PRACTICAL NO 03

1. Write a program to input two numbers and display the highest number.

```
.#include<Stdio.h>

int main()
        {
int n1,n2;
printf("Enter first number");
scanf("%d",&n1);
printf("Enter second number");
scanf("%d",&n2);
if (n1<n2)
printf("%d is greater than %d",n2,n1);
else if
(n1>n2)
printf("%d is greater than %d",n1,n2);
else
printf("%d and %d are equal",n1,n2);
}
```

2. Write a complete program to ask user enter three integer numbers, and then tell the user the largest value and smallest value among the three numbers.

```
#include<stdio.h>
int main()
{
int n1,n2,n3;
printf("Enter first number");
scanf("%d",&n1);
printf("Enter second number");
scanf("%d",&n2);
printf("Enter third number");
scanf("%d",&n3);
if (n1>n2 && n1>n3)
   printf("%d is the greatest number\n",n1);
else if (n2>n1 && n2>n3)
   printf("%d is the greatest number\n",n2);
else
   printf("%d is the greatest number\n",n3);

   if (n1<n2 && n1<n3)
   printf("%d is the lowest number\n",n1);
else if (n2<n1 && n2<n3)
   printf("%d is the lowest number\n",n2);
else if (n3<n1 && n3<n2)
   printf("%d is the lowest number\n",n3);
}
```

3. Display employee name, new salary, when the user inputs employee name, and basic salary. You can refer following formula and the table to calculate new salary:

New Salary = Basic Salary + Increment

Basic Salary Less than 5000

More than or equal 5000 and less than 10000
More than or equal 10,000

Increment
5% of Basic Salary

10% of Basic Salary 15% of Basic Salary

```
#include<stdio.h>
int main()
{
   float bs,ns;
   char name[15];

   printf("Enter your name :");
   scanf("%s",&name);
   printf("Enter your basic salary :");
   scanf("%f",&bs);
   if (bs<=5000)
      ns=bs+bs*.05;
   else if (bs<=10000)
      ns=bs+bs*.1;
   else
      ns=bs+bs*.15;
   printf("%s your new salay is %f",name,ns);
}
```

4. Diameter, Circumference and Area of a Circle) Write a program that reads in the radius of a circle and prints the circle's diameter, circumference and area. Use the constant value 3.14159 for π. Perform each of these calculations inside the printf statement(s) and use the conversion specifier %f.

```
#include<stdio.h>
int main()
 {
float d,c,a,r;
float pi=3.14159;
 printf("Enter radius length :");
scanf("%f",&r);
 printf("Diameter=%f\n",d=r*2);
printf("Circumference=%f\n",c=2*pi*r);
  printf("Area=%f\n",a=pi*r*r);
 }
```

5. Write a program that reads in two integers and determines and prints if the first is a multiple of the second.

```
#include<stdio.h>
 int main()
 {
 int n1,n2;
 printf("Enter 1st number");
 scanf("%d",&n1);
 printf("Enter 2nd number");
 scanf("%d",&n2);
  if (n1%n2==0 && n1>n2)
 printf("%d is a multiple of %d",n1,n2);
  else if (n1%n2==0 && n1<n2)
  printf("%d is a multiple of %d",n2,n1);
  else if (n2%n1==0 && n2>n1)
 printf("%d is a multiple of %d",n2,n1);
  else if (n2%n1==0 && n1>n2)
  printf("%d is a multiple of %d",n1,n2);
  else printf("%d and %d are not multiples of each other",n1,n2,);

}
```

