C PROGRAMMING LAB MANUAL

1. **Program to read radius and find area and circumference of circle .**

```
#include<stdio.h>
int main()
{
  int r;
  float PI = 3.14, area, ci;
  printf("\nEnter radius of circle: ");
  scanf("%d", &r);
  area = PI * r * r;
    ci = 2 * PI * r;
printf("\nArea of circle : %f ", area);
printf("\nCircumference : %f ", ci);
  return (0);
}
```

Input:

Enter radius of a circle

5

Output:

Area of Circle : 78.5

Circumfrance :31.4

2. Program to read three numbers and find the biggest of three.

```
#include <stdio.h>
int main()
{
   int num1, num2, num3;
   printf(" Enter the number1 = ");
   scanf("%d", &num1);
   printf("\n Enter the number2 = ");
   scanf("%d", &num2);
   printf("\n Enter the number3 = ");
   scanf("%d", &num3);
   if (num1 > num2)
   {
      if (num1 > num3)
      {
         printf("\n Largest number = %d \n",num1);
      }
      else
      {
         printf("\n Largest number = %d \n",num3);
      }
   }
```

```
    else if (num2 > num3)
    {
        printf("\n Largest number = %d \n",num2);
    }
    else
    {
        printf("\n Largest number = %d \n",num3);
    }
    return 0;
}
```

Input:

Enter the number1 = 10

Enter the number2 = 5

Enter the number3 = 2

Output:

Largest number = 10

3. Program to check whether the number is prime or not

```
#include <stdio.h>
int main() {
  int n, i, flag = 0;
  printf("Enter a positive integer: ");
  scanf("%d", &n);
  for (i = 2; i <= n / 2; ++i) {
    // condition for non-prime
    if (n % i == 0) {
      flag = 1;
      break;
    }
  }
  if (n == 1) {
    printf("1 is neither prime nor composite.");
  }
  else {
    if (flag == 0)
      printf("%d is a prime number.", n);
    else
      printf("%d is not a prime number.", n);
  }
```

```
  return 0;
}
```

Input:

Enter a positive integer: 19

Output:

19 is a prime number

4 . Program to read a number, find the sum of the digits, reverse the number and check it for palindrome.

```
#include <stdio.h>
void main()
{
   int num, temp, remainder,  reverse = 0;

   printf("Enter an integer \n");
   scanf("%d", &num);
  while(num>0)
remainder =num%10 ;
Temp = temp+rem ;
num=num/10   #return integer part of the result
          print("Sum is :",temp)
```

```
   /*  original number is stored at temp */
   temp = num;
   while (num > 0)
   {
      remainder = num % 10;
      reverse = reverse * 10 + remainder;
      num /= 10;
   }
   printf("Given number is = %d\n", temp);
   printf("Its reverse is  = %d\n", reverse);
   if (temp == reverse)
      printf(" %d  is a palindrome \n",reverse);
   else
      printf("%d is not a palindrome \n",reverse);
}
```

Input:

Enter an integer 1221

Output:

Given number is : 1221

Its revers is : 1221

1221 is a palindrome

5. Program to read numbers from keyboard continuously till the user presses 999 and to find the sum of only positive numbers.

```
#include<stdio.h>
#include<conio.h>
int main()
{
   int i, num, count_p=0 ;
   int arr[100];
   //size of array
   printf("Enter Number of elements: ");
   scanf("%d", &num);
   //take input from user for "num" numbers
Printf(“enter elements\n”);

   for(i=0;i<num;i++)
   {
      scanf("%d", &arr[i]);
   }
   //count the numbers
   for(i=0;i<num;i++)
   {
```

```
        //check for positive numbers
        if(arr[i]>0)
        {
           count_p++;
        }
        else
        {
           printf("Wrong Entry");
           break;
        }
    }
    printf("Positive Numbers: %d\n", count_p);
}
```

Input:

