Software Engineer Trainee 2023 (1st Phase-Initial Screening)

Question Part (45 MCQ Question)

There will be 45 MCQ questions (12 to 56) related to Software Engineer Trainee basic skill knowledge. Don't browse the internet or take photographs. You have to answer all the questions.

12

Which of the following is not fundamental concept in Object-Oriented Programming?

○ Inheritance

○ Encapsulation

○ Polymorphism

◉ Multi-threading

13

Which of the following combination of characteristics represent an object in Object-Oriented Programming?(2.5 Points)

○ Identity, state and thread safety

○ state, behavior and thread safety

◉ Identity, state and behavior

○ Identity, behavior and thread safety

14

Which of the following is true about method overloading in OOP?(2.5 Points)

◯ The method signature must include the return type

◯ The return type of overloaded methods must be the same

◯ The number and types of parameters must be the same

🔘 The number and types of parameters must be different

15

What type of casting is demonstrated in the following code?

class Employee {}

class Manager extends Employee {}

Employee employee = new Manager ();(2.5 Points)

🔘 Upcasting

◯ Downcasting

◯ Both Upcasting and Downcasting

◯ No casting

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5.What will be the output of the following code?

```
class  Counter{

    static int count = 0;

    public Counter(){

        count += 1;

        System.out.print(count+ " ");

    }

}

Counter counter1 = new Counter();

Counter counter2 = new Counter();

Counter counter3 = new Counter();
```
(2.5 Points)

○ 0 1 2

○ 1 1 1

◉ 1 2 3

○ 0 2 3

17

Which of the following represents IS-A relationship in Object-Oriented Programming?(2.5 Points)

○ Abstraction

○ Encapsulation

○ Polymorphism

● Inheritance

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Go through the picture below and answer the questions following:

Read the options carefully

I. When an object is created, constructor is called

Ii. In the above example, constructor overloading is used

Iii. Output from the code above is

The candidate's name is Ahmed, age is 25

Which of the question below is correct?
(2.5 Points)

```cpp
using namespace std;
class Candidate{
    public:
        string name;
        int age;
        void display(){
            cout<<"Candidate name is"<< " " <<name<< " " <<"age is"<< " " <<age<< "
                " << endl;
        }
        Candidate(){
            cout <<"The Candidate Information"<< endl;
        }
        Candidate (string x,int y){
            name = x;
            age= y;
        }
};
int main() {
    Candidate ob;
    Candidate firstCandidate("Ahmed",25);
    firstCandidate.display();
    return 0;
}
```

- ○ i
- ● i, ii
- ○ ii,iii
- ○ i, ii, iii

19

In which classes instance cannot be created?(2.5 Points)

◯ Anonymous class

🔘 Base class

◯ Virtual class

◯ None of the above

20

9. Which of the following is an advantage of adjacency list representation over adjacency matrix representation of a graph?

i.   DFS and BSF can be done in O(V + E) time for adjacency list representation. These operations take O(V^2) time in adjacency matrix representation. Here V and E are numbers of vertices and edges respectively

ii.   Adding a vertex in adjacency list representation is easier than adjacency matrix representation.

iii.   Adjacency list are helpful when we need to quickly check if two nodes have a direct edge or not.

Which of the following statements are true?(2.5 Points)

◯ i, iii

🔘 i, ii

◯ ii, iii

◯ i, ii, iii

21

Which of the following algorithms performs fastest (time complexity is mini-
mum) if we need to find out the shortest path from the node 'N' to each
other node is an undirected and unweighted connected graph? (All algo-
rithms should start performing from node N).(2.5 Points)

