

# h7 Graphs

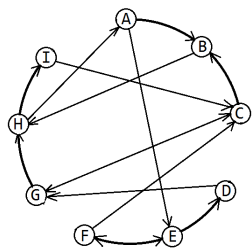
已开始： 3月30日 17:47

## 测验说明

- 1. This is an individual assignment. Do not compare or share your answers until after the due date and time of the quiz. Do not post your work or questions publicly to Piazza or other forums.
- 2. You must complete (and submit) the quiz BEFORE the due date and time, NOT AT the exact time due.
- 3. Be sure to save answers as you complete each question so that answers are not lost.
- 4. Every time you open the quiz, it counts as an attempt. You have 120 minutes per attempt.
- 5. This quiz is MUTED, which means that in Canvas, you will not be able to see your scores until after the quiz deadline. Consider these quizzes like a cross between an in-class quiz and a problem set. We would like you to think carefully about your answers before you submit.
- 6. You have 3 attempts, to handle any possible technical issues or unexpected interruptions to your quiz. We will count the highest-scoring attempt.

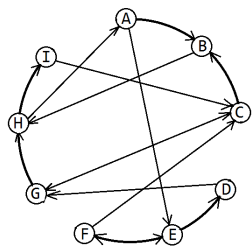
Use the following **directed** graph for the questions below. The arrow tip indicates the target (destination) of the directed edge. Note an edge with an arrow tip at each end indicates there is an edge in each direction between those two vertices. In this graph, CG and EF are edges going in two directions.

The in-degree of C is 3 (from I, G, and F) and the out-degree of C is 2 (to B and G), so the total degree of C is 5.



### 问题 1

3 分



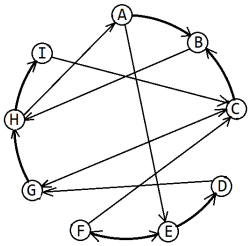
Select all vertices that have an **in** degree of 2.

☐ A

- ☒ B
- ☐ C
- ☐ D
- ☒ E
- ☐ F
- ☒ G
- ☒ H
- ☐ I

## 问题 2

3 分

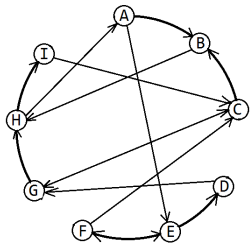


Check the box next to each vertex that has a **degree of 3**.

- ☒ A
- ☒ B
- ☐ C
- ☐ D
- ☐ E
- ☒ F
- ☐ G
- ☐ H
- ☐ I

## 问题 3

2 分



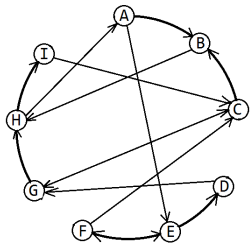
Which of the following is the list of vertices in Depth First Search order starting at vertex D?

When choosing between successors, use the CS400 convention of alphabetical increasing order.

- ☐ D,G,C,B,H,I,A,E,F
- ☐ D,G,H,I,C,B
- ☐ D,G,H,I,C,B,A,E,F
- ☒ D,G,C,B,H,A,E,F,I
- ☐ D,G,H,I,A,E,F,C,B

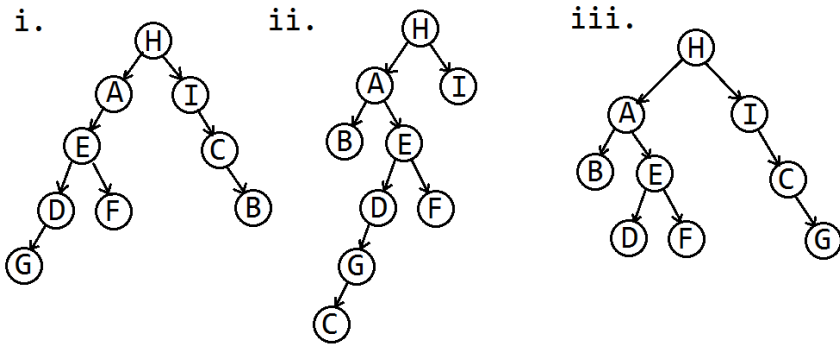
#### 问题 4

2 分



Which tree is the breadth first search spanning tree of the directed graph (above) if starting at vertex H?

When choosing successors, use the 367 convention of alphabetical increasing order A-Z.

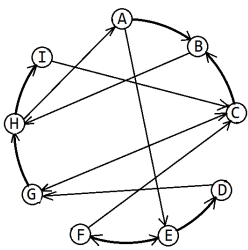


From Wikipedia: "In the [mathematical](https://en.wikipedia.org/wiki/Mathematics) [field of graph theory](https://en.wikipedia.org/wiki/Graph_theory), a **spanning tree**  $T$  of an [undirected graph](https://en.wikipedia.org/wiki/Undirected_graph)  $G$  is a subgraph that is a [tree](https://en.wikipedia.org/wiki/Tree_(graph_theory)), which includes all of the [vertices](https://en.wikipedia.org/wiki/Vertex_(graph_theory)) of  $G$ , with minimum possible number of edges. In general, a graph may have several spanning trees, but a graph that is not [connected](https://en.wikipedia.org/wiki/Connected_graph) will not contain a spanning tree."

- ☐ i only
- ☐ ii only
- ☒ iii only
- ☐ i and ii only
- ☐ i, ii, and iii are all breadth-first search spanning trees starting at vertex H and following the 367 convention for selecting successors for the above directed graph.

## 问题 5

2 分



Which quantity is larger in this graph: the order, the size ?

- ☐ the order is larger than the size
- ☒ the size is larger than the order
- ☐ the order and the size are the same

## 问题 6

2 分

When performing any kind of a search of a graph, we always assume that all vertices are

- ☐ initially marked visited
- ☒ initially marked unvisited
- ☐ weighted
- ☐ unweighted

## 问题 7

4 分

Complete the algorithm for computing the degree of a node if the edges are stored in an Adjacency Matrix called `matrix`.

```
public int computeDegree (Graphnode<T> node) {  
    int index = node.getMatrixIndex(); // maps this node's key to correct index in matrix  
    int degree =   
    ;  
    for (int x=0; x <   
    ; x++) {  
        if (   
    ) {  
          
    ;  
        }  
    }  
    return degree;  
}
```

## 问题 8

2 分

What is the best case, worst case time complexity for computing the *degree* of a **single** graph node, if the edges are stored in an adjacency matrix,  $V$  is the number of vertices in the graph, and  $E$  is the number of edges in the graph?

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在 18:52 保存测验

提交测验