

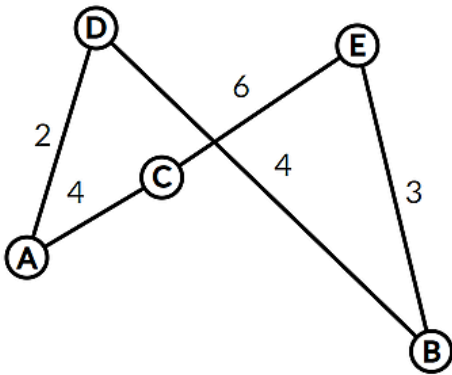
Check Your Understanding

Graph Theory – Paths of Optimal Value and Trees of Optimal Value

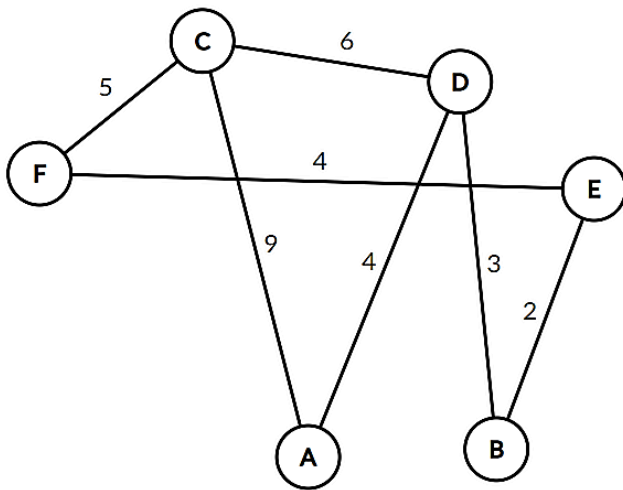
The table below identifies some key concepts from this unit. Complete each question, check your answers, and get help as needed.

Key Concepts	Basic Questions	Intermediate Questions	Advanced Questions
Paths of Optimal Value	1	2, 3	
Trees of Optimal Value	4, 5		
Determining which to use		6, 7, 8	9

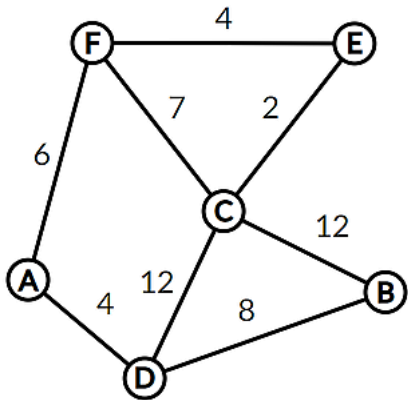
1. Determine a path of minimum value from E to A



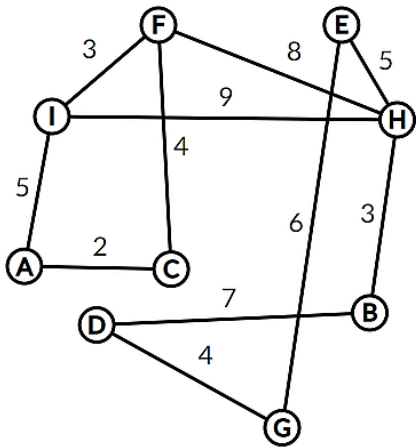
2. Determine a path of minimum value from A to E



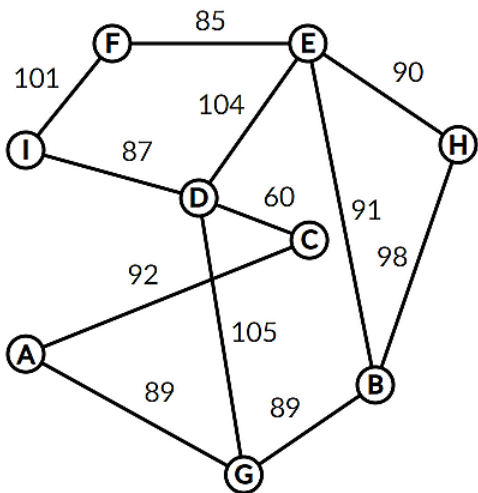
3. Find a simple path of maximum value from D to C



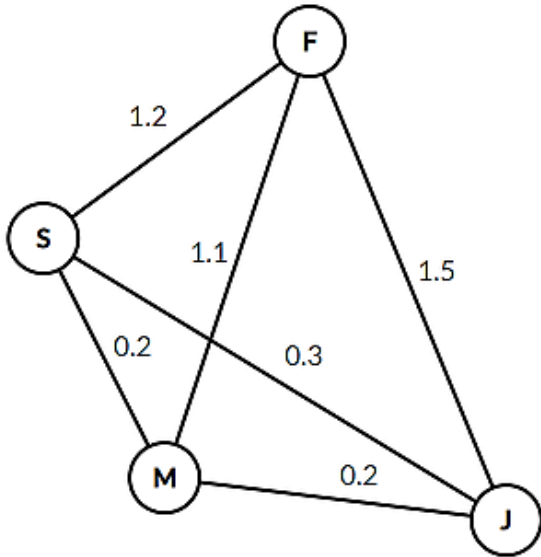
4. Find a tree of minimum value.