Enter Number of elements : 5

Enter elements

1

9

7

6

16

Output: Positive Numbers: 5

6 **. Program to read percentage of marks and to display appropriate message (Demonstration of else-if ladder)**

```
#include<stdio.h>

#include<conio.h>

void main()

{

 int s1,s2,s3,s4,s5,t,p;

 clrscr();

 printf("\n Enter marks of 5 subjects each out of 100 ");

 printf("\n\n ********************************************");

 printf("\n\n Sub1 = ");

 scanf("%d",&s1);

 printf("\n Sub2 = ");

 scanf("%d",&s2);

 printf("\n Sub3 = ");

 scanf("%d",&s3);

 printf("\n Sub4 = ");

 scanf("%d",&s4);

 printf("\n Sub5 = ");

 scanf("%d",&s5);

 printf("\n ********************************************");

 t=s1+s2+s3+s4+s5;  //Total
```

```
 printf("\n Total Marks = %d/500",t);


 p=t/5;  //Percentage
 printf("\n\n Percentage = %d%",p);
 printf("\n ****************************************");
////////////// Ladder If Statement ////////////
 if(p>=80)
   printf("\n\n Your Grade : A+");
  else if(p>=75)
    printf("\n\n Your Grade : A");
    else if(p>=60)
      printf("\n\n Your Grade : B");
       else if(p>=45)
         printf("\n\n Your Grade : C");
          else if(p>=35)
            printf("\n\n Your grade : D");
  else
    printf("\n\n You Are Fail");
 //////// Ladder If Statement ////////////
 getch();
}
```

Input:

Enter marks of 5 subjects each out of 100:

Sub1: 65

Sub2: 75

Sub3 :85

Sub4: 95

Sub5:85

Output:

Total : 405

Percentage : 81

Your grade : A+

7 . Program To find the roots of quadratic equation.

```
#include <math.h>
#include <stdio.h>
int main() {
   double a, b, c, discriminant, root1, root2, realPart, imagPart;
   printf("Enter coefficients a, b and c: ");
   scanf("%lf %lf %lf", &a, &b, &c);
   discriminant = b * b - 4 * a * c;
   // condition for real and different roots
   if (discriminant > 0) {
      root1 = (-b + sqrt(discriminant)) / (2 * a);
      root2 = (-b - sqrt(discriminant)) / (2 * a);
      printf("root1 = %.2lf and root2 = %.2lf", root1, root2);
   }
   // condition for real and equal roots
   else if (discriminant == 0) {
      root1 = root2 = -b / (2 * a);
      printf("root1 = root2 = %.2lf;", root1);
   }
   // if roots are not real
   else {
      realPart = -b / (2 * a);
```

```
        imagPart = sqrt(-discriminant) / (2 * a);

        printf("root1 = %.2lf+%.2lfi and root2 = %.2f-%.2fi", realPart, imagPart,
realPart, imagPart);

    }

    return 0;

}
```

Output:

Enter coefficients a, b and c: 2.3

4

5.6

root1 = -0.87+1.30i and root2 = -0.87-1.30i

8 . to read marks scored by n students and find the average of marks (Demonstration of single dimensional array)

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

```
int main() {
   int n, i;
   float num[100], sum = 0.0, avg;
   printf("Enter the numbers of elements: ");
   scanf("%d", &n);
   while (n > 100 || n < 1) {
      printf("Error! number should in range of (1 to 100).\n");
      printf("Enter the number again: ");
      scanf("%d", &n);
   }
      printf("%d. Enter the elements: ", i + 1);
   for (i = 0; i < n; i++)
 {
      scanf("%f", &num[i]);
   }
   for (i = 0; i < n; ++i)
{
      sum += num[i];
}
   avg = sum / n;
   printf("Average = %.2f", avg);
   return 0;
```

}

Input:

Enter number of elements: 5

Enter the elements:

60

70

80

90

100

Output:

Sum = 400

Average= 80.00

9 . Program to remove Duplicate Element in a single dimensional Array

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

```
int remove_duplicate(int arr[], int n)
{
  if (n == 0 || n == 1)
    return n;
  int temp[n];
  int j = 0;
  int i;
  for (i = 0; i < n - 1; i++)
    if (arr[i] != arr[i + 1])
      temp[j++] = arr[i];
  temp[j++] = arr[n - 1];
  for (i = 0; i < j; i++)
    arr[i] = temp[i];
  return j;
}
int main()
{
  int i,n;
int arr[n];

printf(“enter number of elements\n”)
  scanf("%d", &n);
```

```
  for (i = 0; i < n; i++)
  {
    scanf("%d", &arr[i]);
  }
  printf("\nArray Before Removing Duplicates: ");
  for (i = 0; i < n; i++)
    printf("%d ", arr[i]);
  n = remove_duplicate(arr, n);
  printf("\nArray After Removing Duplicates: ");
  for (i = 0; i < n; i++)
    printf("%d ", arr[i]);
  return 0;
}
```