6. Write a C program that prints the integer equivalents of some uppercase letters, lowercase letters, digits and special symbols. As a minimum, determine the integer equivalents of the following: A B C a b c 0 1 2 $ * + / and the blank character.

```
#include <stdio.h>

int main()

{

char uppercaseLetters[] = {'A', 'B', 'C'};

char lowercaseLetters[] = {'a', 'b', 'c'};

char digits[] = {'0', '1', '2'};

char symbols[] = {'$', '*', '+', '/', ' '};

printf("Integer equivalents:\n");


// Uppercase letters

printf("Uppercase letters:\n");

for (int i = 0; i < sizeof(uppercaseLetters) / sizeof(uppercaseLetters[0]); i++) {

    printf("%c: %d\n", uppercaseLetters[i], uppercaseLetters[i]);

}

// Lowercase letters

printf("Lowercase letters:\n");

for (int i = 0; i < sizeof(lowercaseLetters) / sizeof(lowercaseLetters[0]); i++) {

    printf("%c: %d\n", lowercaseLetters[i], lowercaseLetters[i]);

}


// Digits
```

```
printf("Digits:\n");

for (int i = 0; i < sizeof(digits) / sizeof(digits[0]); i++) {

    printf("%c: %d\n", digits[i], digits[i]);

}

 // Special symbols

printf("Special symbols:\n");

for (int i = 0; i < sizeof(symbols) / sizeof(symbols[0]); i++)

    printf("%c: %d\n", symbols[i], symbols[i]);
    return 0;

    }
```

7. The gross remuneration of a company salesman comprises the Basic Salary and certain additional allowances and bonuses as given below:
Salesmen with over 5 years' service receive a 10% additional allowance of Basic Salary each month.

Salesmen working in Colombo (Input character 'C' if the city is Colombo) receive an additional allowance of Rs. 2,500/- per month.
The monthly bonus payment is computed as given below:

Monthly Sales(Rs)	**Bonus as a percentage of monthly sales**
0-25000 25000-50000 >=50000	10 12 15

Write a program to output the gross monthly remuneration of a salesman.

```
#include <stdio.h>

int main() {
   float bs, ts, fs, es;
   char c;
   int m;

   printf("Enter your basic salary: ");
   scanf("%f", &bs);

   if (bs > -50000)
      ts = bs * 0.85;
   else if (bs < 25000)
      ts = bs * 0.88;
   else
      ts = bs * 0.9;

   printf("Enter your number of service years: ");
   scanf("%d", &m);

   if (m == 5)
      es = ts + bs * 0.1;
   else
      es = ts;

   printf("Enter C if you live in Colombo, otherwise enter N: ");
   scanf(" %c", &c);

   if (c == 'C' || c == 'c')
      fs = es + bs * 0.1;
   else
      fs = es;
```

```
    printf("Your final salary is %.2f\n", fs);

    return 0;
}
```

PRACTICAL NO 04

Q1) Use If-Else and write a program that reads an integer and determines and prints if the number is even or odd. (i.e. divisible by 2)

Re-write the above program using a switch statement instead of an If-Else statement!

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

int main()
{
    int no;

    printf("Enter a Number ");
    scanf("%d", &no);

    if(no%2==1)
    printf("Odd Number");
    else
    printf("Even Number");

    return 0;
}
```

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

```
int main()
{
  int no;

  printf("Ennter a Number ");
  scanf("%d", &no);

  switch(no%2)
  {
   case 0:printf("Even Number");break;
   case 1:printf("Odd Number");break;

    default:printf("Invalid Input");
  }

   return 0;
}
```

Q2) Write a simple menu driven calculator to perform (+ - / *) operations. (The program must display a menu to select the desired operator.)

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

int main()
{
   int choice;
   float no1,no2,result;

   printf("Simple Menu Driven Calculator \n");
   printf("1. Addition \n");
   printf("2. Substraction \n");
   printf("3. Multipication \n");
   printf("4. Division \n");
   printf("Enter Your Choice [1-4]: \n");
   scanf("%d", &choice);

   printf("Enter First Number ");
   scanf("%f", &no1);
   printf("Enter Second Number ");
   scanf("%f", &no2);

   switch(choice)
   {
   case 1:
      result=no1+no2;
      printf("%.2f \n", result);
   break;

   case 2:
      result=no1-no2;
      printf("%.2f \n", result);
   break;

   case 3:
      result=no1*no2;
      printf("%.2f \n", result);
   break;

   case 4:
      if(no2 != 0)
      {
         result=no1/no2;
         printf("%.2f \n", result);
      }
      else
```

```
        {
            printf("Can Not Be Devided \n");
        }
     break;

    default:
        printf("Invalid Choice \n");
        break;

    }


    return 0;
}
```

Q3) Create a text-based, menu-driven program that allows the user to choose whether to calculate the circumference of a circle, the area of a circle or the volume of a sphere. The program should then input a radius from the user, perform the appropriate calculation and display the result.