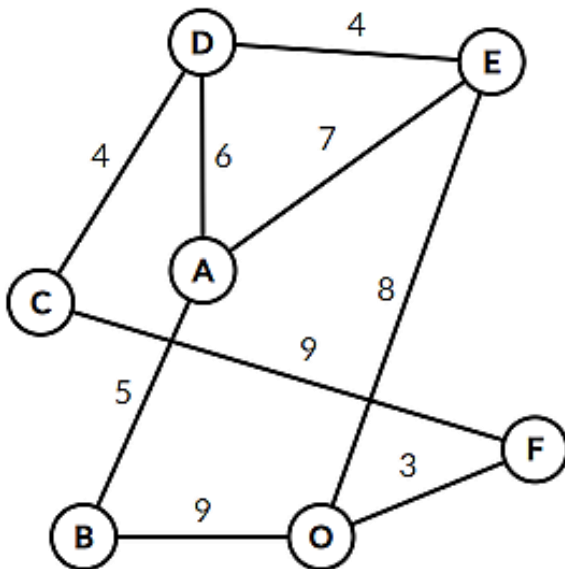
5. Find a tree of maximum value.



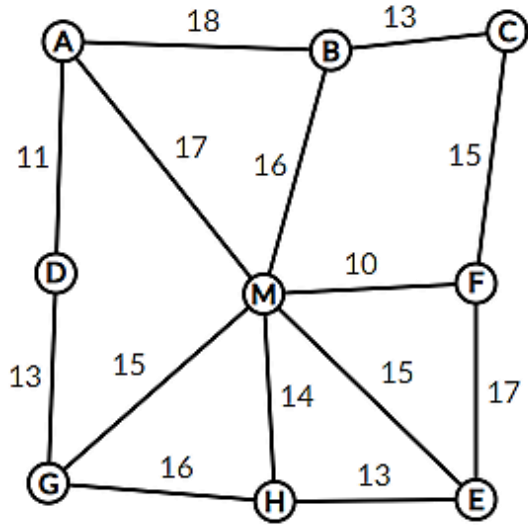
6. You are taking a walk after school. You must start at school (S) and visit the following places, in any order: McDonald's (M), your friend's house (F), Jean Coutu (J). You must then return to school (S). The graph below shows distances (in km). You want to walk the minimum possible distance. **What path should you take?**



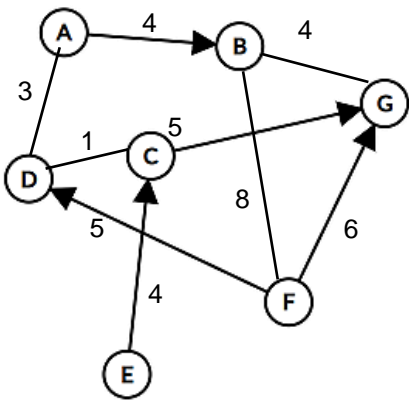
7. Dr. James has one working electrical outlet (O) in her classroom. There are 6 locations (A, B, C, D, E, and F) around the room where she needs electricity. The graph below shows distances between locations (in m). What is the minimum total length of extension cords Dr. James would need to ensure every location is connected to the working electrical outlet, either directly or indirectly?



8. A small new hotel is being developed in Gatineau. Each room (A, B, C, D, E, F, G, and H) must have plumbing connecting it (either directly or indirectly) to the main sewer line (M). Because it is unclear which plumbing lines are the easiest to run, the company has budgeted for the maximum possible cost, without duplicating any lines. If the cost of plumbing lines averages \$25/m, what is the maximum cost the company should budget?

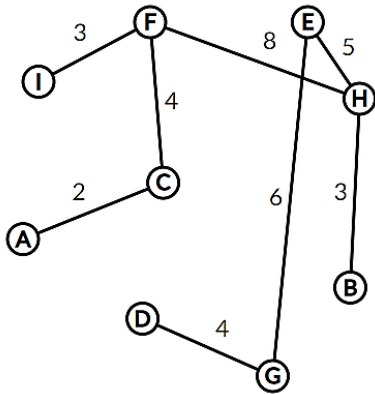


9. Henrique would like to drive from C to F in the minimum possible time. What route should he take?

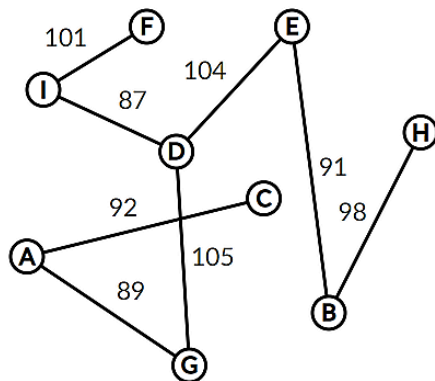


ANSWER KEY

1. EBDA
2. ADBE
3. DBCDAFC
- 4.



5.



6. SFMJS (or SJMFS)
7. Dr. James needs 30 m of extension cords
8. \$3150
9. CDABF