2022 Spring CPSC 240
Practice Exercise 1: Triangles

Preface

This program will introduce the art of programming in assembly language and provide opportunity to select a programming platform. The platform chosen may be used for the remainder of this course especially the midterm and final tests.

Program specification

Make a hybrid program where the main module is written in X86 assembly. The program takes as input the lengths of two sides of a triangle and the size of the included angle in degrees. Using those data the program computes the area of the triangle and the length of the perimeter of the triangle and displays the results in a friendly readable format.

Sample dialog with the user of the program with valid inputs.

Welcome to Amazing Triangles programmed by John Coffee on January 24, 2022.

We take care of all your triangles.

Please enter your name: Juan Wilder

Good morning Juan, please enter the length of side 1, length of side 2, and size (degrees) of the included angle between them as real float numbers. Separate the numbers by white space, and be sure to press <enter> after the last inputted number.

5.75   6.9   32.7448 <enter>

Thank you Juan. You entered 5.750000   6.8999999   32.7448000

The area of your triangle is 24.888888 square units

The perimeter is 19.567 linear units.

The area will now be sent to the driver function.

The driver received this number 24.888888888 and will simply keep it.

An integer zero will now be sent to the operating system. Have a good day. Bye

Color legend
Yellow: driver
Green: X86
Blue: keyboard (stdin)

Replace John Coffee's name with your own name.

Replace the old date with the date you made this program.

Sample dialog with the user of the program with an invalid input.

Welcome to Amazing Triangles programmed by John Coffee on January 24, 2022.

We take care of all your triangles.

Please enter your name: Elizabeth Torres

Good morning Elizabeth, please enter the length of side 1, length of side 2, and size (degrees) of the included angle between them as real float numbers. Separate the numbers by white space, and be sure to press <enter> after the last inputted number.

12.5 -15.6   120.5 <enter>

Thank you Juan. You entered 12.50000   -15.500000   120.500000

Unfortunately, one of your inputs is invalid. Please run this program again.

The driver received this number 0.0000 and will simply keep it.

An integer zero will now be sent to the operating system. Have a good day. Bye

Color legend
Yellow: driver
Green: X86
Blue: keyboard (stdin)

Replace John Coffee's name with your own name.

Replace the old date with the date you made this program.

All inputs into this program are positive 64-bit float numbers. Negative numbers must rejected.

Prepare your programming environment.

We use open source free tools only for programming.   Choose one of the following to become your home for programming.

1. Tuffix. If you are a continuing student at CSUF this is probably your easiest choice. You are already familiar with Tuffix as a platform for programming using other language. You may continue with Tuffix for this course.

2.   WSL. Windows 10 and I assume Windows 11 both have an open source Linux system built in. The only thing for you to do is to activate it. Do a web search for Microsoft + WSL + activate to find many sources of assistance for using WSL.

After you have activated WSL then enter the following commands into the shell:

```
sudo apt  update
sudo apt  install  nasm
sudo apt  install  g++
```

Find a convenient editor like mousepad, gedit, atom, vim, or any other text editor that you like. Use that editor for programming. You ready to do.

3.   Customized distro. This choice is for the specialist.   Choose one of the Linux distributions that appeals to you. You can find information on the top 100 Linuxes at www.distrowatch.com.   Read about the many different choices and pick one that appeals to you.   Down load your selected distro and install it on a computer you own.   The professor of 240 does not mandate a specific Linux; however, there is one recommendation: Choose a Linux that employs the Debian repository system of software.   Since most of your classmates will be using the Debian system you might as well remain compatible with other students in this class. You will be in a better position to get help from classmates and from teaching assistants and from SI leaders if your platform is closely compatible with everyone else's platform.

Selecting your programming platform is a personal decision. The professor of 240 does not tell you where to program. The only advice is to stay in the Debian family of operating systems.

Modular construction

This program will have two files. The first one has the generic name "driver", and the second one could be call "manager". Here in assignment 1 the driver will call the manager.

main
cpp

r.sh
Bash

compute_triangle
X86
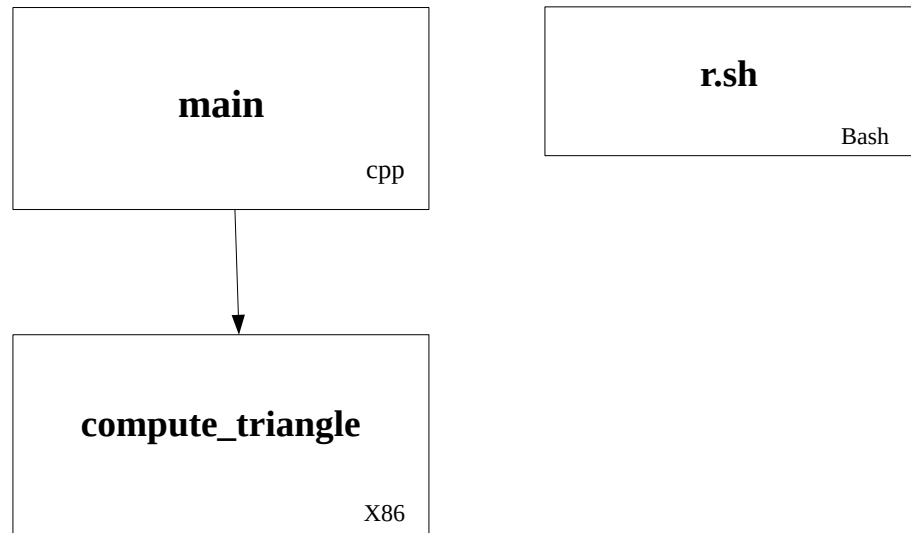
The main function is written in C++. The function that does all the work, compute_triangle, is written in X86, and the director function (which is not really a function) is written in bash.

Timeline

February 8, 2022 @ 11:59pm

After this date this practice exercise will have expired and the class will move on to other current subjects. You need to move ahead with the class.

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