문제 1

1. Check all the statements that are correct.
   a. According to our lecture slides, an edge in an undirected graph normally can't connect a vertex to itself.
   b. The sparsest graph contains only vertices, without edges.
   c. A set of vertices $C = (g, a, b, c, d, e, b, f)$ in a given graph $G = (V, E)$ is a non-simple cycle if the path (g, a, b, c, d, e, b, f) is not simple and the edge $(f, g) \in E$.
   d. Given a graph $G = (V, E)$ and a spanning graph $G' = (V', E')$ of G, $|E|$ is equal to $|E'|$.
   e. The following sentence "a node u in a graph $G = (V, E)$ may be reachable from v" means that there must exist an edge $(u, v) \in E$.
   f. The adjacency matrix of a graph $G = (V, E)$ requires space complexity of $O(V^2)$ while the array of adjacency lists of the graph requires space complexity of $O(V + E)$.
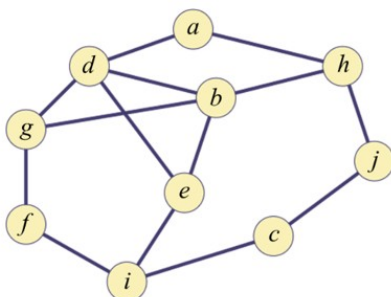
- ☑ a
- ☐ b
- ☑ c
- ☐ d
- ☐ e
- ☑ f

문제 2

2. Suppose you are applying BFS to the graph below with vertex d as root, which layer contains vertex i where a layer L_i is defined as a set of vertices with the same distance i from the root.

- ○ L_0
- ○ L_1
- ○ L_2

문제 3   평가 안 됨 / 4점

3. Let $d[\cdot]$ and $f[\cdot]$ be the discovery time and finish time of a vertex in DFS. For all vertices u, v in a graph, what is the relationship of $d[u], d[v], f[u],$ and $f[v]$ if v is a descendent of u? (Ex, $d[u] < d[v] < f[u] < f[v]$)
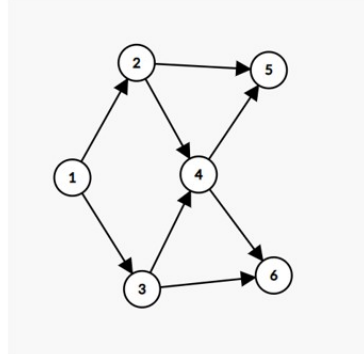
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d[u] < d[v] < f[v] < f[u].

문제 4   평가 안 됨 / 4점

4. Please perform a topological sort on the vertices of the following graph supposing the vertices are represented in increasing order; and find the vertex order (Ex: 1, 2, 3, 4, 5, 6).

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(1,2,3,4,5,6)

문제 5   0 / 4점

5. Check all the statements that are correct.
   a. Given a graph G, you can find the strongly connected components of G by applying DFS to G^T.
   b. A vertex v is an articulation point for a directed graph G if there are distinct vertices w and x (distinct from v also) such that v is in every path from w to x.
   c. Single-destination shortest path problem can be reduced to single-source shortest path problem by reversing the direction of each edge in the graph.
   d. $\delta(u,v) < \delta(u,x) + \delta(x,v)$ where $\delta(u,v)$ is the weight of the shortest path from u to v.
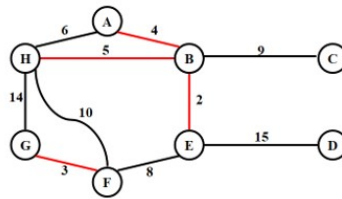
☐ a

☐ b

☑ c

☐ d

문제 6

6. Supposing that you are applying Kruskal's algorithm to the graph below to find a minimum spanning tree (MST), what should be the next edge to be added to F? (F: a forest of trees to be an MST)

$$F = \{(B,E), (G,F), (A,B), (B,H)\}$$

----- < 학생이 제출한 답안 > -----

(F,E)

오답

문제 7   **0 / 1점**

Please tell me the difficulty level of this quiz. (0: very easy, 5: very difficult)

○ 0

○ 1

○ 2

◉ 3

○ 4

○ 5