

Graph theory amusement park project-2019

Part 1

Step 1-Draw a graph of an amusement park with 15 vertices, a loop, a multiple edge and a complete graph with 4 vertices.

Number of vertices	Degree
1	2
1	3
7	4
1	5
5	6

The vertices must be:

The entrance

A Bathroom

Three places to eat (with names)

A store (named)

Nine rides (named)

Step 2-Determine the distance of each edge and put this information in a table and on your graph.

Step 3-Make copies of your graph and table

Part 2

Euler-This will use one of your graphs

1-Label the degree of the vertices

2-Find an Euler circuit, you will have to eulerize. Indicate the repeated edges using multiple edges of a different color.

Part 3

Hamilton-Each part should be on a different graph or table

1- Draw a subgraph of your complete graph with 4 vertices. Use brute force to find all Hamilton circuits.

2-Use cheapest link and your table to find a circuit that includes all vertices. If your graph does not have a Hamilton circuit you will need to add edges. Write the new edges on you chart in a different color.

3-Use your table or graph and nearest neighbor to find a circuit that includes all vertices.

Part 4

Minimum spanning tree-This will use one of you graphs.

1-Use Kuskal's algorithm to find the minimum spanning tree for your park.

Rubric

	Possible points	Points received
The original graph	15 points	
The table	5 points	
Euler circuit	10 points	
Hamilton-Brute force	10 points	
Hamilton-Nearest Neighbor	10 points	
Hamilton-Cheapest link	10 points	
Minimum spanning tree	10 points	
Neat	10 points	
Use of color	10 points	
Pages stapled in the order listed on the rubric	10 points	

- Each part should be on a separate page (7 pages)
- Use one side only-no backs
- Use standard unlined paper
- Use a computer to draw and make the table if you do not believe you can make it neat
- Turn it in with the rubric on top-not stapled