Lab 3

Some datatypes

Type	Storage	Range	format
short int	2	-32,768 to 32,767	%hd
unsigned short int	2	0 to 65,535	%hu
unsigned int	4	0 to 4,294,967,295	%u
int	4	-2,147,483,648 to 2,147,483,647	%d
long int	4	-2,147,483,648 to 2,147,483,647	%ld
unsigned long int	4	0 to 4,294,967,295	%lu
long long int	8	-9,223,372,036,854,775,808 to 9,223,372,036,854,775,807	%lld
unsigned long long int	8	0 to 18,446,744,073,709,551,615	%llu
signed char	1	-128 to 127	%c
unsigned char	1	0 to 255	%c
float	4	1.175494351 E - 38 to 3.402823466 E + 38	%f
double	8	2.2250738585072014 E - 308 to 1.7976931348623158 E + 308	%lf
long double	16 (80b data, rest padding)	3.4E-4932 to 1.1E+4932	%Lf

Q1. Create a “Pass-Fail” Grader that prints “Pass” if the average of the 5 subjects is greater than 75 else “Fail”. Take 5 double inputs (<=100) for the same.

```c
#include <stdio.h>

int main() {
   double num1,num2,num3,num4,num5;
   printf("Enter marks of Subject 1:");
   scanf("%lf",&num1);
   printf("Enter marks of Subject 2:");
   scanf("%lf",&num2);
   printf("Enter marks of Subject 3:");
   scanf("%lf",&num3);
   printf("Enter marks of Subject 4:");
   scanf("%lf",&num4);
   printf("Enter marks of Subject 5:");
   scanf("%lf",&num5);
   if(((num1+num2+num3+num4+num5)/5)>=75)
        printf("Pass");
   else
        printf("Fail");
}
```

```
Enter marks of Subject 1:23
Enter marks of Subject 2:12
Enter marks of Subject 3:2
Enter marks of Subject 4:3
Enter marks of Subject 5:12
Fail

...Program finished with exit code 0
Press ENTER to exit console.
```

Q.2 If Ax^2+Bx+C represents a general quadratic expression, taking A, B, C as input, print the roots of this equation.

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

void main()
{
float a,b,c,root1,root2;
printf("Enter values of a,b,c for finding roots of a quadratic eq: ");
scanf("%f%f%f",&a,&b,&c);

/*checking condition*/
if(b*b>=4*a*c)
{
 root1=(-b+sqrt(b*b-4*a*c))/2*a;
 root2=(-b-sqrt(b*b-4*a*c))/2*a;
 printf("root1= %f\nroot2= %f",root1,root2);
}
else
 printf("\n Imaginary Roots.");
}
```

```
input
Enter values of a,b,c for finding roots of a quadratic eq: 4 3
2

 Imaginary Roots.

...Program finished with exit code 18
Press ENTER to exit console.
```

```
Enter values of a,b,c for finding roots of a quadratic eq: 2 5 3
root1= -4.000000
root2= -6.000000
```

Q.3 Ask the user for integer input, check whether it is positive or negative. Print the factorial if positive else print “Cannot calculate factorial for negative input”. (As factorials grow exponentially, use unsigned int instead of int).

```c
#include <stdio.h>

void main()
{
        int n, i;
        long fact;
        printf("Enter the number: ");
        scanf("%d", &n);

        if (n == 0)
            printf("Factorial of 0 is 1\n");
        else if(n<0)
        {
            printf("Cannot calculate factorial for negative input");
        }
        else
        {
            unsigned int accu = 1;
            unsigned int i;
            for (i = 1; i <= n; i++)
            {
                    accu *= i;
            }
            printf("Factorial of %d is %u\n", n, accu);
        }
}


```

input

```
Enter the number: 5
Factorial of 5 is 120


...Program finished with exit code 22
Press ENTER to exit console.
```

Q.4 Implement a simple calculator that adds, subtracts, multiplies and divides. You should take 2 numbers and a symbol as input. If symbol == ' **+** ', ' **-** ', ' ***** ', ' **/** ' perform addition, subtraction, multiplication and division respectively.

```c
#include <stdio.h>

int main()
{
    char op;
    float num1, num2;

    printf("Enter operator either + or - or * or /: ");
    scanf("%c", &op);

    printf("Enter two operands: ");
    scanf("%f", &num1);
    scanf("%f",&num2);

        if(op=='+')
            printf("Result: %f",num1+num2);
        else if(op=='-')
            printf("Result: %f",num1-num2);
        else if(op=='*')
            printf("Result: %f",num1*num2);
        else if(op=='/')
            printf("Result: %f",num1/num2);
        else
            printf("Error! operator is not correct");

    return 0;
}
```

```
Enter operator either + or - or * or /: -
Enter two operands: 23 4
Result: 19.000000

...Program finished with exit code 0
Press ENTER to exit console.
```

Q.5 Take 3 positive doubles as input and find out the maximum and minimum and print the difference between the two (up to 2 decimal places).

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

  double n1,n2,n3;
  printf("Enter number1:");
  scanf("%lf",&n1);
  printf("Enter number2:");
  scanf("%lf",&n2);
  printf("Enter number3:");
  scanf("%lf",&n3);

  double max,min;
  if(n1>=n2)
  {
        if(n1>=n3)
        {
            max=n1;
            if(n3>=n2)
                min=n2;
            else
                min=n3;
        }
        else
        {
            max=n3;
            min=n2;
        }
  }
  else if(n2>=n3)
  {
```

```
31          max=n2;
32          if(n3>=n1)
33              min=n1;
34          else
35              min=n3;
36    }
37    else
38    {
39        max=n3;
40        min=n1;
41    }
42
43    printf("Difference between Maximum and Minimum is: %0.2lf",max-min);
44
45    return 0;
46 }
```

```
Enter number1:56
Enter number2:43
Enter number3:23
Difference between Maximum and Minimum is: 33.00

...Program finished with exit code 0
Press ENTER to exit console.
```

Q.6 Write a C program which prints ASCII Characters or letters as an output and reads ASCII code from the user input.

Q.7 Write a C program to calculate the Perimeter of a Rectangle (2*(L+W)) without using Addition and Multiplication Operators.

Q.8 Write a C program to Print your Name without using a semicolon at the end of the print statement.