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

int main()
{
    int choice;
    double radius,circumference,area,volume;

    printf("Menu. \n");
    printf("1. Calculate Circumference of a Circle \n");
    printf("2. Calculate area of a Circle \n");
    printf("3. Calculate volume of a sphere \n");
    printf("Enter Your Choice [1-3]: ");
    scanf("%d", &choice);


    switch(choice)
    {
    case 1:
        printf("Enter the radius of the circle: ");
        scanf("%lf", &radius);
```

```
        circumference= 2 * 3.1415 * radius;
        printf("Circumference of the circle: %.2lf \n", circumference);
        break;

    case 2:
        printf("Enter the radius of the circle: ");
        scanf("%lf", &radius);
        area= 3.1415 * pow(radius, 2);
        printf("Area of the circle: %2lf \n", area);
        break;

    case 3:
        printf("Enter the radius of the sphere: ");
        scanf("%2lf", &radius);
        volume=(4.0/3.0) * 3.1415 * radius * radius * radius;
        printf("Volume of the sphere: %2lf \n", volume);
        break;

    default:
        printf("Invalid Choice\n");
        break;
    }



    return 0;
}
```

Q4) Write a C program to read a character from the user and determine whether the given letter is vowel or not. (Use a switch statement which also includes ‘default’ state).

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

int main()
{
    char letter;

    printf("Enter a character: ");
    scanf("%c", &letter);

    switch(letter)

{
  case'a':
```

```
    printf("Vowel Character");
  break;

  case'A':
    printf("Vowel Character");
  break;

  case 'e':
    printf("Vowel Character");
  break;

  case'E':
    printf("Vowel Character");
  break;

  case 'i':
    printf("Vowel Character");
  break;

  case'I':
    printf("Vowel Character");
  break;

  case 'o':
    printf("Vowel Character");
  break;

  case'O':
    printf("Vowel Character");
  break;

  case 'u':
    printf("Vowel Character");
  break;

  case'U':
    printf("Vowel Character");
  break;

  default:
    printf("Not a Vowel Character");
  break;
}

   return 0;
}
```

Q5) Write a C program to enter month number and print total number of days in month using switch case. First assume that the given month belongs to a non-leap year.

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

int main()
{

 int monthno;

 printf("Enter a Month Number [1-12]: ");
 scanf("%d", &monthno);

 switch(monthno)

 {
 case 1:

 printf("Month: January \n");
 printf("31 Days");
 break;

 case 2:

 printf("Month: February \n");
 printf("28 Days");
 break;

 case 3:

 printf("Month: March \n");
 printf("31 Days");
 break;

 case 4:

 printf("Month: April \n");
 printf("30 Days");
 break;

 case 5:

 printf("Month: May \n");
 printf("31 Days");
 break;
```

```
case 6:

printf("Month: June \n");
printf("30 Days");
break;

case 7:

printf("Month: July \n");
printf("31 Days");
break;

case 8:

printf("Month: August \n");
printf("30 Days");
break;

case 9:

printf("Month: September \n");
printf("31 Days");
break;

case 10:

printf("Month: October \n");
printf("30 Days");
break;

case 11:

printf("Month: November \n");
printf("31 Days");
break;

case 12:

printf("Month: December \n");
printf("30 Days");
break;

default:
printf("Invalid Month \n");
break;

}
```

return 0;
}

PRACTICAL NO 05

Section A

Q1) Write a C program to print numbers from 0 to 100. (You are required to write 3 separate answers each using While, Do..While, For, looping structures).

- While