○ DFS

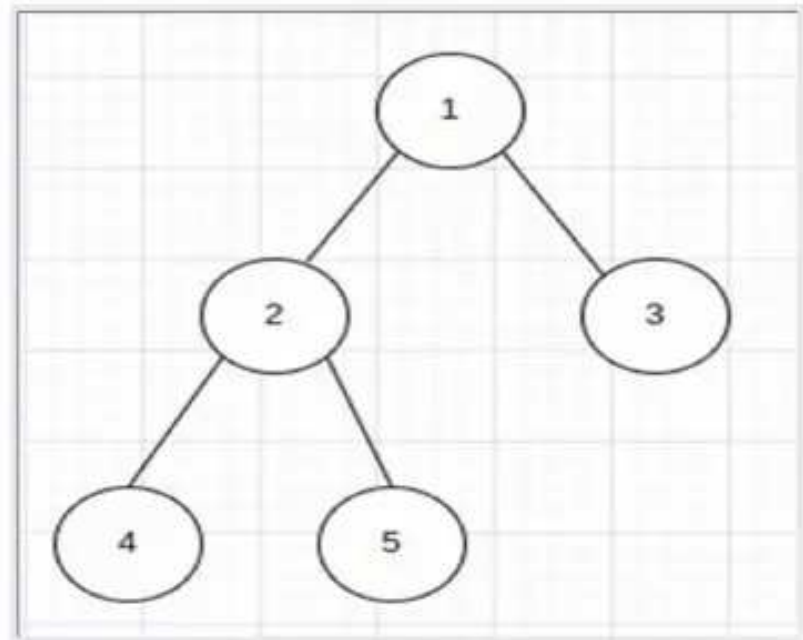◉ BFS

○ Warshall's

○ Dijkstra's

22

You are creating an operating system for the employees of Brain Station 23.
But you faced a problem regarding time sharing among the applications!
The problem is like, the operating system must maintain a list of
programs/processes which are running and must alternately allow each pro-
gram to use a small slice of CPU time, one program at a time. The operating
system will pick a program, let it use a small amount of CPU time and then
move on to the next program and so on.

What data structure you will choose to solve this problem?(2.5 Points)

◉ Circular linked list

○ Stack

○ Binary indexed tree

○ None of the above

23

What is true about the following tree?(2.5 Points)

○ It's a full binary tree

○ It's a complete binary tree

○ It can be used to create a priority queue

● Both b and c.

24

Suppose, your supervisor asked you to create a program to organize some data. But the data must be organized in a way that, if he inputs a series of data then all the data must come out sequentially. What data structure you think is preferable?(2.5 Points)

○ Stack

○ Segment tree

● Queue

○ None of the above

25

What will be the output of the following code?(2.5 Points)

```
int a = 2, b = 10, c;

for(int i=1; i<=b; i++)
{
    if(a > 0 && a <= 3)
    {
        c = b >> a;
    }

    ++a;

    if(a > 2) a -= i;
    else
    {
        b += (c-i);
    }

    b--;
}

printf("%d, %d, %d\n", a, b, c/a);
```

○ 0, 2, 0

○ -1, 3, 5

◉ Floating point exception

○ 0, 2, -5

26

If we have the following recurrence relation:

Then T(n) in terms of Big Θ notation is:(2.5 Points)

$$T(n) = \begin{cases} 2T(\sqrt{n}) + 1, & 1 \\ 2, & 0 < n \leq \end{cases}$$

○ Θ(n)

○ Θ(logn)

◉ Θ(log log n)

○ Θ(√n)

27

Which one of the following is correct for Bellman Ford algorithm?(2.5 Points)

○ The for loop-in gets executed for "V-1" times.

○ It provides solution for single source shortest path.

○ It helps to find out if a graph has negative weight cycles.

◉ All of the above

28

Which one is not true about Dijkstra's algorithm?(2.5 Points)

⦿ It can be applied on graphs which have negative weight function.

◯ It's efficient than Bellman Ford algorithm.

◯ Both a & b

◯ None of the above

29

What will be the postfix expression for the following infix expression?

(A + B) / C * D + E ^ F(2.5 Points)

◯ A B C / + D E F * ^ +

◯ A B + C D / * E F + ^

◯ A B C + / D * E + F ^

⦿ A B + C / D * E F ^ +

30

Multiple words and search for a particular word. Which of the following al-
gorithms should be used in the dictionary app so that the app performs the
search and insertion operation most efficiently? (2.5 Points)

◯ Binary Search Trees

◯ Hash Tables

⦿ Trie

◯ Ternary Search

31

Mr. Joy has been assigned homework to determine the square root of a positive number. Which of the following algorithms can he use to solve this math problem? (2.5 Points)

◯ Kruskal's algorithm

◯ Breadth First Traversal

◯ Counting Sort

🔘 Binary Search

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Mr. Joy is planning to build a web browser. Now he is analyzing requirements for the navigation system of his web browser, which will preserve the browsing history. What is the appropriate data structure to use for the navigation system? (2.5 Points)

◯ Array

🔘 Stack

◯ Queue

◯ Linked list

33

Which of the following sorting algorithms performs least efficiently in worst-case scenarios?

