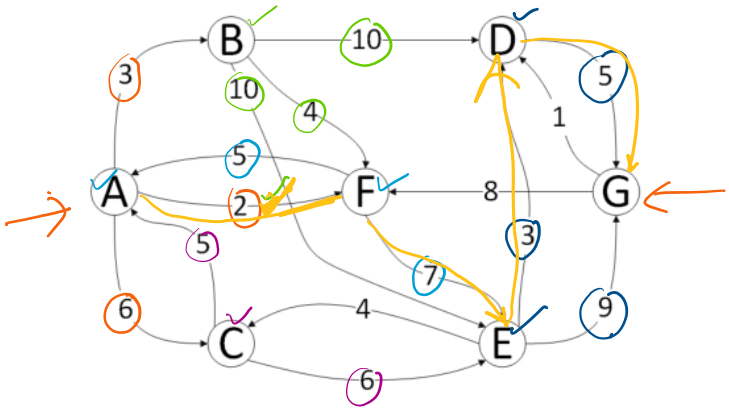
Q3 Part 1

Monday, 29 April 2024 6:53 PM

Question 3 Graphs and Max-Heap Trees

Part 1 Consider the following weighted directed graph (with 7 vertices and 16 edges):



2 + 7 + 3 + 5 = 17

(a) Calculate the **shortest path** from *A* to *G* using the Dijkstra's algorithm. ("Shortest" means the path with the lowest total weight.) **[10 marks]**

You are expected to show your work using a table of the following form and also list the shortest path (e.g. A– >B– >C) and and specify the resulting weight:

A	B	C	D	E	F	G	Finished
0,A	∞,B	∞,C	∞,D	∞,E	∞,F	∞,G	
0,A✓	3,A	6,A	∝D	∝E	2,A	∝G	A
0,A✓	3,A	6,A	∝D	9,F	2,A✓	∝G	F
0,A✓	3,A✓	6,A	13,B	9,F	2,A✓	∝G	B
0,A✓	3,A✓	6,A✓	13,B	9,F	2,A✓	∝G	C
0,A✓	3,A✓	6,A✓	12,E	9,F✓	2,A✓	18,E	E
0,A✓	3,A✓	6,A✓	12,E✓	9,F✓	2,A✓	17,D	D

Total Weight: 17

Shortest Path: A → F → E → D → G