```
#include <stdio.h>

int main() {
    int number = 0;

    while (number <= 100) {
        printf("%d ", number);
        number++;
    }

  return 0;
}
```

- Do while

```c
#include <stdio.h>

int main() {
    int number = 0;

    do {
        printf("%d ", number);
        number++;
    } while (number <= 100);

    return 0;
}
```

- For

```c
#include <stdio.h>

int main() {
for (int number = 0; number <= 100; number++) {
 printf("%d ", number);
 }

 return 0;
 }
```

Q2) Write a C program to calculate and print the total of 10 marks and the average. If the average is less than 50 program should print “Fail!” otherwise “Pass!”

```
#include <stdio.h>

int main() {
int marks[10];
int total = 0;

printf("Enter 10 marks:\n");
for (int i = 0; i < 10; i++) {
scanf("%d", &marks[i]);
total += marks[i];
}

float average = (float)total / 10;

printf("Total: %d\n", total);
printf("Average: %.2f\n", average);

if (average < 50) {
printf("Fail!\n");
} else {
printf("Pass!\n");
}

return 0;
}
```

Q3) Write a C program to calculate factorial of a user given number. Hint:

- Select an appropriate looping structure.
- Factorial of '0' is '1' (0! = 1)
- Ex: factorial of number 5 is calculated as 5! = 5*4*3*2*1

```
#include <stdio.h>

int main() {
int number;
int factorial = 1;

printf("Enter a number: ");
scanf("%d", &number);

if (number < 0) {
printf("Factorial is not defined for negative numbers.\n");
} else {
for (int i = 1; i <= number; i++) {
factorial *= i;
}

printf("Factorial of %d is %d\n", number, factorial);
}

return 0;
}
```

Q4) Write a C program to calculate the sum of all digits of a user given number.
If user input 123 your program should output 6. (Calculated as 1+2+3)

```c
#include <stdio.h>

int main() {
    int number, sum = 0;

    printf("Enter a number: ");
    scanf("%d", &number);

    int remainder;
    while (number > 0) {
        remainder = number % 10;
        sum += remainder;
        number /= 10;
    }

    printf("Sum of digits: %d\n", sum);

    return 0;
}
```

Q5) Write a C program to reverse the digits of a number using *do-while* statement.

```c
#include <stdio.h>

int main() {
    int number, reversedNumber = 0, remainder;

    printf("Enter a number: ");
    scanf("%d", &number);

    do {
        remainder = number % 10;
        reversedNumber = reversedNumber * 10 + remainder;
        number = number / 10;
```

```
    } while (number != 0);

    printf("Reversed number: %d\n", reversedNumber);

    return 0;
}
```

Q6) Write a C program to calculate nth power of a given integer. The user input base and exponent. (Do NOT use inbuilt functions, instead use a loop)

```
#include <stdio.h>

int main() {
    int base, exponent, result = 1;

    printf("Enter the base: ");
    scanf("%d", &base);

    printf("Enter the exponent: ");
    scanf("%d", &exponent);

    int i;
    for (i = 0; i < exponent; i++) {
        result *= base;
    }

 printf("%d raised to the power %d is: %d\n", base,
exponent, result);
    return 0;
}
```

Q7) Write a C program to print first 10 numbers of “Fibonacci Sequence”.

```c
#include <stdio.h>

int main() {
    int n = 10;
    int fib[n];
    int i;

    fib[0] = 0;
    fib[1] = 1;

    for (i = 2; i < n; i++) {
        fib[i] = fib[i-1] + fib[i-2];
    }

    printf("The first 10 numbers of the Fibonacci sequence
are:\n");
    for (i = 0; i < n; i++) {
        printf("%d ", fib[i]);
    }
    printf("\n");

    return 0;
}
```

Q8) Write a C program to check whether a given number is an Armstrong Number! (Refer to previous flowcharts)

```c
#include <stdio.h>

int main() {
    int number, originalNumber, remainder, result = 0, n =
0;

    printf("Enter a number: ");
    scanf("%d", &number);

    originalNumber = number;

    while (originalNumber != 0) {
        originalNumber /= 10;
        ++n;
    }
   originalNumber = number;
        while (originalNumber != 0) {
        remainder = originalNumber % 10;
        int power = 1;
        for (int i = 1; i <= n; ++i) {
            power *= remainder;
        }
        result += power;
        originalNumber /= 10;
    }

    if (result == number)
        printf("%d is an Armstrong number.\n", number);
    else
        printf("%d is not an Armstrong number.\n", number);

    return 0;
}
```

Q9) Write a C program to print all the ASCII values for letters A to Z.

