

The Menu

Your program must display a menu of options for the user.

1. Calculate the Slope of a Line
2. Identify Quadrant of an (x,y) Coordinate
3. Calculate Hypotenuse, Given 2 Sides
4. Convert Pounds to Kilograms
5. Convert Miles to Kilometers
6. Quit

You must check that a valid menu selection has been given. If it is invalid, an error message should be displayed and the menu/input prompt repeated until valid data is given. The program should continue until the user selects the quit option (i.e., the only way the program terminates is when the user selects the quit option).

Calculations and Output

All floating point numbers must be displayed with 3 decimal places of precision.

Slope of a line requires input of two (x,y) coordinates. The calculation of the slope is the difference in the y-values divided by the difference in the x-values.

Identifying the quadrant requires the input of one (x,y) coordinate. The quadrants are identified as I, II, III and IV, with I being the upper right section where both x and y are positive. The remaining quadrants are identified using a counter-clockwise motion/direction.

Calculating a hypotenuse requires input of the other two sides of the triangle, where both values must be positive. The calculation of the hypotenuse is the square root of the sum of the squares of the other two sides, i.e., $\text{hypotenuse} = \sqrt{s_1^2 + s_2^2}$

NOTE: Using the square root function requires: `#include <cmath>`

Conversion of pounds to kilograms requires input of the weight in pounds. The calculation of kilograms is pounds multiplied by **0.45**

Conversion of miles to kilometers requires input of the distance in miles. The calculation of kilometers is miles multiplied by **1.61**

Again, you MUST name your source file 'pa5.cc' and you MUST store it in your class directory (cs150x).

See next page for Sample Run !!!

Sample Run:

1. Calculate Slope
2. Identify Quadrant
3. Calculate Hypotenuse
4. Convert Pounds to Kilograms
5. Convert Miles to Kilometers
6. Quit

Selection: 1

Enter x,y of first point: 2 2

Enter x,y of second point: 4 6

slope through (2.000,2.000) and (4.000,6.000) is 2.000

1. Calculate Slope
2. Identify Quadrant
3. Calculate Hypotenuse
4. Convert Pounds to Kilograms
5. Convert Miles to Kilometers
6. Quit

Selection: 2

Enter an x,y coordinate: -5 13

point (-5.000,13.000) is in Quadrant II

1. Calculate Slope
2. Identify Quadrant
3. Calculate Hypotenuse
4. Convert Pounds to Kilograms
5. Convert Miles to Kilometers
6. Quit

Selection: 3

Enter the length of side1: 3

Enter the length of side2: 4

Hypotenuse = 5.000

1. Calculate Slope
2. Identify Quadrant
3. Calculate Hypotenuse
4. Convert Pounds to Kilograms
5. Convert Miles to Kilometers
6. Quit

Selection: 4

Enter a weight in pounds: 100

100.000 pounds is 45.000 kilograms

CMPS 150 – Fall 2005 -- Programming Assignment #5

1. Calculate Slope
2. Identify Quadrant
3. Calculate Hypotenuse
4. Convert Pounds to Kilograms
5. Convert Miles to Kilometers
6. Quit

Selection: 5

Enter a distance in miles: 10

10.000 miles is 16.100 kilometers

1. Calculate Slope
2. Identify Quadrant
3. Calculate Hypotenuse
4. Convert Pounds to Kilograms
5. Convert Miles to Kilometers
6. Quit

Selection: 8

Invalid Selection -- Please Try Again !

1. Calculate Slope
2. Identify Quadrant
3. Calculate Hypotenuse
4. Convert Pounds to Kilograms
5. Convert Miles to Kilometers
6. Quit

Selection: 3

Enter the length of side1: 6

Enter the length of side2: 0

Invalid length -- both sides must be greater than zero

1. Calculate Slope
2. Identify Quadrant
3. Calculate Hypotenuse
4. Convert Pounds to Kilograms
5. Convert Miles to Kilometers
6. Quit

Selection: 1

Enter x,y of first point: 1 1

Enter x,y of second point: 1 2

slope through (1.000,1.000) and (1.000,2.000) is undefined

1. Calculate Slope
2. Identify Quadrant
3. Calculate Hypotenuse
4. Convert Pounds to Kilograms
5. Convert Miles to Kilometers
6. Quit

Selection: 2

Enter an x,y coordinate: 0 0

point (0.000,0.000) is the origin

1. Calculate Slope
2. Identify Quadrant
3. Calculate Hypotenuse
4. Convert Pounds to Kilograms
5. Convert Miles to Kilometers
6. Quit

Selection: 6

Thank you for using the program ... Goodbye !!

4) Additional Requirements:

- Use comments as appropriate. Refer to the “Programming Style Sheet” on the CMPS 150 web site.
- Your program must use good names for all variables and named constants. (Good names are names that are descriptive of the values stored or the function performed.)
- Adhere to style requirements. See “Programming Style Sheet” on the CMPS 150 web site.

5) Name your source file 'pa5.cc' and store it in your class directory (cs150x).

6) Compile your program and test it (see Some Unix Help for quick assistance).

To compile:

```
g++ -o pa5run pa5.cc
```

To run (execute):

```
pa5run
```

- 7) After it is debugged and running correctly, submit pa5.cc (the source file only) electronically by 10:00 PM, Monday, October 17, 2005 to receive full credit.

```
submit -d pa5.cc
```

The CLID for the TA of your section is the name to put in. This is one of the following:

<u>Section</u>	<u>TA</u>	<u>CLID of TA</u>
Section 3.....	Gesan	gxw2096
Section 4.....	Anca.....	axd9917
Section 5.....	Mitun	mxh2169
Section 6.....	Jason	jbm8240

You will be asked to enter the assignment name and the CLID of the person it is to go to. The assignment name is:

```
assn5
```

REMINDER: You can turn in programs up to 24 hours late for 75% credit, or up to 48 hours late for 50% credit.

NOTE: Programs that do NOT compile will receive a grade of zero !!!