Exam 1

Due Feb 17 at 11:59pm **Points** 27 **Questions** 27
Available Feb 15 at 12:01am - May 3 at 11:59pm **Time Limit** 60 Minutes

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	32 minutes	19 out of 27

ⓘ Correct answers will be available on Feb 18 at 12:01am.

Score for this quiz: **19** out of 27
Submitted Feb 15 at 5:49pm
This attempt took 32 minutes.

Incorrect

Question 1 — 0 / 1 pts

For the stable matching problem (where n men propose to n women), which of the following statements is/are correct?

I. All executions of the G-S algorithm yield the same matching.

II. Gale-Shapley matching guarantees to terminate.

III. All men and women are paired at the end.

- ◉ II and III only
- ○ III only
- ○ I, II, and III

I and III only

Question 2

1 / 1 pts

For the stable matching problem (where n men propose to n women), what is the time complexity of Gale-Shapley algorithm?

O(n log n)

O(n)

O(n * n)

O(n^3)

Question 3

1 / 1 pts

What is the time complexity for the optimal algorithm for merging two sorted linked lists, each with n elements, into one sorted linked list?

O(n log n)

O(n)

O(log n)

O(n * n)

Question 4

1 / 1 pts

Which of the following statements is/are true?

I. The number of distinct pairs among n (n > 2) distinct objects is O(n).

II. The best case time complexity of Merge Sort is O(nlogn).

III. The worst case time complexity for accessing an element in a hash table is O(n).

II and III only

I, II, and III

I and III only

I and II only

Incorrect

Question 5

0 / 1 pts

Which of the following statements is/are ***false***?

I. The operation of sorting n unsorted elements using a heap can be completed in O(logn) time.

II. If the heap currently has n elements, inserting the item v into heap H takes O(log n) time.

III. If the heap currently has n elements, identifying the minimum element in the heap H takes O(log n) time.

- II only
- I only
- II and III only
- I and III only

Question 6

1 / 1 pts

Suppose that f, g, h are three functions. Which of the following statements are true ?

I. If f = O(h) and g = O(h^2), then f + g = O(h).

II. If f = O(g) and g = O(h), then f = O(h).

III. If f = Ω(g) and h = Ω(g), then f = Ω (h)

IV. If f = Θ (g) and g = Θ(h), then f = Θ(h)

I and IV only

I and II only

II and IV only

I, II and IV only

Question 7

1 / 1 pts

Given a connected, undirected graph with E edges and V vertices, what is the time complexity for a graph traversal using BFS or DFS?

O(E+V)

O(E)

O(V)

O(E*V)

Question 8

1 / 1 pts

Which of the following statements is/are true?

I. Given a graph, if the number of edges of graph is n, and the number of vertices is n-1, then there is no cycle in the graph.

II. A common implementation of BFS uses a queue.

III. A common implementation of DFS uses a stack.

IV. In order to find a connected component in a graph, G, containing node s, we can use either BFS or DFS.

- II and III only
- I, II, III and IV
- II, III, and IV only
- I and II only

Incorrect

Question 9

0 / 1 pts

For a stable matching problem, which of the following statements is/are true?

I. It's possible for an instance of the stable matching problem to have more than one stable matching.

II. For the hospital-student domain, the Gale Shapley algorithm is student optimal.

III. For the hospital-student domain, the Gale Shapley algorithm is hospital optimal.

III only

I and II only

II and III only

I and III only

Question 10

1 / 1 pts

Hospital h and student s form an unstable pair if

h prefers s to one of its admitted students and s prefers h to assigned hospital.

h does not prefer s to one of its admitted students but s prefers h to assigned hospital.

none of these.

h prefers s to one of its admitted students but s does not prefer h to assigned hospital.

Question 11

1 / 1 pts

Which of the following algorithms serves as a method of solving the stable matching problem?

- Dijkstra's algorithm
- Ford-Fulkerson algorithm
- Gale-Shapley algorithm
- Prim's algorithm

Question 12

1 / 1 pts

A matching M is _____ if |M| = |H| = |S| = n.

- Stable
- Imperfect

Perfect

Proper

Question 13

1 / 1 pts

Big O notation provides an asymptotic

Tight bound

Loose bound

Lower bound

Upper bound

Question 14

1 / 1 pts

If f = O(g) and g = O(h), then f = O(h). This property is known as

Transitivity

None of these

Associativity

Commutativity

Question 15

1 / 1 pts

Binary search algorithm runs in

Linear time

Exponential time

Quadratic time

Logarithmic time

Question 16

1 / 1 pts

A path p is called _____ if all its vertices are distinct from each other.

- Complex
- Simple
- None of these
- Unique

Question 17

1 / 1 pts

A directed graph is strongly connected if for every two nodes, u and v:

- there is no path from u to v and but a path from v to u.
- there is a path from u to v and but no path from v to u.

None of these

there is a path from u to v and a path from v to u.

