**Coding Question**

You have developed an e-commerce website. Many people have created accounts on your website. You have the password of all the users. You want to know how many distinct passwords are there in total.

Details of a password are as described:

* Each password is a string of characters from a to z(small letters)
* Two passwords, say Pass1 and Pass2 are said to be same if Pass2 can be obtained by swapping the ith character with the jthcharacter in Pass1, where (i+j)%2=0.

Note: Swapping can be done repeatedly.

**Input Specification:**

Input1: N number of users registered

Input2: An array of strings containing all the passwords of the N users.

**Output Specification:**

Return T, the total number of distinct passwords present.

**Example 1:**

Input1: 2

Input2: {abcd, cdab}

Output: 1

Explanation:

‘cdab’ can be obtained from ‘abcd’ by swapping 0th and 1stelements with 2nd and 3rd elements respectively. Hence only 1 distinct password.

**Example 2:**

Input1: 2

Input2: {abcd, bcad}

Output: 2

Explanation:

‘bcad’ cannot be obtained from ‘abcd’ under the given conditions. Hence, 2 distinct passwords.

**Multiple choice questions**

**Data Structures**

1. What will be the output?

class Node {

int key;

Node left= null, right=null;

Node(int key) {

this.key=key;

}

}

class main{

public static int height(Node root) {

if(root == null) {

return 0;

}

return 1+ Math.max(height(root.left), height(root.right));

}

Public static void main(String []args) {

Node root =null;

root= new Node(15);

root.left = new Node(10);

root.right=new Node(20);

root.left.left = new Node(8);

root.left.right = new Node(12);

root.right.left = new Node(16);

root.right.right = new Node(25);

System.out.print(height(root));

}

}

Choose the best option

1. 2
2. 3
3. 4
4. 5
5. Consider a binary search tree with nodes (A,B,C,D, E,F). Using Postorder traversal, the result was A B C D E F. What will be the sequence if the same is traversed using Preorder.
6. F C D E A B
7. F A C D B E
8. F C A B E D
9. F C A E B D
10. Which of the given statements specifies the following code?

“INCREASE-KEY(S, x, k); increases value of element x’s key to k. Assume k >= x’s current key value.”

1. Min-priority queue
2. Max-priority queue
3. Avg-priority queue
4. None of the given options
5. You have implemented a stack using two queues. The stack should support push operation in O(1) time. How many enqueue/dequeue operations on the queues are required to support the following sequence of stack operations?

push(5);

push(6);

pop();

push(3);

push(4);

pop();

1. 7 enqueue 5 dequeue
2. 8 enqueue 6 dequeue
3. 7 enqueue 6 dequeue
4. 8 enqueue 5 dequeue
5. What would be the level-order traversal of the BST formed by inserting the following keys in sequence?

41, 53, 18, 72, 63, 38, 71, 79, 47, 54

1. 41 18 53 38 47 72 63 79 54 71
2. 41 18 53 38 47 63 54 72 71 79
3. 18 38 41 47 53 54 63 71 72 79
4. 79 72 71 63 54 53 47 41 38 18

**Algorithms**

1. Find out the time complexity of given recurrence relation:

Tn = {1 if n=0}

Tn = { T(n-2) +n2if n>1}

1. O(n2)
2. O(nlogn)
3. O(n)
4. O(n3)
5. Consider the following recurrence relation of the all pairs of shortest paths and find out their time complexity:

AK(i,j) = { 0 if i=j

Min(Ak-1(i,j), AK-1(i, k) + Ak-1(k,j) if i != j}

1. O(2^n)
2. O(n^2)
3. O(n^3)
4. O(3^n)
5. Consider these functions:

push() : push an element into the stack

pop(): pop the top of the stack element

top: returns the item stored in the top of the stack

What will be the output of the following sequence of operations?

Push(20);

Push(4);

Top();

Pop();

Pop();

Pop();

Push(5);

Top();

Choose the best option:

1. 20
2. 4
3. 5
4. 6
5. Find the time complexity of the following program:

intmaxLength( int a[], int n)

{

int sum=0, len=0;

for(inti=0;i<n;i++)

sum+=a[i];

if(sum%2 == 0)

return n;

for(inti=0;i<n;i++)

{

if(a[i]%2==1)

len= max(len, max(n-i-1, i));

}

returnlen;

}

int main()

{

int a[]={1,2,3,2};

int n= sizeof(a) /sizeof(a[0]);

cout<<maxLength(a,n) << "\n";

return 0;

}

1. O(n)
2. O(nlogn)
3. O(logn)
4. S2 & S3zzzzz
5. In a company, 7 objects are given with their profit and weight. Find out the total profit using knapsack problem using given data:

Object: A B C D E F G

Profit: 25 75 15 95 80 40 35

Weight: 4 12 2 18 15 6 5

Consider the knapsack size M=48.

