Started on	Wednesday, 21 May 2025, 12:35 PM
State	Finished
Completed on	Wednesday, 21 May 2025, 12:56 PM
Time taken	20 mins 47 secs
Marks	17.00/20.00
Grade	**85.00** out of 100.00

Question **1**

Complete

Mark 1.00 out of 1.00

Which of the following scheduling algorithms may cause starvation?

Select one:

- **a. First-Come-First-Serve (FCFS)**
- **b. Shortest Job Next (SJN)**
- **c. Round Robin**
- **d. Multilevel Queue with fixed priority**

Question **2**

Complete

Mark 1.00 out of 1.00

Which of the following protocols is connectionless and unreliable?

Select one:

- **a. TCP**
- **b. HTTP**
- **c. UDP**
- **d. FTP**

Question **3**

Complete

Mark 1.00 out of 1.00

In white-box testing, which of the following is most relevant?

Select one:

- **a. Functional specification**
- **b. User requirements**
- **c. Code structure and logic**
- **d. GUI layout**

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Question 4

Complete

Mark 1.00 out of 1.00

What is the result of compiling and running the following code?

```
import java.util.ArrayList;
import java.util.List;

public class GenericsChallenge {
    public static void main(String[] args) {
        List<Integer> numbers = new ArrayList<>();
        numbers.add(10);
        numbers.add(20);
        List rawList = numbers;
        rawList.add("Hello");
        System.out.println(numbers.get(2));
    }
}
```

Select one:

- **a. Hello**
- **b. ClassCastException at runtime**
- **c. 20**
- **d. 10**

Question 5

Complete

Mark 1.00 out of 1.00

What is the main purpose of a page replacement algorithm?

Select one:

- **a. To increase CPU utilization**
- **b. To decide which memory page to swap out when memory is full**
- **c. To schedule disk I/O operations**
- **d. To allocate memory to processes**

Question 6

Complete

Mark 0.00 out of 1.00

Which metric measures the degree to which source code has been tested?

Select one:

- a. **Test Case Efficiency**
- b. **Cyclomatic Complexity**
- c. **Defect Density**
- d. **Code Coverage**

Question 7

Complete

Mark 1.00 out of 1.00

Which statement is true regarding the following code snippet?

```
class Super {
    public int value = 10;
    public void printValue() {
        System.out.println("Super: " + value);
    }
}

class Sub extends Super {
    public int value = 20; // This is field hiding, not overriding
    public void printValue() {
        System.out.println("Sub: " + value);
    }
}

public class FieldHiding {
    public static void main(String[] args) {
        Super s = new Sub();
        System.out.println(s.value);
        s.printValue();
    }
}
```

Select one:

- **a. The output will be:**
  20
  Sub: 20
- **b. The output will be:**
  10
  Sub: 20
- **c. The code will not compile due to field re-declaration.**
- **d. he output will be:**
  10
  Super: 10

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Question 8

Complete

Mark 1.00 out of 1.00

Dijkstra's algorithm is run on a directed graph with non-negative weights. Let V be the number of vertices and E the number of edges.

What is the time complexity of Dijkstra's algorithm using a Min-Heap (PriorityQueue)?

Select one:

- **a. O((V + E) log V)**
- **b. O(E log E)**
- **c. O(V²)**
- **d. O(V log E)**

Question 9

Complete

Mark 1.00 out of 1.00

What is the function of the TCP three-way handshake?

Select one:

- **a. Reliable connection establishment**
- **b. Data encryption**
- **c. IP address resolution**
- **d. Port number translation**

Question 10

Complete

Mark 1.00 out of 1.00

What is the primary goal of requirement analysis in software engineering?

Select one:

- **a. Determining hardware needs**
- **b. Designing database schemas**
- **c. Understanding what the user needs**
- **d. Coding of requirements**

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Question 11

Complete

Mark 1.00 out of 1.00

Given a binary tree (not BST), the Lowest Common Ancestor (LCA) of two nodes p and q is found using the following recursive method:

```
TreeNode LCA(TreeNode root, TreeNode p, TreeNode q) {
if (root == null || root == p || root == q) return root;
TreeNode left = LCA(root.left, p, q);
TreeNode right = LCA(root.right, p, q);
if (left != null && right != null) return root;
return (left != null) ? left : right;
}
```

What is the time complexity of this algorithm?

Select one:

- **a. O(n log n)**
- **b. O(log n)**
- **c. O(h)**
- **d. O(n)**

Question 12

Complete

Mark 0.00 out of 1.00

Which of the following is a process model that emphasizes incremental development and customer feedback?