○ Merge sort

○ Heap sort

◉ Quick sort

○ Counting sort

34

Which of the following statement is false for the single linked list?(2.5 Points)

◉ It contains a pointer that points to the previous node.

○ It only can traverse in one direction

○ The last node called the tail, which points to NULL.

○ Time complexity of insertion is O(n)

35

Rearrange the query so that it could be executable:

1. FROM vehicles

2. HAVING COUNT(vehicles.vehicle_id) > 5

3. SELECT drivers.last_name, COUNT(vehicles.vehicle_id) AS number_of_vehicles

4. GROUP BY last_name

5. WHERE last_name = 'Patrick' OR last_name = 'Sean'

6. INNER JOIN drivers ON vehicles.vehicle_id = drivers.driver_id(2.5 Points)

- 🔘 3 1 6 4 2 5
- ⚪ 3 6 1 2 5 4
- ⚪ 3 1 6 5 4 2
- ⚪ 3 2 1 4 6 5

36

This a query that returns all cards that have a card_number ending with "80_1". Which WHERE clause should you use to fill in the blank in this query?

SELECT card_id, card_holder_name, card_number

FROM cards _____ ;(2.5 Points)

- 🔘 WHERE card_number LIKE '%80_1'
- ⚪ WHERE card_number LIKE ('%80'+'_'+'1')
- ⚪ WHERE card_number LIKE '%80"_"1'
- ⚪ WHERE card_number LIKE '%80[_]1'

37

What is the result of this query?

SELECT 5/6 AS output;

◯ Error

⦿ 0

◯ 1

◯ None of the above

38

Which of the following aggregate functions ignores nulls?(2.5 Points)

◯ MAX

◯ SUM

⦿ COUNT

◯ None of the above

39

What is ACID property in the Database?(2.5 Points)

⦿ Atomicity, Consistency, Isolation, Durability

◯ Atomicity, Concurrency, Isolation, Durability

◯ Accessibility, Consistency, Integrity, Durability

◯ Atomicity, Consistency, Integrity, Durability

40

What is the purpose of a view in a relational database?(2.5 Points)

🔘 To provide an alternative way to display data from one or more tables

⭕ To store data

⭕ To create a relationship between tables

⭕ To create a backup of a table

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Write a SQL query to retrieve the top 5 most expensive products in the prod-
ucts table.

A) SELECT product_name, price
FROM products
ORDER BY price ASC
LIMIT 5;

B) SELECT product_name, price
FROM products
WHERE price > 5000
LIMIT 5;

C) SELECT product_name, price
FROM products
ORDER BY price DESC
LIMIT 5;

D) SELECT product_name, price
FROM products
ORDER BY price DESC
FETCH FIRST 5;
(2.5 Points)

○ A

○ B

◉ C

○ D

42

What type of database model is best suited for handling large amounts of unstructured data?(2.5 Points)

○ Relational

○ Hierarchical

○ Network

◉ Document

43

Which of the following is not a method to improve database performance? (2.5 Points)

◉ Indexing

○ Partitioning

○ Encryption

○ Denormalization

44

What would be the output of this snippet?(2.5 Points)

```cpp
int n = 12;
int i;

for (i = 0; i <= n / 2; i++)
{
    if (i <= 5)
    {
        i++;
    }
    else
    {
        break;
    }
}

cout<<(i);
```

- ○ 4
- ○ 5
- ● 6
- ○ None

45

Which one to use to write if a BOOK is called MONITOR, MONITOR is called PENCIL, PENCIL is called BAG, and BAG is called SHIP?(2.5 Points)

- ○ MONITOR
- ○ PENCIL
- ● BAG
- ○ BOOK

46

Suppose a monkey can jump max 3 feet in a move. He wants to reach the top of a tree. The tree is 10 feet long. Initially he is at the bottom of the tree. The tree is slippery at some heights. The slipper points will bring the monkey down to a lower height. The slipper heights and the height of the slipping down point are given as.

