Lab Sheet 4

1. Write a function swap ( ) that takes two arguments and swaps the values.

```c
#include <stdio.h>

void swap(int *x, int *y)
{
    int temp;
    temp=*x; *x=*y; *y=temp;
}

int main()
{
    int x,y;
    printf("Enter 1st num: "); scanf("%d",&x);
    printf("Enter 2nd num: "); scanf("%d",&y);
    printf("Initial values: %d %d\n",x,y);

    swap(&x,&y);
    printf("Swapped values: %d %d\n",x,y);
    return 0;
}
```

OUTPUT:

```
Enter 1st num: 40
Enter 2nd num: 50
Initial values: 40 50
Swapped values: 50 40
```

2.Using the function slargest(), return the second largest among the three numbers.

```c
#include <stdio.h>

int slargest(int a,int b,int c)
{
    if (a>b)
    {
        if (a>c)
        {   if (b>c)
                return b;
            else
                return c;
        }
    }
    else if (b>c)
    {   if (b>a)
        {   if (c>a)
                return c;
            else
                return a;
        }
    }
}
```

```
        else if (c>a)
        {    if (c>b)
            {    if (a>b)
                        return a;
                else
                        return b;
            }
        }
        else if (a==b)
            return a;
        else if (b==c)
            return b;
        else if (a==c)
            return c;
        else if (a==b && b==c)
            return a;
}
```

```c
int main()
{
    int a,b,c;
    printf("Enter 1st num: "); scanf("%d",&a);
    printf("Enter 2nd num: "); scanf("%d",&b);
    printf("Enter 3rd num: "); scanf("%d",&c);

    int x = slargest(a,b,c);
    printf("Second Largest Num: %d\n",x);
    return 0;

}
```

OUTPUT:

```
Enter 1st num: 50
Enter 2nd num: 20
Enter 3rd num: 40
Second Largest Num: 40
```

3. Write a program to find the largest digit in a number. Use a function that takes an integer number as an argument.

```c
#include <stdio.h>

int largdg(int x)
{
    int lg = 0;
    while (x > 0)
    {
        int dg = x % 10;
        if (dg > lg)
            lg = dg;
        x /= 10;
    }
    return lg;
}

int main()
{
    int x;
    printf("Enter num: ");
    scanf("%d", &x);

    int lg = largdg(x);
    printf("Largest digit: %d\n", lg);
}
```

OUTPUT:

```
Enter num: 2483
Largest digit: 8
```

4. Write a program to print the sum of 1+2+3+...+n. Use a function with a limit as the argument.

```c
#include <stdio.h>

int sum(int x)
{
    int s = 0;
    for (int i = 1; i <= x; i++)
        s += i;
    return s;
}

int main()
{
    int x;
    printf("Enter num: ");
    scanf("%d", &x);

    int s = sum(x);
    printf("Sum: %d\n", s);
}
```

OUTPUT:

```
Enter num: 5
Sum: 15
```

5. Write a program that accepts three numbers and, using a function, returns the largest among the numbers using a conditional operator.

```c
#include <stdio.h>

int larg(int a, int b, int c)
{
    int lg = (a > b) ? ((a > c) ? a : c) : ((b > c) ? b : c);
    return lg;
}
int main()
{
    int x, y, z;
    printf("Enter nums: ");
    scanf("%d %d %d", &x, &y, &z);

    int n = larg(x, y, z);
    printf("Largest Num: %d\n", n);
}
```

OUTPUT:

```
Enter nums: 50 60 70
Largest Num: 70
```

6. Write a program that reads a number and finds the factorial using a function that takes an integer number.

```c
#include <stdio.h>

int fact(int x)
{
    int f = 1;
    for (int i = 2; i <= x; i++)
        f *= i;
    return f;
}

int main()
{
    int x;
    printf("Enter num: ");
    scanf("%d", &x);

    int f = fact(x);
    printf("Factorial: %d\n", f);
}
```

OUTPUT:
```
Enter num: 5
Factorial: 120
```

7. Write a menu-driven program with the following options: -
• Add
• Difference
• Product
• Division

```c
#include <stdio.h>

int main()
{
    int ch, x, y, r;
    printf("1.Add\n2.Subtract\n3.Multiply\n4.Divide\n");
    printf("Enter choice: ");
    scanf("%d", &ch);
    printf("Enter two nums: ");
    scanf("%d %d", &x, &y);

    switch (ch)
    {
    case 1:
        r = x + y;
        break;
    case 2:
        r = x - y;
        break;
    case 3:
        r = x * y;
        break;
```

```
        case 4:
            r = x / y;
            break;
        default:
            printf("Invalid input.");
            break;
        }
        printf("Result: %d\n", r);
        return 0;
    }
```

OUTPUT:

```
1.Add
2.Subtract
3.Multiply
4.Divide
Enter choice: 3
Enter two nums: 4 67
Result: 268
```

8. Write a program to find the sum of the series 1/1! + 4/2! + 27/3! +… …. Using functions, find the sum of the series.

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

int fact(int x)
{
    int f = 1;
    for (int i = 2; i <= x; i++)
        f *= i;
    return f;
}
int sum(int x)
{
    double s = 0.0;
    for (int i = 1; i <= x; i++)
        s += pow(i, i) / (double)fact(i);
    return s;
}
int main()
{
    int x;
    double r;
    printf("Enter num: ");
    scanf("%d", &x);

    r = sum(x);
    printf("Sum: %f\n", r);
}
```

OUTPUT

```
Enter num: 5
Sum: 44.000000
```

9. Write a function to print the first n terms of the Fibonacci series.

