세계 속의 빛
이공계 대학

Computer Programming

Lab6

May 2, 2025

Ex3

- **Problem: *Hypotenuse Calculations* – function**
- Define a **function** called hypotenuse that calculates the length of the hypotenuse of a right triangle when the other two sides are given. Use this function in a program to determine the length of the hypotenuse for each of the following triangles. The function should take two arguments of type double and return the hypotenuse as a double. Test your program with the side values specified in Fig. below.

Triangle	Side 1	Side 2
1	3.0	4.0
2	5.0	12.0
3	8.0	15.0

Fig. Sample triangle side values

Ex3

- **Program output**

```
[ohyong@cse ~/cp/Lab6]$ vi ex6_3.c
[ohyong@cse ~/cp/Lab6]$ gcc ex6_3.c -o ex6_3 -lm
[ohyong@cse ~/cp/Lab6]$ ./ex6_3
Enter the sides of the triangle: 3 4
Hypotenuse: 5.0

Enter the sides of the triangle: 5.0 12.0
Hypotenuse: 13.0

Enter the sides of the triangle: 8 15.0
Hypotenuse: 17.0
```

Extra

- Write a program that solves a quadratic equation of the form $ax^2 + bx + c = 0$. Use the sqrt() function.
  - ✓In C, mathematical functions are defined in the math.h header file , and the GCC compile option -lm is used to link the math library.
  - ✓Take three inputs: a, b, and c.
  - ✓Calculate the discriminant $D = b^2 - 4ac$.
  - ✓If $D > 0$, the equation has two distinct real roots, and the program should compute and print them.
  - ✓If $D = 0$, the equation has one real root (a double root), and the program should compute and print it.
  - ✓If $D < 0$, the equation has no real roots, and the program should print a message indicating that.
  - ✓You can use the formula for the roots of a quadratic equation:
    - Root 1: $(-b + \sqrt{(b^2 - 4ac)}) / 2a$
    - Root 2: $(-b - \sqrt{(b^2 - 4ac)}) / 2a$

Extra

- **Program output**

```
[ohyong@cse ~/cp/Lab6]$ vi ex6_extra.c
[ohyong@cse ~/cp/Lab6]$ gcc ex6_extra.c -o ex6_extra -lm
[ohyong@cse ~/cp/Lab6]$ ./ex6_extra
Enter a: 1
Enter b: -3
Enter c: 2
Root 1: 2.00
Root 2: 1.00
```

```
[ohyong@cse ~/cp/Lab6]$ ./ex6_extra
Enter a: 1
Enter b: -6
Enter c: 9
Double root: 3.00
```

```
[ohyong@cse ~/cp/Lab6]$ ./ex6_extra
Enter a: 1
Enter b: 4
Enter c: 8
No real roots exist.
```

Submission

- **Submit to server**

Lab #

Class #

At the end of the Lab6, submit your C sources file by typing

~gs1401/bin/submit Lab6_5 ex6_3.c ex6_extra.c // by Friday 13:50

You may check that you have submitted your source code correctly by typing

~gs1401/bin/submit -check