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Univ. Roll No. 2115800023

Mid-Term Examination, Odd Semester 2021-22  
B. Tech. (Hons.) CS / EC (VLSI), I-Year, I-Semester  
BCSC 0051: Computer Programming Using C

Time: 2 Hours

Maximum Marks: 15

Section- A

Note: Attempt All Three Questions.

3x1=3 Marks

1. Predict the output of the following code

```
#include <stdio.h>

void main()
{
    if (sizeof(int) > -1)
        printf("True");
    else
        printf("False");
}
```

2. Choose the appropriate option for the output of the given C program.

```
#include <stdio.h>

int main()
{
    int a=2;
    printf("%ld ", sizeof(a+3.5));
    printf("%ld ", sizeof a+3);
    return 0;
}
```

- a) Compile time error
- b) 4 4
- c) 4 7
- d) 8 7

3. Complete the following code by finding the missing statements.

```
#include <stdio.h>
```



```

int main()
{
    int year;
    printf("Enter a year: ");
    scanf("%d", &year);
    if (year % 400 == 0) {
        printf("%d is a leap year.", year);
    }
    else if (..... == 0) {
        printf("%d is not a leap year.", year);
    }
    else if (..... == 0) {
        printf("%d is a leap year.", year);
    }
    else {
        printf("%d is not a leap year.", year);
    }
    return 0;
}

```

### Section- B

Note: Attempt All Three Questions.

3x2=06 Marks

1. Indian Intelligence Bureau has recently come across an encrypted message containing information about the number of bombs to be planted in Bombay by Taliban. The message is in the form of a whole number/integer. For getting the desired information, the agency has to decrypt the message.

The message can be decrypted by converting the number to its binary representation. The number of 1's in the binary representation of the number reflect the number of bombs to be planted. The bureau needs a programmer for doing this task.

**Task:** Design a program to decrypt the message and find the number of bombs.

**Input Format:** An integer n representing the encrypted message.

**Output Format:** Number of bombs to be planted.

**Example Test case:**

**Input:** 15

**Output:**

Message Decrypted Successfully



Number of Bombs: 4

**Explanation:** There are four 1's in the binary representation of 15.

2. Every Wednesday Morning, students of GLA University get parathas in mess. However, each student is allowed to take a maximum of 2 parathas only. Some students feel that this quantity is not enough for them and they take duplicate turns in queue to get more parathas and try to fool the mess supervisor. Each student has a unique Mess ID. Now, the supervisor wants to identify such students who have taken duplicate turns. Help him to complete the task.

**Task:** Design a program to find the IDs of students who have taken duplicate turns and the total number of turns they have taken.

**Input Format:** A list of student IDs taking breakfast in the queue.

**Output Format:** All the duplicate Student IDs with the total number of turns they have taken.

**Example Test case:**

**Input:** 1 2 3 4 2 1 5 6 1 4 7 2 9

where every number represents a student ID.

**Output:**

Student ID 1 has taken 3 turns

Student ID 2 has taken 3 turns

Student ID 4 has taken 2 turns

3. Design a program to print the following pattern on the screen if  $n=5$ , where  $n$  is the number of rows.

```
1
2 3 2
3 4 5 4 3
4 5 6 7 6 5 4
5 6 7 8 9 8 7 6 5
```

### Section - C

**Note: Attempt Any Two Questions.**

2x3=6 Marks

1. Seema is an NGO worker. She recently pays visit to a government school and interacts with the students there. She has also brought  $x$  chocolates with her and hoping to distribute one chocolate to each student. She has decided that she will distribute the chocolates only and only if the number of students are exactly equal to the number of chocolates she has. She will not distribute the chocolates if the number of students is either less than or greater than the number of chocolates.

The number of students in the school is equal to the sum of cubes of the individual digits of the number  $x$  (number of chocolates).

**Task:** Design a program to find the number of students in the school and check whether the number of students is exactly equal to the number of chocolates Seema has. Accordingly print on the screen whether the chocolates can be distributed among the students or not.

**Input Format:** An integer  $x$  representing the number of chocolates.

**Output Format:** A message displaying whether the number of chocolates can be distributed or not.



Example Test case:

Input: 371

Output: Chocolates can be distributed

Explanation:

Number of students =  $3^3 + 7^3 + 1^3 = 27 + 343 + 1 = 371$

As the number of students is equal to the number of chocolates, so chocolates can be distributed.

2. Aditya is a front-line worker at a healthcare facility. His job is to ensure that the patients visit the doctor according to their age. The most elder person is sent first, the next eldest person is sent second and so on. Aditya, like countless other front-line workers, has helped us significantly during the pandemic. As a token of our appreciation, you need to arrange the patients in decreasing order of age.

Task: Given an array of integers where every element represents the age of patients in any order, design a program to arrange the ages in decreasing order. Assume that, all the patients have distinct ages.

Input Format: The input will be an array of integers, representing age of patients.

Output Format: Print the age in decreasing order, where each element is separated by a space.

Example Test Case:

Sample Input: 10 28 51 19 18 17 44 68 20 50

Sample Output: 68 51 50 44 28 20 19 18 17 10

3. Watson gives Sherlock an array of integers. His challenge is to find an element of the array such that the sum of all elements to the left of that element is equal to the sum of all elements to the right of it.

Example 1

arr[] = {5, 6, 8, 11}

The element is 8 which is between two subarrays that sum to 11.

Example 2

arr[] = {1}

The answer is 1 since left and right sum to 0.

Task: You will be given array of integers and you must determine whether there is an element that meets the criterion. If there is, print YES. Otherwise, print NO.

Input Format: an array of integers

Output Format: Print YES if an element meets the given criterion otherwise print NO.

Sample Input 1

1 2 3

Sample Output 1

NO

Sample Input 2

1 2 3 3

Sample Output 2

YES