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State	Finished
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Time taken	25 mins 49 secs
Marks	16.00/20.00
Grade	**80.00** out of 100.00

Question 1

Correct

Mark 1.00 out of 1.00

Which of the following models is best suited for small projects with well-understood requirements?

Select one:

- **a. Waterfall Model**

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

The correct answer is: Waterfall Model

Question 2

Correct

Mark 1.00 out of 1.00

Which of the following statements is TRUE regarding the First Normal Form (1NF) in database normalization?

Select one:

- a. **1NF eliminates partial dependencies**
- b. **1NF allows multi-valued attributes**
- c. **1NF eliminates transitive dependencies**
- d. **1NF requires that all attributes contain atomic (indivisible) values**

The correct answer is: 1NF requires that all attributes contain atomic (indivisible) values

Question 3

Incorrect

Mark 0.00 out of 1.00

Which of the following may only be hidden and not overridden? (Choose all that apply)

Select one or more:

- [ ] **a. protected instance methods**
- [x] **b. private variable**

- [x] **c. private instance methods**

d. static methods

- [ ] **e. public variables**
- [ ] **f. public instance methods**

The correct answer is: private instance methods, static methods, public variables, private variable

Question 4

Incorrect

Mark 0.00 out of 1.00

```
from collections import deque

def bfs(capacity, flow, s, t, parent):
    visited = [False]  len(capacity)
    queue = deque([s])
    visited[s] = True
    while queue:
        u = queue.popleft()
        for v in range(len(capacity)):
            if not visited[v] and capacity[u][v] - flow[u][v] > 0:
                parent[v] = u
                visited[v] = True
                if v == t:
                    return True
                queue.append(v)
    return False

def edmonds_karp(capacity, s, t):
    n = len(capacity)
    flow = [[0]  n for _ in range(n)]
    parent = [-1]  n
    max_flow = 0

    while bfs(capacity, flow, s, t, parent):
        path_flow = float('inf')
        v = t
        while v != s:
            u = parent[v]
            path_flow = min(path_flow, capacity[u][v] - flow[u][v])
            v = u
        v = t
        while v != s:
            u = parent[v]
            flow[u][v] += path_flow
            flow[v][u] -= path_flow
            v = u
        max_flow += path_flow
```

```
    return max_flow

capacity = [
    [0, 10, 10, 0, 0, 0],
    [0, 0, 2, 4, 8, 0],
    [0, 0, 0, 0, 9, 0],
    [0, 0, 0, 0, 0, 10],
    [0, 0, 0, 6, 0, 10],
    [0, 0, 0, 0, 0, 0]
]

print(edmonds_karp(capacity, 0, 5))
```

What will be the output?

Select one:

- **a. 14**

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- **b. 19**
- **c. 13**
- **d. 20**

The correct answer is: 19

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Question 5

Correct

Mark 1.00 out of 1.00

```
class TrieNode:
    def __init__(self):
        self.children = [None]  26
        self.is_end = False

def insert(root, word):
    node = root
    for char in word:
        index = ord(char) - ord('a')
        if not node.children[index]:
            node.children[index] = TrieNode()
        node = node.children[index]
    node.is_end = True

def search(root, word):
    node = root
    for char in word:
        index = ord(char) - ord('a')
        if not node.children[index]:
            return False
        node = node.children[index]
    return node.is_end

root = TrieNode()
insert(root, "code")
insert(root, "coder")
print(search(root, "code"))
print(search(root, "cod"))
```

What will be printed?

Select one:

- **a. True, True**
- **b. False, True**
- **c. True, False**

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d. False, False

The correct answer is: True, False

Question 6

Correct

Mark 1.00 out of 1.00

Which of the following describes the "Isolation" property in the ACID transaction model?

