

Final Exam ↕

Due Dec 16 at 11:59pm

Points 250

Questions 25

Available Dec 12 at 12am - Dec 16 at 11:59pm

Time Limit 120 Minutes

Instructions

This exam is timed for two hours (120 minutes). You are free to have open notes, book, whatever you want but you may only take this exam once!

Good luck!

Attempt History

	Attempt	Time	Score
LATEST	Attempt 1	80 minutes	250 out of 250

Score for this quiz: **250** out of 250

Submitted Dec 15 at 11:30pm

This attempt took 80 minutes.

Question 1	10 / 10 pts
HashMaps can preserve sorted data.	
<input type="radio"/> True	
<input checked="" type="radio"/> False	
Correct!	

Question 2	10 / 10 pts
The following code does what?	

```
public int foo(String s){  
    final int x = 31;  
  
    int y = 0;  
  
    for(int z = 0; z < s.length; z++){  
  
        y = ((x * y) + s.charAt(z)) % M;  
    }  
  
    return y;  
}
```

- random number generator
- String parser
- StringTokenizer
- hashing
- sorting algorithm

Correct!

Question 3

10 / 10 pts

The sorting algorithm that is NOT guaranteed optimal performance is:

- They are all optimal
- Merge Sort
- Heap Sort
- Quicksort

Correct!

Question 4**10 / 10 pts**

If you need to do n searches on an array, you should do the following (assume $n = 16$):

- Linear Search on unsorted array
- Heap Sort / Binary Search

Correct!**Question 5****10 / 10 pts**

String Tokenizers are not needed if you use fixed-length tokens.

Correct!

- True
- False

Question 6**10 / 10 pts**

If you wanted to convert from upper case to lower case, you could:

- Subtract 32 from 'A' to 'Z' chars
- Subtract 32 from all chars
- Add 32 to 'A' to 'Z' chars
- Add 32 to all chars

Correct!

Question 7**10 / 10 pts**

If we wanted to find the value (1 or 0) of the third bit from the right (bitNum = 2) of variable x, we should:

- int bit = $(x >> 3) \& 1;$
- int bit = $x >> 3;$
- int bit = $x \& 4;$
- int bit = $(x >> 2) \& 1;$

Correct!**Question 8****10 / 10 pts**

If we have two bounding boxes (x_1, y_1, x_2, y_2) with the following coordinates:

Box1 = (10, 10, 50, 100)

Box2 = (40, 55, 140, 95)

Do these boxes collide?

Correct!

- Yes
- No

Question 9**10 / 10 pts**

If our reference screen resolution is 1920 x 1080, but the system only supported a maximum of 1366 x 768, our scale factor would be:

Correct!

0.71f

1.41f

0.56f

1.0f

Question 10

10 / 10 pts

In a String Tokenizer, ideally, the number of tokens should be:

Correct!

of Delimiters

of Delimiters + 1

of Delimiters - 1

Question 11

10 / 10 pts

Selection sort performs worse if the array is in reverse order compared with random order.

True

False

Correct!

Question 12

10 / 10 pts

Most theoretical Computer Scientists currently believe that $P \neq NP$.

True

False

Correct!

Question 13

10 / 10 pts

The computers we use are considered nondeterministic.

True

False

Correct!

Question 14

10 / 10 pts

If a graph is undirected and connected (any vertice has a path to any

other vertex) BUT the graph is also acyclic, this graph will have how many edges?

V edges

None apply

V + 1 edges

V - 1 edges

Correct!

Question 15

10 / 10 pts

The following code has what time complexity (worst case)?

```
public static int foo(int n, int i, int m){  
    if(i > n || i == 0)  
        return m;  
    return foo(n, i * 2, m);  
}
```

(Starting i = 1)

Linear

Logarithmic

Linearithmic

Correct!

Question 16

10 / 10 pts

If you need to do n searches on an array, you should do the following of the two (assume $n = 8$):

Correct!

- Linear Search on unsorted array
- Quicksort / Binary Search

Question 17

10 / 10 pts

We should resize the array of LinkedLists used for our custom Hash map over time.

Correct!

- True
- False

Question 18

10 / 10 pts

Worst case for the custom Hash method "getValue" is $O(n)$.

Correct!

- True
- False

Question 19

10 / 10 pts

If you need a performance guarantee, HashMaps are not the data structure to use.

 Correct! True False**Question 20**

10 / 10 pts

If you have two circle collision buffers (CB1 = 64 radius; CB2 = 32 radius) with the following distance:

$$d = 100$$

Do these buffers collide?

 True False Correct!**Question 21**

10 / 10 pts

A "level order" traversal of a Binary Search Tree (BST) is the same as a Breadth-first Search.

 Correct! True False**Question 22**

10 / 10 pts

Recursion is usually (not always) less efficient than iterative solutions.

 Correct! True False**Question 23**

10 / 10 pts

HashMaps can have duplicate keys.

 True False Correct!**Question 24**

10 / 10 pts

Assume an unsorted array with 64 elements. If we wish to run a Binary Search on this array after an optimal sort, what is the largest amount of operations possible to accomplish BOTH the Binary Search and the optimal sort?

 70 390 6 4102 Correct!**Question 25**

10 / 10 pts

It is possible to have more edges in an undirected graph than vertices without having a cycle.

True

False

Correct!

Quiz Score: **250** out of 250