H   Roll No. 2294031

TCS–201

B. TECH. (SECOND SEMESTER) MID SEMESTER EXAMINATION, April, 2023

PROGRAMMING FOR PROBLEM SOLVING

Time : 1½ Hours

Maximum Marks : 50

Note : (i) Answer all the questions by choosing any *one* of the sub-questions.

(ii) Each sub-question carries 10 marks.

1. (a) (i) Explain the concept of a char arrays and illustrate with an example showing the significance of null character with an example.

(ii) Write a C program to toggle the case of characters in a string i.e. if the character is in uppercase convert it into lowercase and vice-versa. Print the converted string to the screen.

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OR

(b) Draw a flowchart and write a c program to read a string from the keyboard and store all vowels and consonants in it into two different character arrays. Print the content of both the arrays to the console. Program should be able to process any type of characters entered by the user.

2. (a) Draw a flowchart and design a user defined function (UDF) that returns 1 if the string passed to it is a palindrome and 0 otherwise. Implement a C program to read the string in the main program and print appropriate message based on the value returned by the function.

OR

(b) Discuss the string manipulation functions *strcpy, strcat, strcmp* and *strchr* with their protoype declaration including the number of arguments with their datatypes and return type of the functions. Illustrate each of the functions with a snippet of C code.

3. (a) Demonstrate the pointer declaration in C with an appropriate example. Show the difference between referencing an address and de-referencing a pointer.

(b) Elaborate the meaning of the following terms with an example for each.

   (i)   Wild pointer

   (ii) Null pointer

   (iii) Dangling pointer

   (iv) Void pointer

OR

(C) Draw a flowchart and design a UDF in C that takes two numbers and returns the modulus and the product to the calling program. Implement a C program using a pointer to return the values from the function. Print the final values of modulus and product to the console.

4. (a) (i) Design a UDF to compare two strings using a pointer and return 1 if they are equal otherwise return 0. Write a C program to accept two strings in the main program and print appropriate message on the value returned by the function to the console.

(ii) List and explain the four dynamic memory management functions in C along with their prototypes. Justify the significance of dynamic memory allocation over static memory allocation. What is memory leak problem in C and suggest a mechanism to overcome it ?

OR·

(b) (i) Declare a structure in C to store the details of a student such as Name, Date of Birth, Course, Semester No and his percentage marks. Write the C declaration using typedef and tagged type structures.

(ii) A certain manufacturing unit has an inventory store that has certain N types of items with the following details, Item Name, Unit price per piece (in ₹) and quantity (in Nos). Write a C program using a structure and display the total cost of the inventory in rupees.

Sample Input :

Enter the No, of item (N) : 3

Item Name : Fasteners

Unit Price (₹) : 100

Quantity (in Nos) : 300

Item Name : Screw Jacks

Unit Price (₹) : 1,000

Quantity (in Nos) : 100

Item Name : Thin Iron Sheets

Unit Price (₹) : 5,000

Quantity (in Nos) : 200

Output :

Total cost of the inventory (₹) :

11,30,000

5. (a) Predict the output of the following program code :   2 × 5 =10 Marks)

(i)

```
#include<stdio.h>
int main()
{
    char str[] ="graphic";
    printf("%c", str [5]);
    printf("\n%s",str+2);
    return 0;
}
```

(ii)

```c
#include <stdio.h>
int main()
{
char s[] = "Program\0ming is fun";
int i=0;
while(s[i] !='\0')
{
        putchar(s [i]);
        i ++;
}
return 0;
}
```

(iii)

```c
# include <stdio.h>
int main ()
{
int*ptr[] = {11, 22, 23, 44};
int i;
for (i=4;i>1;i--)
{
     print ("%d\t", ptr [4-i]);
}
return 0;
}
```

(iv)
```
#jnclude <stdio.h>
char* fun 1 (void)
{
char *str=" west";
return (str+2);
}
char* fun 2(void)
{
char *str="Wiring";
return (str+2);
}
int main()
{
    printf(" %s%s", fun 1 (), fun 2());
    return 0;
}
```

(v)
```
#include <stdio.h>
#include <stdio.h>
char* SS(char str[])
{
   char *tstr=str + strleri(str)-4;
    return (tstr);
}
int main()
```

```
{
    char str {"Litchees & Mangoes"};
    printf("%s",SS(str);
    return 0;
}
```

OR

(b) Differentiate between structure and union in C. Develop a program in C to read the details of N employees of a company, details such as empcode, name, depart name and salary. Use appropriate data types to store the details. Display all the details of N employees by sorting the salary in descending order (highest to lowest) to the console in proper format.