

Lab Sheet 6

1. Write a program to add, subtract, multiply and divide two integers using user defined function add(), sub(), mul() and div()

➤ Code

```
#include <stdio.h>

int add(int a, int b){
    return a + b;
}
int sub(int a, int b){
    return a - b;
}
float mul(float a, float b){
    return a * b;
}
float div(float a, float b){
    return a / b;
}

int main( ){
    int x = 10, y = 4;
    int a = add(x, y);
    int s = sub(x, y);
    float m = mul(x, y);
    float d = div(x, y);
    printf("Addition: %d\n", a);
    printf("Subtraction: %d\n", s);
    printf("Multiplication: %f\n", m);
    printf("Division: %f\n", d);
    return 0;
}
```

➤ Output

```
Addition: 14
Subtraction: 6
Multiplication: 40.000000
Division: 2.500000
```

2. WAP to display sum of series: $x + x^2/2! + x^3/3! + x^4/4! + x^5/5! \dots x^n/n!$. User defined function factorial() and power() should be used to calculate the factorial and power.

➤ **Code**

```
#include <stdio.h>

int factorial(int n){
    if (n <= 1){
        return 1;
    }
    return n * factorial(n - 1);
}

int power(int x, int n){
    if (n == 0)
    {
        return 1;
    }
    return x * power(x, n - 1);
}

int main()
{
    float term = 0;
    int x, n;
    printf("Enter the value of x and n: ");
    scanf("%d%d", &x, &n);
    for (int i = 1; i <= n; i++){
        term += power(x, i) / (float)factorial(i);
    }
    printf("The sum of series:  $x + x^2/2! + x^3/3! + x^4/4! + x^5/5! \dots x^n/n!$  s %f", term);

    return 0;
}
```

➤ **Output**

```
Enter the value of x and n: 5 5
The sum of series:  $x + x^2/2! + x^3/3! + x^4/4! + x^5/5! \dots x^n/n!$  s 90.416664
```

3. WAP to calculate factorial using Recursion.

➤ Code

```
#include <stdio.h>
int fact(int n){
    if (n <= 1)
    {
        return 1;
    }
    return n * fact(n - 1);
}

int main(){
    int n;
    printf("Enter a number: ");
    scanf("%d", &n);
    int factorial = fact(n);
    printf("The factorial of %d is : %d.", n, factorial);
    return 0;
}
```

➤ Output

```
Enter a number: 5
The factorial of 5 is : 120.
```

4. WAP to display the nth Fibonacci number using recursion.

➤ Code

```
#include <stdio.h>

int fibo(int n){
    if (n == 1 || n == 2)
        return 1;
    else
        return fibo(n - 1) + fibo(n - 2);
}

int main(){
    int n;
    printf("Enter the value of n: ");
    scanf("%d", &n);
    printf("The %dth Fibonacci number is %d\n", n, fibo(n));
    return 0;
}
```

➤ Output

```
Enter the value of n: 6
The 6th Fibonacci number is 8
```

5. WAP to take two numbers in main(). Write a function Swap() to swap the values of the variables. Print the swapped values in main().

➤ **Code**

```
#include <stdio.h>
void swap(int *a, int *b){
    int temp = *a;
    *a = *b;
    *b = temp;
}
int main(){
    int x, y;
    printf("Enter two numbers: ");
    scanf("%d%d", &x, &y);
    printf("Before swapping:\nx = %d, y = %d\n", x, y);
    swap(&x, &y);
    printf("After swapping:\nx = %d, y = %d\n", x, y);
    return 0;
}
```

➤ **Output**

```
Enter two numbers: 5 6
Before swapping:
x = 5, y = 6
After swapping:
x = 6, y = 5
```

6. WAP to take two float number in main(). Write a function single user define function calculator() to perform the addition, subtraction and multiplication. The sum, difference and product should be displayed from the main() function. [Use the concept of pass by reference.].

➤ Code

```
#include <stdio.h>
void calc(int x, int y, int *sum, int *sub, int *mul, float *divide)
{
    *sum = x + y;
    *sub = x - y;
    *mul = x * y;
    *divide = x / (float)y;
}

int main()
{
    int x, y, sum, sub, mul;
    float divide;
    printf("Enter two numbers: ");
    scanf("%d%d", &x, &y);
    calc(x, y, &sum, &sub, &mul, &divide);
    printf("Sum: %d\n", sum);
    printf("Difference: %d\n", sub);
    printf("Product: %d\n", mul);
    printf("Division: %f\n", divide);
    return 0;
}
```

➤ Output

```
Enter two numbers: 5 19
Sum: 24
Difference: -14
Product: 95
Division: 0.263158
```

7. WAP to input a integer number in main(). Write a user define function isPrime() to calculate whether the number is prime or not. Print whether the number is prime or not from the main()

➤ **Code**

```
#include <stdio.h>
int isPrime(int num){
    int flag = 1;
    for (int i = 2; i <= num / 2; i++){
        if (num % i == 0)
        {
            flag = 0;
        }
    }
    return flag;
}
int main(){
    int a;
    printf("Enter a number: ");
    scanf("%d", &a);
    int prime = isPrime(a);
    if (prime == 1) {
        printf("%d is prime number.\n", a);
    } else {
        printf("%d is not a prime number.\n", a);
    }
    return 0;
}
```

➤ **Output**

```
Enter a number: 7
7 is prime number.
```

8. WAP to illustrate the concept of global and static variables.

➤ **Code**

```
#include <stdio.h>

// declaring global variable;
int global = 5;

void change()
{
    global = 15;
}

int main()
{
    // global variable
    printf("Global variable: %d\n", global);
    global = 10;
    printf("Global variable after changing from main: %d\n", global);
    change();
    printf("Global variable after changing from change(): %d\n", global);

    // static variable
    for (int i = 0; i < 5; i++)
    {
        static int count = 0;
        count++;
        printf("count = %d\n", count);
    }

    return 0;
}
```

➤ **Output**

```
Global variable: 5
Global variable after changing from main: 10
Global variable after changing from change(): 15
count = 1
count = 2
count = 3
count = 4
count = 5
```