Slippery heights: [4, 6, 8, 9]

Slipping down heights: [2, 3, 5, 7]

What would be the minimum number of moves to reach the top of the tree? (2.5 Points)

○ 3

○ 4

○ 5

○ Not possible

47

You have a bag containing 20 blue and 13 red balls. You randomly select two balls without replacement, and depending on whether they are the same color or different colors, you replace them with a blue or red ball respectively. The balls that you take out are not returned to the bag, so the number of balls in the bag decreases each time. What color will be the last ball remaining in the bag?
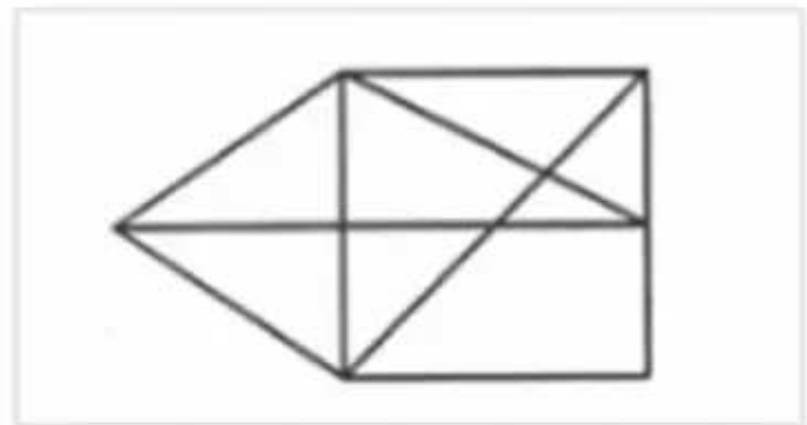
○ Red ball

○ Blue ball

○ Green ball

○ Yellow ball

48

Once upon a time, a group of detectives were presented with a challenge to identify which of the 1000 candies was poisoned, before it caused harm to any living species. They had to act fast, as the poison would take effect within an hour of consumption. The detectives knew they could use test subjects, but they needed to determine the minimum number required to solve the mystery in time. Can you help them find the solution before it's too late? (2.5 Points)

○ 5

○ 100

◉ 10

○ 25

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How many triangles are there in the given figure?(2.5 Points)

○ 12

○ 13

◉ 14

○ 15

50

5, 10, 10, 29, 17, 66

What is the next number of the series?(2.5 Points)

- ⦿ 66
- ◯ 26
- ◯ 132
- ◯ 35

51

You are asked to develop an email sending application which can be used to send files too. Which protocol will you choose?(2.5 Points)

- ⦿ SMTP only
- ◯ SMTP & FTP
- ◯ HTTP & FTP
- ◯ HTTP only

52

Sakib & Rakib are working on the same project. They are using git for collab-
oration. Rakib made some changes to the project and committed that on his
computer. Now Sakib wants to get in sync with those changes. Which com-
mands can they use to do that?(2.5 Points)

🔵 git commit & git pull

◯ git push & git pull

◯ git merge

◯ git clone

53

Given the following IP address, which one is private IP?

◯ 100.10.0.1

🔵 192.168.1.1

◯ 11.1.2.3

◯ 255.255.0.0

54

QuestionWhich of the following is true about the Transmission Control
Protocol (TCP) and the User Datagram Protocol (UDP)?(2.5 Points)

◯ TCP guarantees that data is delivered in the order it was sent, while UDP does not.

◯ UDP is connection-oriented, while TCP is connectionless

◯ TCP is faster than UDP because it uses smaller packets.

◯ Both TCP and UDP use the same port numbers for different services

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Which protocol will you use for video streaming applications to get the best performance?(2.5 Points)

◉ HTTPS

◯ TCP

◯ UDP

◯ FTP

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I have an email address (example@gmail.com). Which protocol should I use to get the IP address?(2.5 Points)

◯ TELNET

◉ SMTP

◯ DNS

◯ TCP

Back

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