

**Exercise-set 11.**  
**Solutions**

1. a) yes,  
b) no,  
c) no,  
d) yes.
2. a)  $S, G, E, A, H, B, F, C, D$ .  
b) No.
3. The edge not in the BFS spanning tree started from  $s$  whose endpoints are closest to  $s$  determines such a cycle.
4. a) no,  
b) yes,  
c) yes.
- 5.
6. There are 36 minimum weight spanning trees of weight 19.
7. There are  $99!$  minimum weight spanning trees of weight  $2 + 3 + \dots + 100 = 5049$ .
8. The weight of a minimum weight spanning tree is 150.
9. By Kruskal's algorithm: when we get to  $e$ , we cannot create a cycle.
10. By Kruskal's algorithm: the other edges of  $C$  can be selected before  $e$ .