Select one:

- a. **Transactions should be able to access the database at the same time without affecting the integrity of the database**
- b. **Transactions should leave the database in a consistent state even if the system crashes**
- c. **Transactions should execute in a way that they appear to be running concurrently but are actually executed one after the other**

- d. **Transactions should guarantee that once they are committed, they are permanent and not subject to rollback**

The correct answer is: Transactions should execute in a way that they appear to be running concurrently but are actually executed one after the other

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Question 7

Correct

Mark 1.00 out of 1.00

What is the result of the following?

```
6: String [] names = {"Tom", "Dick", "Harry"};
7: List<String> list = names.asList();
8: list.set(0, "Sue");
9: System.out.println(names[0]);
```

Select one:

- **a. Compiler error on line 8.**
- **b. An exception is thrown.**
- **c. Sue**
- **d. Compiler error on line 7.**

- **e. Tom**

The correct answer is: Compiler error on line 7.

Question 8

Correct

Mark 1.00 out of 1.00

Given the following SQL query, what will be the result of this subquery?

```
SELECT ProductName
FROM Products
WHERE ProductID IN (SELECT ProductID FROM OrderDetails WHERE Quantity
50);
```

Select one:

- a. It returns the products ordered more than 50 times
- b. It returns the products with IDs greater than 50
- c. It returns the total quantity of each product in the order details
- d. It returns the product names that appear in the order details for products with quantities greater than 50

The correct answer is: It returns the product names that appear in the order details for products with quantities greater than 50

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Question 9

Correct

Mark 1.00 out of 1.00

What is the primary benefit of using an index in a database?

Select one:

- a. It ensures data integrity by enforcing constraints
- b. It increases the complexity of write operations
- c. It speeds up the retrieval of data from large tables

- d. It reduces disk space usage by eliminating duplicate data

The correct answer is: It speeds up the retrieval of data from large tables

Question **10**

Correct

Mark 1.00 out of 1.00

```
def is_Min_heap(arr, i, n):
    if 2i + 1 >= n:
        return True
    left = 2i + 1
    right = 2i + 2

    if arr[i] > arr[left]:
        return False
    if right < n and arr[i] > arr[right]:
        return False

    return is_Min_heap(arr, left, n) and (right >= n or is_Min_heap(arr, right, n))

arr = [1, 3, 5, 7, 9, 10]
print(is_Min_heap(arr, 0, len(arr)))
```

What will be printed?

Select one:

- a. None
- b. True

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c. False

d. Error

The correct answer is: True

Question 11

Incorrect

Mark 0.00 out of 1.00

What is the output of the following SQL query?

```
SELECT Employees.EmployeeID, Employees.Name, Departments.DepartmentName
FROM Employees
INNER JOIN Departments ON Employees.DepartmentID =
Departments.DepartmentID;
```

Select one:

- a. **Returns departments with no employees assigned**
- b. **Returns all employees, even if they don't belong to a department**
- c. **Returns employees who belong to a department, excluding employees without a department**
- d. **Returns employees and departments, with NULL values where there is no match**

The correct answer is: Returns employees who belong to a department, excluding employees without a department

Question 12

Correct

Mark 1.00 out of 1.00

Which phase of TCP congestion control increases the congestion window size exponentially?

Select one:

- **a. Slow Start**

- **b. Fast Retransmit**
- **c. Fast Recovery**
- **d. Congestion Avoidance**

The correct answer is: Slow Start

Question 13

Correct

Mark 1.00 out of 1.00

```
class Node:
    def __init__(self, val):
        self.val = val
        self.left = None
        self.right = None
        self.height = 1

def get_height(n):
    return n.height if n else 0

def update_height(n):
    n.height = 1 + max(get_height(n.left), get_height(n.right))

def right_rotate(y):
    x = y.left
    T2 = x.right
    x.right = y
    y.left = T2
    update_height(y)
    update_height(x)
    return x

# Constructing an LL case manually:
root = Node(30)
root.left = Node(20)
root.left.left = Node(10)
update_height(root.left.left)
update_height(root.left)
update_height(root)

rotated = right_rotate(root)
print(rotated.val)
```

What will be the printed output after right rotation?

