

Quaid-i-Azam University
Department of Computer Science

MS-DS (Data Science)
Sample Admission Test

The purpose of this sample test is to give applicants an idea of computing subject areas in which their knowledge will be evaluated. The number of questions may vary in the actual admission test.

Problem Solving and Analytics

- Q1) How would you measure exactly 6 liters of water when you have only two containers, a 4 liters bucket and a 9 liters bucket. Write an algorithm/pseudo code to solve the problem.
- Q2) Suppose you are given the digits 3, 8, and 4. You have to form an even number, using one, two or all three of the given digits. Each digit can be used only once in a number. How many even numbers can be possibly formed?

Programming

- Q3) Write code in C++ / Java/Python to reverse the data stored in an array of size N (after execution, item stored at location 0 is swapped with the item stored at location N-1 and so on).
- Q4) Differentiate between:
- (a) Run time error and logical error
 - (b) Break statement and continue statement.

Databases

- Q5) Create an Entity Relationship Diagram for the given scenario.
- A national level ART Gallery wants to develop a database for its resource management. The gallery has one outlet in city. The outlet is in rented space. The gallery space displays the artists' art. The art can be of different types e.g. Painting, sculpture, digital art etc. Each art is made/owned by one person (artist). The art is displayed at one outlet at a certain time. It can be displayed at different outlets at different time periods. A person can buy the art by paying for its fixed price to the gallery. The gallery keeps 20% of the paid price and gives 80% to the artist. The Gallery wants to keep track of all the art display information, along with its selling details.

Q6) Give the Structured Query Language (SQL) syntax of the given queries.

Artist (A_Id, A_Name, A_DoB, A_Label, A_City, A_Country)

Album (B_Id, B_Title, B_Release_D)

Song (S_Id, A_Id, S_Title, B_Id, S_Release_Date)

i). Give the artists' detail who released a song in January 2022.

ii). How many albums released in year 2021?

Data Structures and Algorithms

Q7) How an empty AVL tree would look like after inserting the following values in the given order: 67, 33, 55, 9, 81, 76, 24, 95?

Q.8) What is the time complexity of the following code in terms of N?

```
int sum = 0;
for (i = 1; i <= N; i++) {
    for (j = N; j > 0; j=j/2) {
        sum = sum + i + j;
    }
}
```

Q.9) How an empty Stack would like after performing the following operations:

Push(5)

Push(10)

Pop()

Pop()

Push(3)

Push(7)

Push(9)

Q.10) How an empty Binary Search Tree (BST) would look like after inserting the following values in the given order: A,F,B,E,C,D,G?