Input:

Enter the number of elements:

5

Enter array elements

16

04

76

04

45

Array Before Removing Duplicates:

16 04 76 04 45

Array After Removing Duplicates:

16 04 76 45

10 . Program to perform addition and subtraction of Matrices

```
#include<stdio.h>

int main()
```

```
{
   printf("\n\n\t\tStudytonight - Best place to learn\n\n\n");
   int n, m, i,j, first[10][10], second[10][10], sum[10][10], diff[10][10];
   printf("\nEnter the number of rows and columns of the first matrix \n\n");
   scanf("%d%d", &m, &n);
   printf("\nEnter the %d elements of the first matrix \n\n", m*n);
   for(i = 0; i < m; i++)   // to iterate the rows
      for(j = 0; j < n; j++)   // to iterate the columns
         scanf("%d", &first[c][d]);
   printf("\nEnter the %d elements of the second matrix \n\n", m*n);
for(i = 0; i < m; i++)    // to iterate the rows
      for(j = 0; j < n; j++)    // to iterate the columns
         scanf("%d", &second[c][d]);
   /*
      printing the first matrix
   */
   printf("\n\nThe first matrix is: \n\n");
for(i = 0; i < m; i++)    // to iterate the rows
   {
for(j = 0; j < n; j++)    // to iterate the columns
      {
         printf("%d\t", first[c][d]);
```

```
        }
    printf("\n");
    }
    /*
        printing the second matrix
    */
    printf("\n\nThe second matrix is: \n\n");
for(i = 0; i < m; i++)    // to iterate the rows
    {
for(j = 0; j < n; j++)    // to iterate the columns
        {
            printf("%d\t", second[c][d]);
        }
    printf("\n");
    }
    /*
        finding the SUM of the two matrices
        and storing in another matrix sum of the same size
    */
for(i = 0; i < m; i++)
for(j = 0; j < n; j++)            sum[c][d] = first[c][d] + second[c][d];
    // printing the elements of the sum matrix
```

```
   printf("\n\nThe sum of the two entered matrices is: \n\n");
for(i = 0; i < m; i++)
   {
for(j = 0; j < n; j++)        {
          printf("%d\t", sum[c][d]);
       }
       printf("\n");
   }
   /*
       finding the DIFFERENCE of the two matrices
       and storing in another matrix difference of the same size
   */
for(i = 0; i < m; i++)
{
for(j = 0; j < n; j++)
{
          diff[c][d] = first[c][d] - second[c][d];
}
}
   // printing the elements of the diff matrix
   printf("\n\nThe difference(subtraction) of the two entered matrices is: \n\n");
for(i = 0; i < m; i++)
```

```
  {
for(j = 0; j < n; j++)
      {
         printf("%d\t", diff[c][d]);
      }
      printf("\n");
   }
   return 0;
}
```

Input:

Enter the order of the matrix:

3

3

Enter First Matrix elements:

1 2 3 4 5 6 7 8 9

Enter Second Matrix elements:

1 2 3 4 5 6 7 8 9

The sum of the two entered matrices is:

2 4 6

8 10 12

14 16 18

The difference(subtraction) of the two entered matrices is:

0 0 0

0 0 0

0 0 0

11 . Program to find Factorial of the given number

```
#include<stdio.h>
int main(){
```

```
  int i,num;
long f=1;
 printf("Enter a number: ");
  scanf("%d",&num);
  for(i=1;i<=num;i++)
      f=f*i;
  printf("Factorial of %d is: %d",num,f);
  return 0;
}
```

Input:

Enter a number:

6

Factorial of 6 is : 720

12 . Program To generate Fibonacci series

```
#include <stdio.h>
int main() {
```

```
  int i, n;
  // initialize first and second terms
  int t1 = 0, t2 = 1,t3;
  printf(“Enter n value\n”)
scan(%d”,&n)
printf(“%d\t”,t1);
while(t2<=n)
{
printf(“%d\t”,t2);
t3=t1+t2;
t1=t2;
t2=t3;

}
  return 0;
}
```

Input:

Enter n value: 10

Output:

0 1 1 2 3 5 8

14 . Program to find the length of a string without using built in function

```
#include <stdio.h>
 void main()
```

```
{
   char string[100];
   int i, length = 0;
   printf("Enter a string \n");
   Scanf( "%s ", string);
   /*  keep going through each character of the string till its end */
   for (i = 0; string[i] != '\0'; i++)
   {
      length++;
   }

printf(" the length of the string %s is(Number of Characters Present in the string) = %d\n", string, length);
}
```

Input: Enter a string

Sreenivas

Output:

the length of the string sreenivas is(Number of Characters Present in the string)

9

15 . Program To demonstrate string functions.

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

```
Void main(){
Char string1[25],string2[25];
int l;
Clrscr();
Printf("***** performing string length ******\n");
Printf("enter only one string \n");
Scanf("%s",string1);

l = strlen(string1);
printf("the string length is %d\n\n",l);
printf("**** performing string concatenation ****\n");
printf("enter two strings\n");
scanf("%s%s",string1,string2);
printf("the concatenated string is %s\n\n",strcat(string1,string2));
printf("***** performing string compare *****\n");
printf("enter two strings \n");
scanf("%s%s",string1,string2);
if(strcmp(string1,string2) = = 0)
printf("strings are equal\n");
else
printf("strings are not equal\n");
printf("*** performing string copy ****\n");
```

```
printf(“enter a strings\n”);
scanf(“%s”,string1);
printf(“the Original string is %s \n”,string1);
strcpy(string1,string2);
printf(“the Copied  string is %s\n”,string2);
getch();
}
```

Output:

enter only one string

Sreeni

the string length is: 6

****** performing string concatenation ******

Enter two strings

Sree

nivas

the concatenated string is : Sreenivas

******* performing string compare *******

Enter two strings

Sree

SREE

Strings are not equal

***** performing string copy ******

Enter a string

Apple

The Original String is

Apple

Copied String is:

Apple

16 . **Program** to read, display and add two m x n matrices using functions

```
#include<stdio.h>

#include<conio.h>
```

```
void read_arr(int a[10][10],int row,int col)
{
   int i,j;
printf(“enter elements of the matrix\n”);
   for(i=1;i<=row;i++)
   {
   for(j=1;j<=col;j++)
   {
         scanf(\"%d\",&a[i][j]);
         }
   }
}

void add_arr(int m1[10][10],int m2[10][10],int m3[10][10],int row,int col)
{
   int i,j;
   for(i=1;i<=row;i++)
   {
   for(j=1;j<=col;j++)
   {
   m3[i][j] =  (m1[i][j] + m2[i][j]);
```

```
    }
    }
}

void print_arr(int m[10][10],int row,int col)
{
    int i,j;
    for(i=1;i<=row;i++)
        {
        for(j=1;j<=col;j++)
        {
            printf(\"%d \",m[i][j]);
         }
        printf(\"\\n\");
        }
}

main()
{
    int m1[10][10],m2[10][10],m3[10][10],m4[10][10],row,col;
    clrscr();
    printf(\"Enter number of rows :\");
```

```
   scanf(\"%d\",&row);
   printf(\"Enter number of columns :\");
   scanf(\"%d\",&col);
   read_arr(m1,row,col);
   read_arr(m2,row,col);
   add_arr(m1,m2,m3,row,col);
diff_arr(m1,m2,m4,row,col);
print(“sum matrix is…\n”)
print_arr(m3,row,col);
print(“sum difference matrix is…\n”)

   print_arr(m4,row,col);
   getch();
}
```

Output:

Enter number of rows:

2

Enter number of columns

2

Enter matrix elements:

1

2

3

4

Enter matrix 2 elemetns

1

2

3

4

Sum matrix is

2 4

6 8

Difference matrix is

0 0

0 0

17 . **Program to read a string and to find the number of alphabets, digits, vowels, consonants, spaces and special characters.**