Question 18

1 / 1 pts

A(n) _____ graph is a tree if it is connected and does not contain a cycle.

Bidirectional

Unidirectional

Undirected

Directed

Question 19

1 / 1 pts

The idea of rooting a tree encodes the notion of a

Cycle

Hierarchy

Size

Direction

Incorrect

Question 20

0 / 1 pts

Consider the following preference rankings:

X-A,B,C.

Y-B,A,C.

Z-A,B,C.

and

A-YXZ,

B-XYZ,

C-XYZ

Is the following matching stable: X-A, Y-B, Z-C?

Yes

Cannot be determined

- (selected) No
- None of these options

Incorrect

Question 21

0 / 1 pts

Consider the following algorithm:

```
int i, j, k = 0;
for (i = n / 2; i <= n; i++) {
    for (j = 2; j <= n; j = j * 2) {
        k = k + n / 2;
    }
}
```

What is the time complexity of this algorithm?

- O(n)
- (selected) O(n^2)
- O(nlogn)
- O(logn)

Question 22

1 / 1 pts

Consider the following algorithm:

```
int a = 0, i = N;
while (i > 0) {
    a += i;
    i /= 2;
}
```

What is the time complexity of this algorithm?

- O(n^2)
- O(logn)
- O(n)
- O(nlogn)

Incorrect

Question 23

0 / 1 pts

```
int fun(int n)
{
    for (int i = 1; i <= n; i++)
    {
        for (int j = 1; j < n; j += i)
        {
            // Some O(1) task
        }
    }
}
```

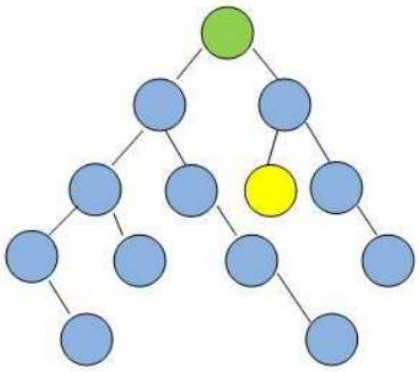
The Big O notation is:

- log(log n)
- n/2
- n*n
- nlog n

Incorrect

Question 24

0 / 1 pts



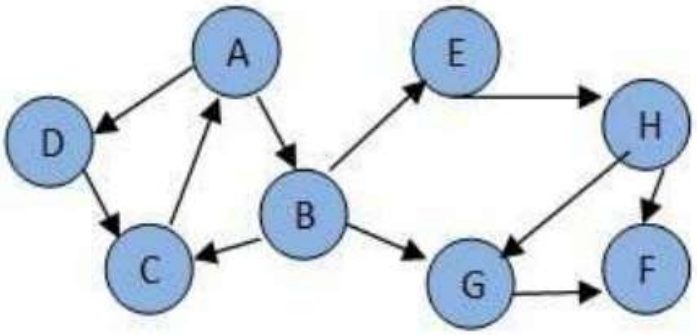
In this graph assume both dfs and bfs choose leftmost node first if there is a choice

Starting from green and ending in yellow,which algorithm visits least number of nodes

- neither
- bfs
- dfs
- equally

Question 25

1 / 1 pts



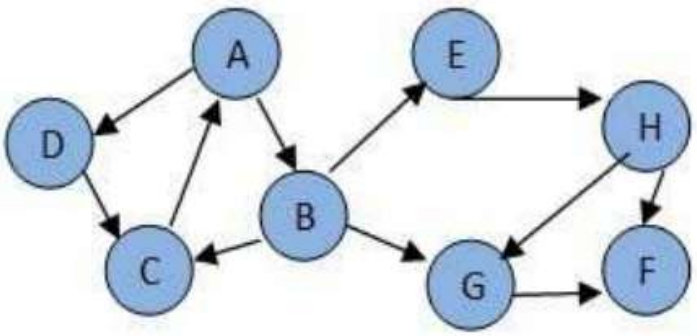
Suppose we're doing a BFS traversal starting with node A. Assume that within a layer we order letters alphabetically. What is the correct traversal order for this BFS?

- (●) ABDCEGHF
- ( ) ABDCGEFH
- ( ) ABDCEFHG
- ( ) ADBCEGHF

Incorrect

Question 26

0 / 1 pts



Suppose we are doing a DFS traversal of this graph starting with node A. What is the correct order for this traversal?

- ABCEHFGD
- None
- ABCHEFGD
- ABCDGFE

Question 27

1 / 1 pts

By the time you have shoot the first n balloons, n-1 new balloons have been inserted on the board. After shooting those n-1 balloons, there are n-2 new balloons are inserted on the board. After checking out those n-2 balloons , there are n-3 new balloons on the board. This same pattern continues until on new balloon are inserted on the board. How many total balloons do you shoot before the board is empty?

- O(n^2)
- O(log n)
- O(n/2)
- O(n)

Quiz Score: **19** out of 27