ASSIGNMENT 1:

//Q1:Write a program to demonstrate Arithmetic,logical,and Bitwise operators

```
#include<stdio.h>
int main()
{
    int a,b,c,d;

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

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

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

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

   //Arithmetic Operators
   printf("\nArithmetic operators:\n");
   printf("%d + %d = %d\n", a, b, a+b);
   printf("%d - %d = %d\n", a, b, a-b);
   printf("%d * %d = %d\n", a, b, a*b);
   printf("%d / %d = %d\n", a, b, a/b);
   printf("(%d %% %d) = %d\n", a, b, a%b);

   //Logical operators
   printf("\nLogical operators:\n");
```

```
    printf("(a > b) && (c > d): %d\n", (a > b) && (c > d));
    printf("(a > b) || (c > d): %d\n", (a > b) || (c > d));
    printf("!(a > b): %d\n", !(a > b));

    // Bitwise operators
    printf("\nBitwise operators:\n");
    printf("a & b = %d\n", a & b);
    printf("a | b = %d\n", a | b);
    printf("a ^ b = %d\n", a ^ b);
    printf("~a = %d\n", ~a);
    printf("a << 2 = %d\n", a << 2);
    printf("a >> 2 = %d\n", a >> 2);

    return 0;
}
```

ASSIGNMENT 2:

//Q2 Write a program to print any one of the following pattern

```
#include<stdio.h>
int main()
{
 int n,i;
 printf("enter no of rows ");
 scanf("%d",&n);
 for(i=1;i<=n;i++)
 {
  for(int k=1;k<=n-i;k++)
  {
   printf(" ");
  }
```

```
 for(int j=1;j<=i;j++)
 {
  printf(" *");
 }
  printf("\n");
}
for(i=1;i<=n;i++)
{
 for(int k=1;k<=i;k++)
 {
  printf(" ");
 }
 for(int j=1;j<=n-i;j++)
 {
  printf(" *");
 }
  printf("\n");
}
 return 0;
}
```

ASSIGNMENT 3:

```
//Q3Write a Program to find the factorial, check whether the number is Armstrong, and
//check for perfect square, prime number, largest of three numbers, LCM and GCD
//using switch case. Also use Goto statments
#include <stdio.h>
#include <math.h>



long factorial(int n)
```

```
 {
    long fact = 1;
    for(int i=1; i<=n; i++)
        fact *= i;
    return fact;
}


int isArmstrong(int n)
{
    int sum = 0, temp = n;
    while(temp != 0) {
        int digit = temp % 10;
        sum += digit * digit * digit;
        temp /= 10;
    }
    return (sum == n);
}


int isPerfectSquare(int n)
{
    int sqrt_n = sqrt(n);
    return (sqrt_n * sqrt_n == n);
}


int isPrime(int n)
{
```

```
    if(n <= 1) return 0;
    for(int i=2; i*i<=n; i++)
        if(n % i == 0) return 0;
    return 1;
}



int largestThree(int a, int b, int c)
{
    return (a > b) ? ((a > c) ? a : c) : ((b > c) ? b : c);
}



  int lcm(int a, int b)
  {
        int max=(a>b)?a:b;
        while(1)
        {
            if(max%a==0 && max%b==0)
              return max;
            max++;
        }

  }

  int gcd(int a, int b)
{
    if(b == 0)
    return a;
```

```
    return gcd(b, a % b);
}

int main()
{
    int choice, n1, n2, n3;

    START:
    printf("\nMenu:\n");
    printf("1. Factorial\n");
    printf("2. Armstrong Number\n");
    printf("3. Perfect Square\n");
    printf("4. Prime Number\n");
    printf("5. Largest of Three Numbers\n");
    printf("6. LCM\n");
    printf("7. GCD\n");
    printf("8. Exit\n");
    printf("Enter your choice: ");
    scanf("%d", &choice);

    switch(choice)
    {
        case 1:
            printf("Enter a number: ");
            scanf("%d", &n1);
            printf("Factorial: %ld\n", factorial(n1));
            break;
        case 2:
            printf("Enter a number: ");
```

```
    scanf("%d", &n1);
    printf("%d is %sArmstrong number\n", n1, isArmstrong(n1) ? "" : "not ");
    break;
case 3:
    printf("Enter a number: ");
    scanf("%d", &n1);
    printf("%d is %sperfect square\n", n1, isPerfectSquare(n1) ? "" : "not ");
    break;
case 4:
    printf("Enter a number: ");
    scanf("%d", &n1);
    printf("%d is %sprime number\n", n1, isPrime(n1) ? "" : "not ");
    break;
case 5:
    printf("Enter three numbers: ");
    scanf("%d %d %d", &n1, &n2, &n3);
    printf("Largest number: %d\n", largestThree(n1, n2, n3));
    break;
case 6:
    printf("Enter two numbers: ");
    scanf("%d %d", &n1, &n2);
    printf("LCM: %d\n", lcm(n1, n2));
    break;
case 7:
    printf("Enter two numbers: ");
    scanf("%d %d", &n1, &n2);
    printf("GCD: %d\n", gcd(n1, n2));
    break;
case 8:
```

```
            goto END;
        default:
            printf("Invalid choice. Please choose again.\n");
    }

    goto START;

    END:
 return 0;
}
```