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

```
void main()
{
   char str[200];
   int i,vowels=0,consonants=0,digits=0,spaces=0,specialCharacters=0;
   printf("Enter a string\n");
   gets(str);
   for(i=0;str[i]!='\0';i++)
   {
      if(str[i]=='a' || str[i]=='e' || str[i]=='i' ||str[i]=='o' || str[i]=='u' || str[i]=='A'
||str[i]=='E' || str[i]=='I' || str[i]=='O' ||str[i]=='U')
      {
         vowels++;
      }
      else if((str[i]>='a'&& str[i]<='z') || (str[i]>='A'&& str[i]<='Z'))
      {
         consonants++;
      }
      else if(str[i]>='0' && str[i]<='9')
      {
         digits++;
      }
      else if (str[i]==' ')
```

```
        {
            spaces++;
        }
        else
        {
            specialCharacters++;
        }
    }
    printf("\nVowels = %d",vowels);
    printf("\nConsonants = %d",consonants);
    printf("\nDigits = %d",digits);
    printf("\nWhite spaces = %d",spaces);
    printf("\nSpecial characters = %d",specialCharacters);
}
```

Output:

Enter a string

“India is a country with 130 Crore Population!!!”

Vowels: 14

Consonants:19

Digits: 3

White spaces : 7

Special Characters : 3

18 . Program to swap two number using pointer

```
# include < stdio.h >

int  main( )
```

```
{
int  a, b, temp ;
int  *p1, *p2 ;
printf(" Enter the first number : ") ;
scanf("%d ",& a) ;
printf("\n Enter the second number : ") ;
scanf("%d ",& b) ;
printf("\n Two Number before swapping :%d, %d ",*p1, *p2) ;
temp = *p1 ;
*p1 = *p2 ;
*p2 = temp ;
printf("\n Two Number after swapping :%d, %d ",*p1, *p2) ;
return ( 0 );
}
```

Output:

Enter First Number:

10

Enter the Second Number:

20

Two numbers before swapping:

10

20

Two numbers after swapping:

20

10

19 . **Program to demonstrate student structure to read & display records of n students**

```
#include <stdio.h>

struct student {
```

```
    char firstName[50];
    int roll;
    float marks;
} s[5];
int main() {
    int i;
    printf("Enter information of students:\n");
    // storing information
    for (i = 0; i < 5; ++i) {
        s[i].roll = i + 1;
        printf("\nFor roll number%d,\n", s[i].roll);
        printf("Enter first name: ");
        scanf("%s", s[i].firstName);
        printf("Enter marks: ");
        scanf("%f", &s[i].marks);
    }
    printf("Displaying Information:\n\n");
    // displaying information
    for (i = 0; i < 5; ++i) {
        printf("\nRoll number: %d\n", i + 1);
        printf("First name: ");
        puts(s[i].firstName);
```

```
        printf("Marks: %.1f", s[i].marks);
        printf("\n");
    }
    return 0;
}
```

Output:

Enter student Information:

111

Sree

76.76

112

Bindu

96.96

113

Manju

92.92

114

Maggi

87.87

115

Kowshik

94.94

Output:

Roll NO: 111

FirstName: sree

Marks: 76.76

Roll NO: 112

FirstName: Bindu

Marks: 96.96

Roll NO: 113

FirstName: Manju

Marks: 92.92

Roll NO: 114

FirstName: Maggi

Marks: 87.87

Roll NO: 115

FirstName: Kowshik

Marks: 94.94

20 . Program to find difference between Structure and Union

```
#include <stdio.h>

struct Employee

{
```

```
  int age;
  char Name[50];
  char Department[20];
  float Salary;
};
union Person
{
  int ag;
  char Nam[50];
  char Departent[20];
  float Salary;
};
int main()
{
  struct Employee emp1;
  union Person Person1;
  printf(" The Size of Employee Structure = %d\n", sizeof (emp1) );
  printf(" The Size of Person Union = %d\n", sizeof (Person1));
  return 0;
}
```

Outout:

The Size of Employee Structure = 124

The Size of Person Union = 100

In union the longest memory occupied by any data type only that memory is occupied.