Select one:

a. 30

b. Error

c. 20

d. 10

The correct answer is: 20

Question **14**

Correct

Mark 1.00 out of 1.00

What is the result of the following statements?

```
1:  public class Test {
2:    public void print(byte x) {
3:      System.out.print("byte");
4:    }
5:    public void print(int x) {
6:      System.out.print("int");
7:    }
8:    public void print(float x) {
9:      System.out.print("float");
10:   }
11:   public void print(Object x) {
12:     System.out.print("Object");
13:   }
14:   public static void main(String[] args) {
15:     Test t = new Test();
16:     short s = 123;
17:     t.print(s);
18:     t.print(true);
19:     t.print(6.789);
20:   }
21: }
```

Select one:

- **a. intObjectObject**

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- b. byteObjectfloat
- c. bytefloatObject
- d. intObjectfloat
- e. intfloatObject
- f. byteObjectObject

The correct answer is: intObjectObject

Question **15**

Correct

Mark 1.00 out of 1.00

What is the result of the following code?

```
4: int total = 0;
5: StringBuilder letters = new StringBuilder("abcdefg");
6: total += letters.substring(1, 2).length();
7: total += letters.substring(6, 6).length();
8: total += letters.substring(6, 5).length();
9: System.out.println(total);
```

Select one:

- **a. 2**
- **b. 1**
- **c. 7**
- **d. The code does not compile**
- **e. An exception is thrown.**

- **f. 3**

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The correct answer is: An exception is thrown.

Question **16**

Incorrect

Mark 0.00 out of 1.00

In the defect lifecycle, what is the correct order of these stages?

1. Open
2. Reopened
3. Assigned
4. Closed
5. New
6. Fixed
7. Verified

Choose the correct sequence:

Select one:

- **a. 5 → 3 → 1 → 6 → 7 → 4**
- **b. 5 → 1 → 3 → 6 → 7 → 4**
- **c. 5 → 1 → 3 → 6 → 7 → 2 → 4**

- **d. 5 → 1 → 3 → 6 → 4 → 7**

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The correct answer is: 5 → 3 → 1 → 6 → 7 → 4

Question 17

Correct

Mark 1.00 out of 1.00

Which type of testing is performed without executing the program?

Select one:

- a. **Regression Testing**
- b. **White-box Testing**
- c. **Static Testing**

- d. **Black-box Testing**

The correct answer is: Static Testing

Question 18

Correct

Mark 1.00 out of 1.00

Which of the following are true? (Choose all that apply)

Select one or more:

- [ ] **a. Immutability allows setters.**
- [x] **b. Encapsulation allows setters.**

- [x] **c. Immutability uses private instance variables.**

d. Encapsulation uses private instance variables.

- [ ] **e. Immutability uses package private instance variables.**
- [ ] **f. Encapsulation uses package private instance variables.**

The correct answer is: Encapsulation uses private instance variables., Encapsulation allows setters., Immutability uses private instance variables.

Question **19**

Correct

Mark 1.00 out of 1.00

Which of the following is NOT a valid state in the Process Life Cycle?

Select one:

- a. **New**
- b. **Blocked**
- c. **Terminating**

- d. **Waiting**

The correct answer is: Terminating

Question **20**

Correct

Mark 1.00 out of 1.00

```
def dfs(graph, start, visited=None):
    if visited is None:
        visited = set()
    visited.add(start)
    for neighbor in graph[start]:
        if neighbor not in visited:
            dfs(graph, neighbor, visited)
    return visited

graph = {
    0: [1],
    1: [2],
    2: [0, 3],
    3: []
}

print(dfs(graph, 0))
```

What will be the output?

Select one:

- a. **{0, 2, 3}**
- b. **{0, 1, 2, 3}**

- c. {0, 1, 2}
- d. {0, 1, 3}

The correct answer is: {0, 1, 2, 3}