```
#include <stdio.h>

int main() {
 char letter;

 printf("ASCII values for letters A to Z:\n");

 for (letter = 'A'; letter <= 'Z'; ++letter) {
     printf("%c: %d\n", letter, letter);
 }

 return 0;
}
```

Q10) Write a program to print this pattern.

```
*
**
***
****
*****
```

```c
#include <stdio.h>

int main() {
    int rows = 5;  // number of rows in the pattern
    int i, j;

    for (i = 1; i <= rows; ++i) {
        for (j = 1; j <= i; ++j) {
            printf("*");
        }
        printf("\n");
    }

    return 0;
}
```

Q11) Write a program to check whether a given number is prime or not.

```c
#include <stdio.h>

int main() {
    int number, i, isPrime = 1;

    printf("Enter a positive integer: ");
    scanf("%d", &number);

    if (number == 0 || number == 1) {
        isPrime = 0;
    } else {
        for (i = 2; i <= number / 2; ++i) {
            if (number % i == 0) {
                isPrime = 0;
                break;
            }
        }
    }

    if (isPrime) {
        printf("%d is a prime number.\n", number);
    } else {
        printf("%d is not a prime number.\n", number);
    }

    return 0;
}
```

Q12) Write a C program to print all factors of a given integer.

```c
#include <stdio.h>

int main() {
    int number, i;

    printf("Enter a positive integer: ");
    scanf("%d", &number);

    printf("Factors of %d are: ", number);

    for (i = 1; i <= number; ++i) {
        if (number % i == 0) {
            printf("%d ", i);
        }
    }

    printf("\n");

    return 0;
}
```

Q12) Write a C program to add all user inputs until user input ‘-1’. And then display the sum.

```c
#include <stdio.h>

int main() {
    int number;
    int sum = 0;

    printf("Enter numbers to be added (enter -1 to
stop):\n");

    while (1) {
        scanf("%d", &number);

        if (number == -1) {
            break;
        }

        sum += number;
    }

    printf("The sum is: %d\n", sum);

    return 0;
}
```

Q13) Write a C program to read user inputs for an integer array (size = 10) and print the array.

```c
#include <stdio.h>

int main() {
    int array[10];
    int i;

    printf("Enter 10 integers:\n");

    for (i = 0; i < 10; i++) {
        scanf("%d", &array[i]);
    }

    printf("The entered array is: ");
  for (i = 0; i < 10; i++) {
        printf("%d ", array[i]);
    }
    printf("\n");

    return 0;
}
```

Q14) Re-Write the above code to count all the even numbers in above integer array and display the count.

```
#include <stdio.h>

int main() {
    int array[10];
    int i, count = 0;

    printf("Enter 10 integers:\n");

    for (i = 0; i < 10; i++) {
        scanf("%d", &array[i]);
    }

    for (i = 0; i < 10; i++) {
        if (array[i] % 2 == 0) {
            count++;
        }
    }

    printf("The count of even numbers in the array is:
%d\n", count);

    return 0;
}
```

Section B

1. Input 10 numbers and to output number of positive, number of negative, number of zeros.

