End Sem Examination December 2024

Course – B.Tech. **Sem – I** **Section - A/B/C/D/E**
Subject Name- Problem Solving & Computer Programming **Subject Code CSE-104**
Time- 2 hours **Max Marks- 40**
Note- Answer all questions. If required, take necessary assumptions and mention the same

Q. No.	Question	Marks
Q1	**A.** Write an algorithm to find what you will get at the end of your degree program based on your own performance till the 4th year placement drive is over. In case, your CGPA is equal or more than 6 and you wanted to join Army (join_Army = 'y' or 'n') to serve nation then your both physical and mental health must be good (physical_health_good = 'y' or 'n' and mental_health_good = 'y' or 'n'). Display "Selected to serve nation" when all 4 factors are true. Otherwise, "Sorry, better luck next time" is displayed. If your CGPA is equal or more than 7.5, and programming skill is good (program_skill_good = 'y' or 'n') and you have done any projects (project_done = 'y' or 'n') then display "you will get good placement at the end of the placement drive". If you involved at least one society out of a different society (member_of_society = 'y', 'n'), then display "Confidence and Decision making skills are improved". **B.** Write a C program for the above case using conditional statements.	(4+4 = 8)
Q2	**A.** Write a C program to print the following pattern for N=5. The value of N is provided by user at run time. * **B.** Write a C program using a recursive function to compute and print the smallest digit in a number entered by the user.	(4 + 4 = 8)
Q3	**A.** The following strategy takes two number inputs and multiplies them together using addition. It works as per the following rules. • Create 2 columns. In the first column, write the first number and in the second column write the second number • Multiply the first column by two and divide the second column by two. Repeat this rule till the number in the second column becomes 1. • Finally, take the sum of all the numbers in the first column, for which, the corresponding number in the second column is odd. The sum represents the product of the two input numbers. **Example:** Input numbers are 2 and 13 2 13 ← 4 6 8 3 ← 16 1 ← Answer: 2 + 8 + 16 = 26	(4 + 4 = 8)

The code for calculating multiplication using the given algorithm is given below. The variable num_1 stores number in 1st column, num_2 stores number in 2nd column and loop_count records the number of iterations of the while loop. What should be inserted at the blank spaces labelled [A], [B], [C], [D], and [E]

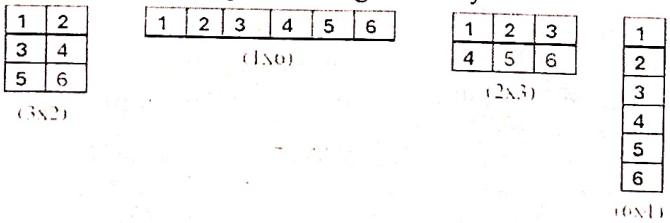
```
#include <stdio.h>
int main()
{
        int num_1, num_2;
        int result = 0;
        int loop_count = 0;
        scanf("%d %d", &num_1, &num_2);
        while (1)
        {
        loop_count++;
        if(__[A]__)
        result = (__[B]__);
        if((__[C]__)
        break;
        num_1 = __[D]__;
        num_2 = __[E]__;
        }
        printf("\n %d", result);
}
```

B. Write a C program that takes an array of integers as input and prints the smallest positive integer that is not present in the array. All the numbers greater than 0 are considered to be positive.
Sample Input: array = [3,4,10,1]
Sample Output: 2
Explanation: 1 and 3 are in the array but 2 (smallest positive) is missing.

Q4

A. Reshaping of an array refers to arranging the elements of the array as per the new dimensions. For example: a 3x2 matrix can be reshaped as either 1x6 or 2x3 or 6x1 matrix as shown below:

The elements in the reshaped array will be entered row wise as per their location in the original array. Write a C program that takes a m x n array and two integers r and c representing the number of rows and the number of columns of the wanted reshaped array. The reshaped array should be filled with all the elements of the original array in the same row-traversing order as they were. If the reshape operation with given parameters is possible and legal, output the new reshaped array; Otherwise, output the original array.



(4 + 4 = 8)

Sample Input:
(2x3 array) r = 1 c = 6 (r and c are the rows and col of new reshaped array)
1 2 3
4 5 6
Sample Output:
1 2 3 4 5 6 (Since reshaping is possible hence printing the reshaped array)

Sample Input:
(2x3 array) r = 4 c = 3 (r and c are the rows and col of the new reshaped array)
1 2 3
4 5 6

Sample Output:
1 2 3 (Since reshaping is not possible hence printing the original array)
4 5 6

B. Write a C program that creates a structure for storing the following details of a student:
Roll number (integer number)
Year of admission (integer number)
Section (Integer number ranging from 1 to 3 inclusive)
CGPA marks (Fractional number)
The program should then accept a new value for the section and CGPA marks from the user and invoke a function that modifies the section and CGPA marks of the student as per the new values provided by the user. The updated structure should be then printed inside the main function.

Q5 (4 * 2 = 8)

a)
```
int main() {
        int x=4, y,z;
        y= --x;  3      (x=3)
        z=x--;   3      (x=2)
        printf(" %d %d %d",x,y,z);
        return 0;
}
```

b)
```
int main() {
   int a[5]={5,1,15,20,25};
   int i,j,k=1;
   i= ++a[1];   i=2
   printf("%d,",a[1]);  2
   j=a[1]++;  (j=2)
   printf("%d,",a[1]);  3
   printf("\n %d, %d %d", i,j);
   return 0;
}
```

c)
```
int main() {
  int x=10, y=3;
  Data(&y, &x, &x);
  printf("x=%d  y=%d", x ,y );
  return 0;
}          x=13  y=10  z=10
int Data(int *x, int *y, int *z) {
    y = y + 4;      (y=10+4) (y=14)
    z = x + y + z;
}
```

d)
```
int main() {
    int i=15, j=4, m, n;
    m = i > 9;    m=1
    n = j== 2 && j!= 2;     n=0,
    printf("m=%d  n=%d", m, n);
    return 0;
}
```