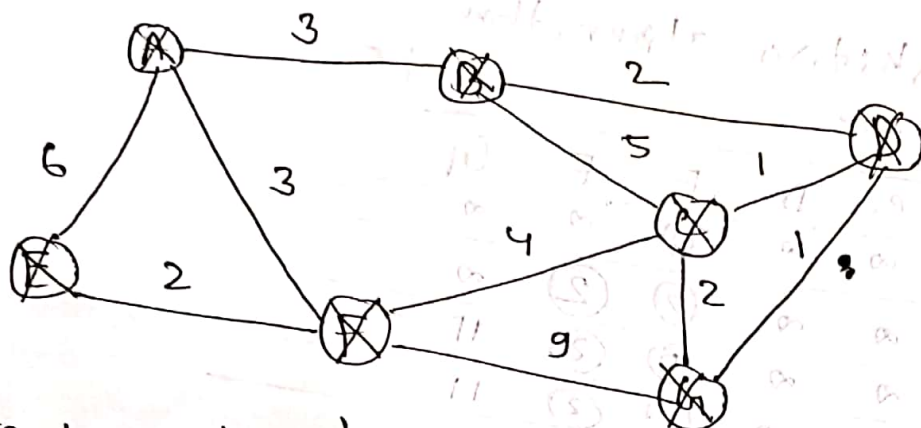
Following Dijkstra algorithm:

Selected Vertex	A	B	C	D	E	F	G
E(0)	∞	∞	∞	∞	0	∞	∞
F(2)	6	∞	∞	∞	0	2	∞
A(5)	5	∞	∞	∞	0	2	11
B(8)	5	8	∞	∞	0	2	11
D(10)	5	8	13	10	0	2	11
G(11)	5	8	13	10	0	2	11

So, we can see that we need at least 11 hours to reach from E to h. So it's not possible to move the materials.

Shortest path: $E \rightarrow F \rightarrow A \rightarrow B \rightarrow D \rightarrow h$

Q.



vertex	Parent	dist	Queue
A	None	0	
B	A	3	X
C	B	5	X
D	B	6	X
E	C	10	X
F	D	12	X
G	E	11	X

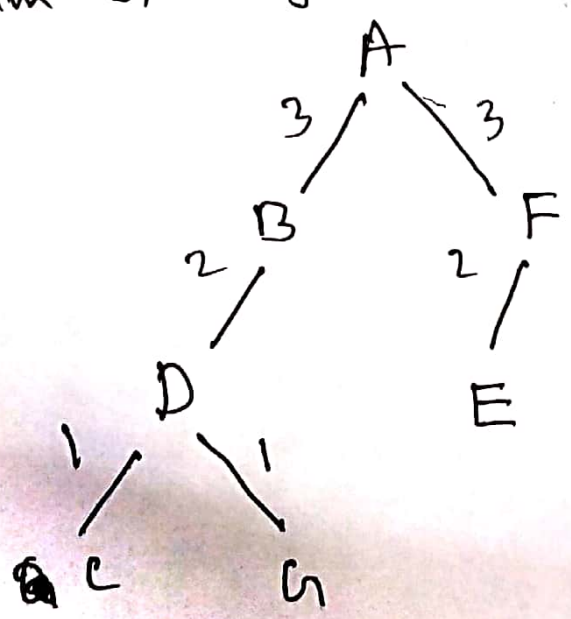
P.T.O

Following the prims algorithm;

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vertex	Parent	dist	Queue
A	None	0	X
B	A	3	X
C	B D	5 1	X
D	B	2	X
E	A F	3 2	X
F	A	3	X
G	D	1	X

minimum spanning tree :



minimum cost : 12