```c
#include <stdio.h>

void Fib(int x)
{
    int a = 0, b = 1, c;
    printf("First %d terms: ", x);
    for (int i = 1; i <= x; i++)
    {
        printf("%d ", a);
        c = a + b;
        a = b;
        b = c;
    }
}
int main()
{
    int x;
    printf("Enter num: ");
    scanf("%d", &x);
    Fib(x);
    return 0;
}
```

OUTPUT:

```
Enter num: 7
First 7 terms: 0 1 1 2 3 5 8
```

10. Write a function to print the non-Fibonacci series until n. For example, if n is 10, your program should display 4, 6, 7, 9, and 10. Do not use arrays in the program.

```c
#include <stdio.h>

int NonFibo(int n)
{
    int n1 = 0, n2 = 1, nxt;
    printf("Non-Fibo Series: ");
    for (int i = 1; i <= n; i++)
    {
        if (i == n1 + n2)
        {
            nxt = n1 + n2;
            n1 = n2;
            n2 = nxt;
        }
        else
            printf("%d ", i);
    }
}
```

```
int main()
{
    int x;
    printf("Enter num: ");
    scanf("%d", &x);
    NonFibo(x);
    return 0;
}
```

OUTPUT:

```
Enter num: 10
Non-Fibo Series: 4 6 7 9 10
```

11. Write a C program that does the following, using functions.
• It asks the user to enter an integer between 100 and 9999.
• If the entered number is out of range, the program asks the user to enter a valid number.
• Then, the program prints the digits in words of the number on separate lines.
Here is an example
 Enter an integer between 100 and 9999: 99
 Invalid Input
 Enter an integer between 100 and 9999: 987
 Seven Eight Nine

```c
#include <stdio.h>

void display_alpha(int num)
{
    char *dgtxt[] = {"Zero", "One", "Two", "Three", "Four", "Five",
                     "Six", "Seven", "Eight", "Nine"};
    while (num > 0)
    {
        int dg = num % 10;
        printf("%s\n", dgtxt[dg]);
        num /= 10;
    }
}

int main()
{
    int x;
    do
    {
        printf("Enter integer b/w 100 and 9999: ");
        scanf("%d", &x);

        if (x < 100 || x > 9999)
            printf("Invalid Input\n");
    } while (x < 100 || x > 9999);
    display_alpha(x);
    return 0;
}
```

OUTPUT:

```
Enter integer b/w 100 and 9999: 500
Zero
Zero
Five
```

12. The following types of chocolates are available in a chocolate shop. Write a menu driven program to display the chocolate type, price, and discount. Get the customer's choice and the number of chocolates required. Assume that each customer can buy only one kind of chocolate. Use a switch case to calculate the total amount with a discount for each customer and display it. Use a function to calculate the full amount. Also, keep track of how many of each type of chocolate were sold throughout the day and print it using a function.

Sl.no	Chocolate Type	Price (Rs.)	Discount (%)
1	White Chocolate	50	10
2	Dark Chocolate	60	12
3	Raw Chocolate	42	6
4	Bittersweet Chocolate	55	8

```c
#include <stdio.h>

struct Chocolate
{
    char type[25];
    int price, discount, qtySold;
};

struct Chocolate choco[] = {
    {"White Chocolate", 50, 10, 0},
    {"Dark Chocolate", 60, 12, 0},
    {"Raw Chocolate", 42, 6, 0},
    {"Bittersweet Chocolate", 55, 8, 0}};

void displayMenu()
{
    printf("Menu:\n");
    printf("------\n");
    for (int i = 0; i < 4; i++)
        printf("%d. %s\n", i + 1, choco[i].type);
    printf("\n");
}
```

```c
void TotalAmount(int choice, int quantity)
{
    int index = choice - 1;
    struct Chocolate selectedChoco = choco[index];
    float discountAmount = selectedChoco.price * selectedChoco.discount / 100.0;
    float totalAmount = selectedChoco.price * quantity - discountAmount;
    printf("Total amount payable: Rs. %.2f\n", totalAmount);
    choco[index].qtySold += quantity;
}

void displayQtySold()
{
    printf("Quantity sold:\n");
    printf("-------------\n");
    for (int i = 0; i < 4; i++)
        printf("%s: %d\n", choco[i].type, choco[i].qtySold);
    printf("\n");
}

int main()
{
    int choice, qty;
    displayMenu();
    do
    {
        printf("Enter your choice (1-4): ");
        scanf("%d", &choice);
    } while (choice < 1 || choice > 4);
    printf("Enter the quantity required: ");
    scanf("%d", &qty);
    TotalAmount(choice, qty);
    printf("\nThank you for your purchase!\n\n");
    displayQtySold();
    return 0;
}
```

OUTPUT:

