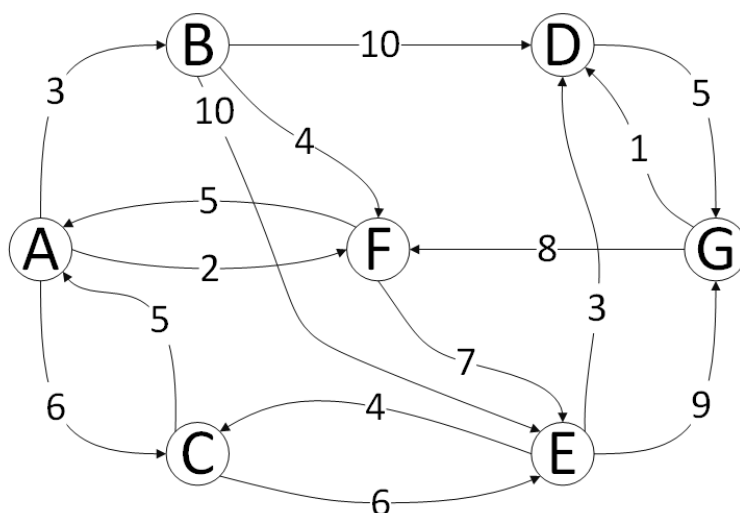


Question 3 Graphs and Max-Heap Trees

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



- (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 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