ASSIGNMENT 4:

//Q4Write a Program to find the value of nCr (Combination) using function

```
#include<stdio.h>
int main()
{
    int n,r,nCr;
    unsigned long int nf,rf,nrf;
    unsigned long int factorial(int);
    printf("Enter n and r:");
    scanf("%d%d",&n,&r);
    if(n<r || n<0 || r<0)
    {
        printf("Invalid data\n");
    }
    else
    {
        nf=factorial(n);
        rf=factorial(r);
```

```
        nrf=factorial(n-r);
        nCr=nf/(rf*nrf);
        printf("%dC%d=%d\n",n,r,nCr);
    }
    return 0;
}
unsigned long int factorial(int n)
{
    unsigned long int fact=1;
    int i;
    for(i=1;i<=n;i++)
    {
        fact=fact*i;
    }
    return fact;
}
```

ASSIGNMENT 5:

```
//Q5 Write a Program to find the factorial using recursive function
#include<stdio.h>
int main()
{
    int n;
    unsigned long int ans;
    unsigned long int factorial(int);
    printf("Enter n:");
    scanf("%d",&n);
    ans=n*factorial(n-1);

    if(n<0)
```

```
    {
        printf("Factorial of negative number is not possible");
    }
    else
    {
        printf("Factorial of %d is %lu\n",n,ans);
    }
   return 0;
}
unsigned long int factorial(int n)
{
    int ans;
    if(n==0)
    {
        return 1;
    }
    else
    {
        ans=n*factorial(n-1);
    }
    return ans;
}
```

ASSIGNMENT 7a:

/*a) Write a Program to find the average , largest, and arranging the elements in descending order of one dimensional array*/

```
#include <stdio.h>

void sortArray(int arr[], int n)
{
```

```
    for (int i = 0; i < n - 1; i++)
    {
        for (int j = i + 1; j < n; j++)
        {
            if (arr[i] < arr[j])
            {
                int temp = arr[i];
                arr[i] = arr[j];
                arr[j] = temp;
            }
        }
    }
}

int main()
{
    int n;
    printf("Enter number of elements: ");
    scanf("%d", &n);
    int arr[n];
    int total = 0, max;

    printf("Enter the elements: ");
    for (int i = 0; i < n; i++)
    {
        scanf("%d", &arr[i]);
        total = total + arr[i];
    }
```

```
    max = arr[0];
    for (int i = 1; i < n; i++)
    {
        if (arr[i] > max)
            max = arr[i];
    }

    float avg = (float)total / n;
    printf("Average: %.2f\n", avg);
    printf("Largest: %d\n", max);

    sortArray(arr, n);
    printf("Array in descending order: ");
    for (int i = 0; i < n; i++)
    {
        printf("%d ", arr[i]);
    }
    printf("\n");

    return 0;
}
```