```
Enter a number:
1 for White Chocolate RS 50 with 10 percent discount
2 for Dark chocolate Rs 60 with 12 percent discount
3 for Raw Chocolate Rs 42 with 4 percent discount
4 for Bittersweet Chocolate Rs 55 with 8 percent discount 2
Item: Dark Chocolate
Price:Rs 60
Discount: 12 percent
Discount amount = 7
Total Price = 53
```

13. Write a function to print the first n terms of the following series:
 1, 2, 4, 8, 16, 22, 26, 38, 62, 74, 102, 104, 108, 116, 122, 126, 138 ….
Hint: To get each term in the above series, you must multiply all the non-zero digits of the last number and add that value to the previous number. Thus, with a value like 62, you multiply 6 x 2 and get 12. Now 62 + 12 = 74, which is the next value in the sequence?

```c
#include <stdio.h>

int getProd(int num)
{
    int prod = 1;
    while (num != 0)
    {
        int dg = num % 10;
        if (dg != 0)
            prod *= dg;
        num /= 10;
    }
    return prod;
}
```

```c
void printSeries(int n)
{
    int series[n];
    series[0] = 1;
    for (int i = 1; i < n; i++)
    {
        int lastNum = series[i - 1];
        int product = getProduct(lastNum);
        int nextNum = lastNum + product;
        series[i] = nextNum;
    }

    for (int i = 0; i < n; i++)
        printf("%d, ", series[i]);
    printf("\n");
}
```

```c
int main()
{
    int x;
    printf("Enter num of terms: ");
    scanf("%d", &x);
    printSeries(x);
    return 0;
}
```

OUTPUT:

```
Enter a number: 10
1 2 4 8 16 22 26 38 62 74
```

14. Write a function to print the numbers in each range whose sum of the factorials of its
digits is equal to the number itself.
For example: 145 = 1! + 4! + 5! = 1 + 24 + 120 = 145

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

int Fact(int dg)
{
    int fact = 1;
    for (int i = 1; i <= dg; i++)
        fact *= i;
    return fact;
}

void displayFactSum(int s, int e)
{
    for (int num = s; num <= e; num++)
    {
        int digitSum = 0;
        int temp = num;
        while (temp > 0)
        {
            int dg = temp % 10;
            digitSum += Fact(dg);
            temp /= 10;
        }
```

```c
            if (digitSum == num)
                printf("%d\n", num);
        }
}

int main()
{
    int s, e;
    printf("Enter starting num: ");
    scanf("%d", &s);
    printf("Enter ending num: ");
    scanf("%d", &e);
    printf("Numbers with Factorial sum equal to themselves:\n");
    displayFactSum(s, e);
    return 0;
}
```

OUTPUT:

```
Enter the starting number of the range: 1
Enter the ending number of the range: 500
1
2
145
```

15. Write a C program using functions to find the HCF of two numbers

```c
#include<stdio.h>

int hcf(int a, int b)
{
    if (a==0 || b==0)
    {
        return a+b;
    }

    if (a==b)
    {
        return a;
    }

    if (a>b)
    {
        return hcf(b, a%b);
    }

    if (a<b)
    {
        return hcf (a, b%a);
    }
}
```

```c
int main(void)
{
    int num1, num2;

    printf("Enter the first number:");
    scanf("%d", &num1);
    printf("Enter the second number:");
    scanf("%d", &num2);

    int c;
    c=hcf(num1, num2);
    printf("The HCF of %d and %d is %d\n", num1, num2, c);

    return 0;
}
```

OUTPUT:

```
Enter the first number: 12
Enter the second number: 30
The HCF of 12 and 30 is 6
```

16. Write a C program using functions to find the LCM of two numbers.

```c
#include<stdio.h>

int GCD(int num1, int num2)
{
    while (num1!=num2)
    {
        if (num1>num2)
            num1-=num2;
        else
            num2-=num1;
    }
    return num1;
}

int LCM(int num1, int num2)
{
    int gcd = GCD(num1, num2);
    int lcm = (num1*num2)/gcd;
    return lcm;
}
```

```c
int main()
{
    int a, b;

    printf("Enter the first number:");
    scanf("%d", &a);
    printf("Enter the second number:");
    scanf("%d", &b);

    int lcm = LCM(a,b);

    printf("The LCM of %d and %d is %d\n", a, b, lcm);

    return 0;
}
```

OUTPUT:

```
Enter the first number: 12
Enter the second number: 30
The LCM of 12 and 30 is: 60
```