1. 290.1
2. 291.11
3. 292.11
4. 16

**Section: Networking:**

1. A company is using a network in which each machine is connected to another machine. When one machine fails, the remaining machines also get affected. Which alternative topology can be implemented to solve such issues? Star, ring, mesh, **dual ring topology**.

|  |  |
| --- | --- |
| 1 Network layer | A Frame |
| 2 Data Link Layer | B Packet |
| 3 Physical Layer | C Symbol |
| 4 Transport Layer | D Datagram |

**1b 2a 3c 4d**

1a 2c 3d 4b

1a 2d 3b 4c

1b 2c 3a 4d

1. A network routing algorithm needs to be developed for a network to ensure speedy and reliable delivery. You need to ensure that the routers will forward packets along the fastest path based on the current network traffic and the routers are expected to share this information with their neighbours as and when the routing table changes. What kind of routing algorithm should be employed in this case?
2. Adaptive routing algorithm such as isolation algorithm
3. Non-adaptive routing algorithm such as Flooding
4. **Adaptive routing algorithm such as distance vector routing algorithm**
5. Non-adaptive routing algorithm such as random walks
6. A user is facing issues while accessing Internet Explorer. All other applications are working of her. While accessing a website, an error message is displayed “Page cannot be displayed”. Which method should be used for troubleshooting this issue?

Bottom-up

Top-down

Bottom-up

**Divide and conquer**

1. An online food agency service processes a large number of food orders every minute. They want to store their customer data and transaction details in physical form. Which transmission media can help them store large information quickly?

Twisted pair cable can help in fast data transfer

Magnetic media helps to store the huge data quickly

Coaxial cable will help to prevent large data leakage during data transfer

**Fiber optics use light to store data which help in fast data storage.**

**Section: Linux**

1. **Identify the output of the following code:**

#! /user/bin/awk -f

BEGIN

{

two=2;

two;

print two

}

Options: a. 3, b. 2, c. two, d. three

1. **What would be the current working directory at the end of the following code?**

$pwd

/home/user1/proj

$cd src

$cd generic

$cd . .

$pwd

**Options: a.** /home/user1/proj

b. /home/user1/

c. /home/user1/proj/src

d. /home/user1/proj/src/generic

1. Your java web application log4j log path has to be mapped to /home/teemp/trelta/logs/trelta.log in the Linux machine. How do you achieve this requirement?

**Options: a.** add/home/teemp/trelta/logs/trelta.log to log4j.appender.FILE propriety in log4j prosperity file.

**b.** add/home/teemp/trelta/logs/trelta.log to log4j.appender.FILE.File propriety in log4j prosperity file.

c. add/home/teemp/trelta/logs/trelta.log to log4j.appender.ORG.FILE.File propriety in log4j prosperity file

d. add/home/teemp/trelta/logs/trelta.log to log4j.appender.org.FILE properity in log4j prosperity file

1. **Identify the output of the following code:**

{

printf(“user\n”) ;

system (“date”) ;

printf(“user1”);

}

If a.out is the executable code corresponding to the above source code, then the command

a.out > out f

**Options: a.** Redirects the output of data to the file out f

**b.** Displays the output of data on the screen

c. Prints everything on the screen

d. Prints the two messages on the screen

1. Identify the output of the following code:

#! /bin/bash

Function user\_function1 {

echo “This is the first function”

}

User\_function2 () {

echo “This is second function”

}

user\_function1

user\_function2

exit 0

**Options: a.** This is the first function

b. This is the second function

c. This is the first function

This is the second function

d. Output will be flushed

**Software Testing**

Q1) If there are 3 alternate paths for a use case, minimum how many test cases are needed for coverage?

3

4

5

6

Q2) How do you ensure test coverage?

By having more count of test cases

By testing all test cases

By mapping test cases to requirement and making test case for missing ones

By having experienced testers

Q3) A project needs 20% of coding effort as test execution effort and 80% of that as test case preparation. If coding effort is 100PD (person days) , what is total test effort?

40 PD

20 PD

36 PD

50 PD

Q4) If reviews took 5 days and testing 20 days with 3 and 5 people working respectively and UAT had 5 days with 2 people , then what is the cost of quality in PD(person days)?

15 PD

100 PD

115 PD

125 PD

Q5) A software product is to be tested in 5 OS and 3 databases. How many correct test cases combinations are required?

Boundary value 5 sets

Orthogonal array 15 sets

Equivalence partitioning 5 sets

Orthogonal array 5 sets

**Software Testing Methodologies**

Q1) Your application consists of 3 modules. You have developed one of the modules and want to test it. However, few of its functionalities are dependent on the other modules which have not been developed yet. In this case, the other modules can be replaced by stubs and drivers as required. Identify the kind of testing used in this scenario.