```
#include <stdio.h>

int main() {
    int numbers[10];
    int i, positiveCount = 0, negativeCount = 0, zeroCount = 0;

    printf("Enter 10 numbers:\n");

    for (i = 0; i < 10; i++) {
        scanf("%d", &numbers[i]);
    }

    for (i = 0; i < 10; i++) {
        if (numbers[i] > 0) {
            positiveCount++;
        } else if (numbers[i] < 0) {
            negativeCount++;
        } else {
            zeroCount++;
        }
    }

    printf("Positive numbers: %d\n", positiveCount);
    printf("Negative numbers: %d\n", negativeCount);
printf("Zeros: %d\n", zeroCount);

    return 0;
}
```

2. Input Marks of 10 students and output the maximum , minimum and average Marks.

```c
#include <stdio.h>

int main() {
    int marks[10];
    int i, totalMarks = 0, maxMarks, minMarks;

    printf("Enter marks of 10 students:\n");

    for (i = 0; i < 10; i++) {
        scanf("%d", &marks[i]);
        totalMarks += marks[i];

        if (i == 0) {
            maxMarks = marks[i];
            minMarks = marks[i];
        } else {
            if (marks[i] > maxMarks) {
                maxMarks = marks[i];
            }
            if (marks[i] < minMarks) {
                minMarks = marks[i];
            }
        }
    }

    double averageMarks = (double) totalMarks / 10;

    printf("Maximum Marks: %d\n", maxMarks);
    printf("Minimum Marks: %d\n", minMarks);
    printf("Average Marks: %.2lf\n", averageMarks);

    return 0;
}
```

3. Input price of 10 items and display the average value of an Item , number of items which the price is greater than 200.

```
#include <stdio.h>

int main() {
    double prices[10];
    int i, count = 0;
    double total = 0.0;

    printf("Enter prices of 10 items:\n");

    for (i = 0; i < 10; i++) {
        scanf("%lf", &prices[i]);
        total += prices[i];

        if (prices[i] > 200) {
            count++;
        }
    }

    double average = total / 10;

    printf("Average value of an item: %.2lf\n", average);
    printf("Number of items with price > 200: %d\n",
count);

    return 0;
}
```

4. Input the Employee no and the Basic Salary of the Employees in an organisation ending with the dummy value -999 for Employee no and count the number Employees whose Basic Salary >=5000.

```
#include <stdio.h>

  int main() {
      int employeeNo, count = 0;
      double basicSalary;

      printf("Enter employee number and basic salary : \n");

      while (1) {
          scanf("%d", &employeeNo);
          if (employeeNo == -999) {
             break;
          }

          scanf("%lf", &basicSalary);

          if (basicSalary >= 5000) {
              count++;
          }
      }

      printf("Number of employees with a basic salary >=
  5000: %d\n", count);

      return 0;
  }
```

5. Input employee number, and hours worked by employees, and to display the following:

Employee number, Over Time Payment, and the percentage of employees whose Over Time Payment exceeding the Rs. 4000/-.

The user should input –999 as employee number to end the program, and the normal Over Time Rate is Rs.150 per hour and Rs. 200 per hour for hours in excess of 40.

```
#include <stdio.h>

int main() {
    int employeeNo, count = 0, overtimeCount = 0;
    double hoursWorked, overtimePayment, totalOvertimePayment = 0.0;

    printf("Enter employee number and hours worked :\n");

    scanf("%d", &employeeNo);

    while (employeeNo != -999) {
        scanf("%lf", &hoursWorked);

        if (hoursWorked > 40) {
            overtimePayment = 150 * 40 + 200 * (hoursWorked - 40);
        } else {
            overtimePayment = 150 * hoursWorked;
        }
        printf("Employee number: %d\n", employeeNo);
        printf("Overtime payment: %.2lf\n", overtimePayment);

        totalOvertimePayment += overtimePayment;
        count++;
        if (overtimePayment > 4000) {
            overtimeCount++;
        }
        scanf("%d", &employeeNo);
    }
    double percentageExceeding4000 = (double) overtimeCount / count *
100;

    printf("\nSummary:\n");
    printf("Total employees: %d\n", count);
    printf("Total overtime payment: %.2lf\n", totalOvertimePayment);
    printf("Percentage of employees with overtime payment exceeding Rs.
4000: %.2lf%%\n", percentageExceeding4000);

}
```