Select one:

- **a. Agile**
- **b. Waterfall**
- **c. V-Model**
- **d. Spiral**

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Question 13

Complete

Mark 1.00 out of 1.00

Consider the following code snippet:

```
public class LoopPuzzle {
    public static void main(String[] args) {
        int sum = 0;
        for (int i = 0; i < 5; i++) {
            if (i % 2 == 0) {
                sum += i;
                continue;
            }
            if (i == 3) {
                break;
            }
            sum++;
        }
        System.out.println(sum);
    }
}
```

Select one:

- **a. 6**
- **b. 3**
- **c. 5**
- **d. 4**

Question 14

Complete

Mark 1.00 out of 1.00

You are given a list of n lowercase English words, each of maximum length m. A Trie is constructed from these words.

What is the worst-case time complexity to search for a prefix of length k in the Trie?

Select one:

- **a. O(k log n)**
- **b. O(k)**
- **c. O(m)**
- **d. O(n)**

Question **15**

Complete

Mark 1.00 out of 1.00

You're inserting a key into a Treap, which maintains:

* Binary Search Tree (BST) property on keys

* Min-Heap property on priorities (lower = higher priority)

After inserting a node based on BST property, what determines whether rotations are required?

Select one:

- **a. If inserted priority is lower than parent priority**
- **b. If tree becomes unbalanced**
- **c. If key is larger than parent**
- **d. If inserted priority is higher than parent priority**

Question **16**

Complete

Mark 0.00 out of 1.00

What is the output of this code?

```
public class StaticInit {
    static {
        System.out.println("Static Block 1");
    }

    public StaticInit() {
        System.out.println("Constructor");
    }

    {
        System.out.println("Instance Initializer Block 1");
    }

    static {
        System.out.println("Static Block 2");
    }

    {
        System.out.println("Instance Initializer Block 2");
    }

    public static void main(String[] args) {
        System.out.println("Main Method Start");
        new StaticInit();
        new StaticInit();
    }
}
```

Select one:

- **a. Static Block 1**
  Static Block 2
  Instance Initializer Block 1
  Instance Initializer Block 2
  Constructor
  Main Method Start

Instance Initializer Block 1
Instance Initializer Block 2
Constructor

b. Main Method Start
Static Block 1
Static Block 2
Instance Initializer Block 1
Instance Initializer Block 2
Constructor
Instance Initializer Block 1
Instance Initializer Block 2
Constructor

c. Static Block 1
Static Block 2
Main Method Start
Instance Initializer Block 1
Instance Initializer Block 2
Constructor
Instance Initializer Block 1
Instance Initializer Block 2
Constructor

d. Static Block 1
Static Block 2
Main Method Start
Instance Initializer Block 1
Instance Initializer Block 2
Constructor
Instance Initializer Block 1
Instance Initializer Block 2
Constructor

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Question 17

Complete

Mark 1.00 out of 1.00

In DFS traversal of a directed graph, each edge is classified as one of the following:

* Tree edge
* Back edge
* Forward edge
* Cross edge

Which of the following is TRUE about back edges in DFS?

Select one:

- a. **Back edges are present only in undirected graphs**
- b. **Back edges form cycles in the graph**
- c. **Back edges point to a vertex not yet discovered**
- d. **Back edges connect a node to its immediate child**

Question **18**

Complete

Mark 1.00 out of 1.00

What will be the output?

```
public class Mystery {
   private static int counter = 0;
   private final int id;

   public Mystery() {
      this.id = ++counter;
   }

   public static void main(String[] args) {
      Mystery m1 = new Mystery();
      Mystery m2 = new Mystery();
      Mystery m3 = m2;
      System.out.println(m1.id + " " + m2.id + " " + m3.id);
   }
}
```

Select one:

- **a. 1 2 3**
- **b. 1 2 2**
- **c. 1 1 1**
- **d. Compilation error**

Question **19**

Complete

Mark 1.00 out of 1.00

What is the goal of integration testing?

Select one:

- **a. Identify GUI defects**
- **b. Verify interaction between integrated modules**
- **c. Ensure performance of the system**
- **d. Test individual modules**

Question **20**

Complete

Mark 1.00 out of 1.00

In the OSI model, what layer is responsible for routing?

Select one:

- **a. Data Link Layer**
- **b. Network Layer**
- **c. Transport Layer**
- **d. Session Layer**