Unit testing

System testing

Integration testing

Component testing

Q2) Model based testing (MBT) is integrated into the test process with different input and output artifacts according to the information and abstraction level. What are the output artifacts involved?

1. Test planning and control
2. Test analysis and design
3. Test implementation and execution
4. Evaluation of exit criteria and reporting
5. Test closure activities
6. Test strategy
7. The test basis including requirement and other test targets , test conditions and existing designs or models
8. Incident and defect reports, test logs and test execution logs from previous test execution activities.
9. Method and process guidelines, tool documents
10. MBT models
11. Parts of the test plan, test schedule and test metrics
12. Test scenarios, test suites, test execution schedules and test design specifications
13. Test cases, test procedure specifications, test data, test scripts and test adaptation layer
14. Bidirectional traceability report between generated tests and the test basis
15. Determine if test environment needs archiving in order to take back-ups
16. Verify the network configuration
17. Identify the required server operating system , databases and other components
18. Identify the number of license required by the test team

Q3) Model based testing (MBT) is integrated into the test process with different input and output artifacts according to the information and abstraction level. What are the input artifacts involved?

1. Test strategy
2. The test basis including requirement and other test targets , test conditions and existing designs or models
3. Incident and defect reports, test logs and test execution logs from previous test execution activities.
4. Method and process guidelines, tool documents
5. Test planning and control
6. Test analysis and design
7. Test implementation and execution
8. Evaluation of exit criteria and reporting
9. Test closure activities
10. MBT models
11. Parts of the test plan, test schedule and test metrics
12. Test scenarios, test suites, test execution schedules and test design specifications
13. Test cases, test procedure specifications, test data, test scripts and test adaptation layer
14. Bidirectional traceability report between generated tests and the test basis, especially requirements and defect reports
15. Determine if test environment needs archiving in order to take back-ups
16. Verify the network configuration
17. Identify the required server operating system , databases and other components
18. Identify the number of license required by the test team

Q4) You need to perform regression testing before delivering a change request for an application. What are the basis on which you will select test cases for the same?

1. All the test cases that were created in the design phase
2. Test cases with least usable functionalities as you might skip those while doing E2E testing
3. Test cases with least defects
4. All the passed test cases again
5. All the test cases suggested by BA & development
6. Need to check client priority test cases
7. All integration test cases
8. All unit test cases
9. Only need to run automation test suite
10. Need to run most stable test case to generate good report to client
11. All smoke test scenarios
12. All complex test cases
13. Boundary value test cases
14. Test cases which have frequent defects
15. Functionalities which are more visible to the users
16. Test cases which verify core features of the product
17. Test cases of functionalities which have undergone more and recent changes
18. All integration test cases
19. Boundary value test cases
20. A sample of failure test cases

Q5) What are the objectives of Load/Performance testing?

1. Evaluate performance acceptance criteria
2. Identify critical scenarios
3. Design workload model
4. Identify the target load levels
5. Design the tests
6. Execute tests
7. Analyze the results
8. Integration response
9. Server response
10. Storage
11. Database response
12. Test output generation time
13. Response time
14. Throughput
15. Resource utilization
16. Maximum user load
17. Business related metrics
18. 3rd party server response
19. Scalability
20. Data integrity
21. Data conversions
22. Variations

**Database Query Languages**

Q1) An application displays list of all users registered on it. Users with access = 1 can update the details of all users whereas the users with access = 0 can only read the details of other users. The database is designed in such a way that it should be normalized. For users(user\_id, name, age, role, access) which of the following is correct for given design?

If access value is boolean, there is no need to normalize it further

There should be other table named permission to store the access values and access must be a foreign key in users tables

There is no need of another table to store the access values as requirement is specific and clearly defined

Access values should be string to clearly know what it means.

Q2) Table T1 joins table T2. Result set row count is equivalent to cross product of the number of rows of table T1 and T2. If a where clause is used in the same query, how will it work?

Left outer join

Right outer join

Inner join full join

Q3) Identify the correct CREATE statement to create a table with Student as table name which contains StudentID as integer, Student Name where length of the name is upto 30, Age as integer and Gender length upto 6.

CREATE TABLE Student(

student\_id INT,

name VARCHAR(100),

age INT, gender VARCHAR(7));

CREATE TABLE Student(

StudentID INT,

StudentName VARCHAR(30),

age INT,

gender VARCHAR(6)

);

CREATE TABLE Student(

Student\_ID INT,

Student\_Name VARCHAR(40),

age INT,

gender VARCHAR(6)

);

CREATE TABLE Student(

Student\_ID INT,

Studentname VARCHAR(40),

age INT,

gender VARCHAR(5)

);

Q4) Which of the following commands will you use to update values in a table?

