



**BHARATI VIDYAPEETH'S**

**INSTITUTE OF COMPUTER APPLICATIONS & MANAGEMENT (BVICAM)**

(Affiliated to Guru Gobind Singh Indraprastha University, Approved by AICTE, New Delhi)

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Course Code: MCA-102

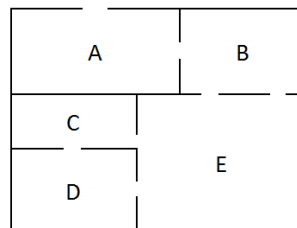
Course Name: Data and File Structures

**Assignment - 2**

(Based on Unit - III)

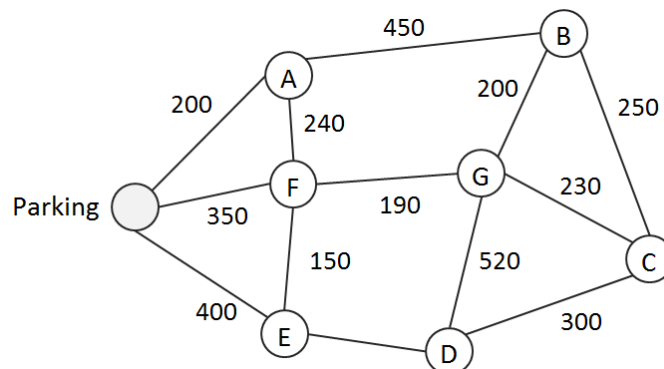
Marks

- Q1. The plan shows a building with five rooms and two doors to the outside. A prize is offered to anyone who can enter the building, pass through every door once only and return to the outside. (4)

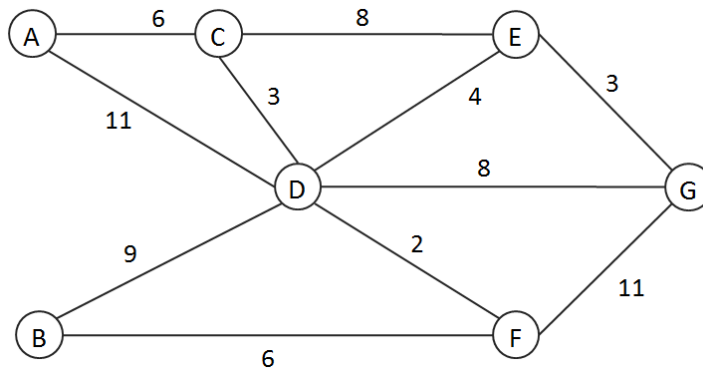


By modelling the situation, develop a computer-based solution to investigate whether this is possible or not.

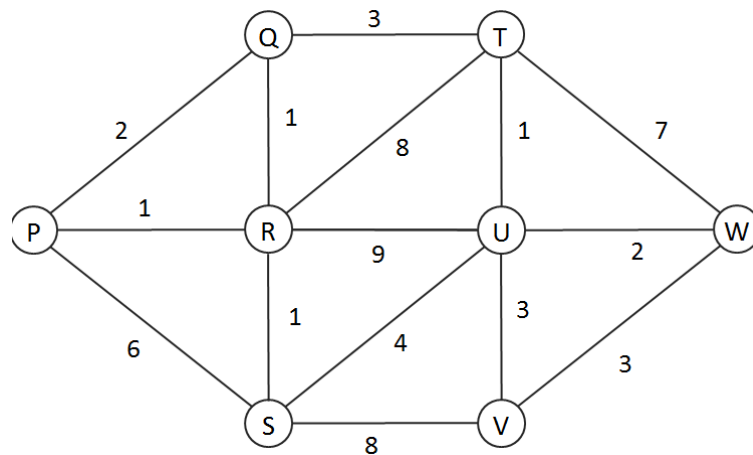
- Q2. The network represents a municipal park, with seven picnic sites and a car parking joined by rough paths. Distances are in meters. The council plans to upgrade some paths, so that all the picnic sites are wheelchair accessible. The cost of the upgrade is 48 rupees per meter of path. Identify which paths should be upgraded so as to minimize the upgradation cost, and state how much money the municipal should earmark for the project. (4)



- Q3. The network shows the journey time, in minutes, along roads joining seven cities. There are paramedics stationed at A and B. An emergency call is received from G. Decide which paramedic should be dispatched. (4)



Q4. The diagram shows a network of roads. The weight on each arc represents the number of traffic lights along that stretch of road. (4)



Show that there are two possible routes from P to W with the minimum number of traffic lights. On a particular day, the road from U to W is closed. Find the route with the minimal number of traffic lights under those circumstances.

Q5. The table shows the distance by direct rail link between eight cities. (4)

|   | A  | B  | C   | D   | E  | F  | G   | H   |
|---|----|----|-----|-----|----|----|-----|-----|
| A | -  | 46 | 10  | -   | -  | -  | -   | 60  |
| B | 46 | -  | -   | 5   | 55 | -  | 65  | 78  |
| C | 10 | -  | -   | 77  | 85 | -  | 110 | 20  |
| D | -  | 5  | 77  | -   | 50 | -  | 15  | 102 |
| E | -  | 55 | 85  | 50  | -  | 20 | 30  | 60  |
| F | -  | -  | -   | -   | 20 | -  | 35  | -   |
| G | -  | 65 | 110 | 15  | 30 | 35 | -   | 105 |
| H | 60 | 78 | 20  | 102 | 60 | -  | 105 | -   |

It is decided to close some of the lines, leaving just enough lines so that it is possible to travel from any city to any other city by rail. Decide which links must be kept so that the length of track is a minimum. Use city A as the starting point.