ASSIGNMENT 7b:

```
//b) Write a Program to multiply two matrices using a function.
#include <stdio.h>

void multiply(int A[10][10], int B[10][10], int C[10][10], int r1, int c1, int r2, int c2) {
    if (c1 != r2) {
        printf("Multiplication not possible!\n");
        return;
```

```
    }

    for (int i = 0; i < r1; i++) {
        for (int j = 0; j < c2; j++) {
            C[i][j] = 0;
            for (int k = 0; k < c1; k++) {
                C[i][j] += A[i][k] * B[k][j];
            }
        }
    }
}

void display(int mat[10][10], int r, int c) {
    for (int i = 0; i < r; i++) {
        for (int j = 0; j < c; j++) {
            printf("%d ", mat[i][j]);
        }
        printf("\n");
    }
}

int main() {
    int r1, c1, r2, c2;

    printf("Enter the number of rows for Matrix A: ");
    scanf("%d", &r1);
    printf("Enter the number of columns for Matrix A: ");
    scanf("%d", &c1);
```

```
printf("Enter the number of rows for Matrix B: ");
scanf("%d", &r2);
printf("Enter the number of columns for Matrix B: ");
scanf("%d", &c2);

if (c1 != r2) {
   printf("Multiplication not possible!\n");
   return 0;
}

int A[10][10], B[10][10], C[10][10];

printf("Enter elements of Matrix A:\n");
for (int i = 0; i < r1; i++) {
   for (int j = 0; j < c1; j++) {
      printf("Enter element A[%d][%d]: ", i + 1, j + 1);
      scanf("%d", &A[i][j]);
   }
}

printf("Enter elements of Matrix B:\n");
for (int i = 0; i < r2; i++) {
   for (int j = 0; j < c2; j++) {
      printf("Enter element B[%d][%d]: ", i + 1, j + 1);
      scanf("%d", &B[i][j]);
   }
}

multiply(A, B, C, r1, c1, r2, c2);
```

```
    printf("Result of multiplication:\n");
    display(C, r1, c2);

    return 0;
}
```

ASSIGNMENT 8a:

```
// a) Write a Program to demonstrate the string functions.
#include <stdio.h>
#include <string.h>

int main()
{
    char str1[50] = "Hello";
    char str2[50] = "Worldd";
    char str3[50];

    printf("Length of str1: %lu\n", strlen(str1));
    strcpy(str3, str1);

    printf("str3 after copying str1: %s\n", str3);

    int result = strcmp(str1, str2);
    if (result == 0)
        printf("str1 and str2 are equal.\n");
    else if (result > 0)
        printf("str1 is greater than str2.\n");
    else
        printf("str1 is smaller than str2.\n");
```

```
    strcat(str2, str1);
    printf("%s\n", str2);

    return 0;
}
```

ASSIGNMENT 8b:

```
/* b)Write a Program to check whether the entered string is palindrome or not
without string functions.*/
#include <stdio.h>

int main() {
    char input[100];
    int start, end, length = 0, palindrome = 1;

    printf("Enter a string: ");
    scanf("%s", input);

    while (input[length] != '\0') {
        length++;
    }

    for (start = 0, end = length - 1; start < length; start++, end--) {
        if (input[start] != input[end]) {
            palindrome = 0;
            break;
        }
    }
```

```
    if (palindrome)
        printf("The string is a palindrome.\n");
    else
        printf("The string is not a palindrome.\n");

    return 0;
}
```

ASSIGMENT 9:

```
/* Write a program to store the name, roll number and marks in three subjects of n
students using Structure. Generate a merit list with respect to the total marks
secured. Display the output in Tabular form in order of maximum total marks to
minimum total marks*/
#include <stdio.h>

struct Student {
    char name[50];
    int roll_no;
    int marks[3];
    int total;
};

void input(struct Student *s) {
    printf("Enter Name: ");
    scanf("%s", s->name);

    printf("Enter Roll Number: ");
    scanf("%d", &s->roll_no);

    printf("Enter marks in 3 subjects: ");
```

```
    for (int i = 0; i < 3; i++) {
        printf("Subject %d marks: ", i + 1);
        scanf("%d", &s->marks[i]);
    }

    s->total = s->marks[0] + s->marks[1] + s->marks[2];
}

void display(struct Student s) {
    printf("%-20s %-10d %-10d\n", s.name, s.roll_no, s.total);
}

int main() {
    int n;
    printf("Enter number of students: ");
    scanf("%d", &n);

    struct Student students[n];

    for (int i = 0; i < n; i++) {
        printf("\nEntering details for student %d:\n", i + 1);
        input(&students[i]);
    }

    for (int i = 0; i < n - 1; i++) {
        for (int j = i + 1; j < n; j++) {
            if (students[i].total < students[j].total) {
                struct Student temp = students[i];
                students[i] = students[j];
```

```
            students[j] = temp;
        }
    }
}

printf("\nMerit List:\n");
printf("%-20s %-10s %-10s\n", "Name", "Roll No", "Total Marks");
for (int i = 0; i < n; i++) {
    display(students[i]);
}

return 0;
}
```