UPDATE table\_name

SET column1 = value, column2 = value2, …;

UPDATE table\_name

WHERE Some\_column = some\_value;

UPDATE table\_name

SET column1 = value, column2 = value2, …

WHERE some\_column = some\_value;

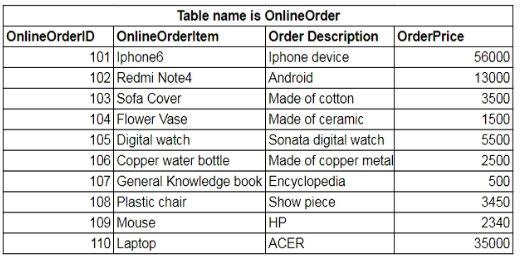
None of the given options

Q5) What will be the output of following SQL query when executed?

SELECT COUNT(\*) AS “Number of Orders”

FROM OnlineOrder

WHERE OrderPrice < 2500



Number of Orders

3

Number of Orders

10

Number of Orders

4

Number of Orders

2

**Pseudo Codes**

Q1) What should be the value of b after the pseudocode is run for user input N as 10

READ N

SET a = 0

SET b = 1

SET c = 1

REPEAT

b = b \* c

a = a + (b / c)

c = c + 1

UNTIL c < N

Print a

46234

362880

10

55

Q2) With a single routine can you able to generate a multiplication table structure for any given number? Few lines of code will be helpful to identify your thought.

def generateMultiplicationTable(

int number, int endIndex) {

for(int i = 0; i<=endIndex; i+) {

print(number\*1 = (number\*i));

}

call displayMultiplicationTable(2, 20)

Output is displayed as

2\*0 = 0

2\*1 = 2

…

2\*20 = 40

def generateMultiplicationTable(

int number, int endIndex) {

for(int i = 0; i<=endIndex; i++) {

print(number\*1 = (number\*i));

}

call generateMultiplicationTable(2)

Output is displayed as

2\*0 = 0

2\*1 = 2

…

2\*20 = 40

main(

int number, int endIndex) {

for(int i = 1; i<=endIndex; i+) {

print(number\*i = (number\*i));

The output is displayed as

2\*0 = 0

2\*1 = 2

…

2\*20 = 40

def generateMultiplicationTable(

int number, int endIndex) {

for(int i = 0; i<=endIndex; i++) {

print(number\*i = (number\*i));

}

call generateMultiplicationTable(2, 20)

Output is displayed as

2\*0 = 0

2\*1 = 2

…

2\*20 = 40

Q 3. What will be the output of the following code if n=4?

FUNCTION doMath(integer n)

BEGIN IF n <= 1

return n

ELSE

return n \* doMath(n-1);

**Options**

16

12

24

64

Q 4. Consider the following pseudocode:

What would be the output of the following program if the input is 9?

START

Integer NumHours, Regular, Overtime, PayAmount, RegPay, OverPay

GET NumHours

SET Regular= 8

SET RegPay= 10

SET OverPay=5

SET Overtime= NumHours – Regular

IF (Overtime>0)

THEN

SET PayAmount= (Regular \* RegPay) + (Overtime \* OverPay)

ELSE

SET PayAmount = NumHours \* RegPay

END IF

Print ‘The amount to be paid is :- ’ , PayAmount

END

**Options:**

The amount to be paid is 90

The amount to be paid is 95

The amount to be paid is 80

The amount to be paid is 85

Q 5. Provide a sample snippet of Pseudocode for "Stack" operation, i.e. LIFO principle. You are taking ten items and display them in LIFO principle, i.e. Last in First Out Principle.

Choose the best option:

A.

ArrayList nameList = new ArrayList();

// Get names one by one and add in loop

nameCount = 10;

for (int i=0; i< nameCount; i++){

//Get name and add in nameList

}

//Display in LIFO order

for(int i=0; i<nameList.length();i++){

System.out.println(nameList.get(i).toString())

}

B.

ArrayList nameList = new ArrayList();

// Get names one by one and add in loop

nameCount = 10;

for (int i=0; i< nameCount; i++){

//Get name and add in nameList

}

C.

ArrayList nameList = new ArrayList();

// Get names one by one and add in loop

nameCount = 10;

for (int i=0; i< nameCount; i++){

//Get name and add in nameList

}

//Display in LIFO order

for(int i=nameList.length(); i>0;i--){

System.out.println(nameList.get(i).toString())

}

D.

ArrayList nameList = new ArrayList();

// Get names one by one and add in loop

nameCount = 10;

for (int i=0; i< nameCount; i--){

//Get name and add in nameList

}

//Display in LIFO order

for(int i=nameList.length(); i>0;i--){

System.out.println(nameList.get(i).toString())

}