EXAMPLE 1A [See Note 1]

1. Program Description: This program will compute the area of a triangle, given the three sides.

2. Analysis:

(a) Inputs:

There are three inputs: the lengths of the three sides.

(b) Outputs:

There is one output, the area.

(c) How to obtain the outputs:

We will use [Heron’s Formula](http://www.mathsisfun.com/geometry/herons-formula.html) (see part (d) below).

(d) Mathematical Formulas:

Let a, b, and c be the lengths of the sides. There are two steps in the computation:

 Set s = (a + b + c)/2 [This is an intermediate result; it is neither an input nor an output.]

 Set Area = Sqrt(s\*(s - a)\*(s - b)\*(s - c)) [This will be the output] [See Note 2]

 (e) Variables table:

|  |  |  |
| --- | --- | --- |
| **Name** | **Data Type** | **Usage** |
| a | Float | Length of first side |
| b | Float | Length of second side |
| c | Float | Length of third side |
| s | Float | The intermediate result used in Heron’s formula |
| Area | Float | The area computed |

3. Some Test Cases:

|  |  |  |  |
| --- | --- | --- | --- |
| a | b | c | Area |
| 3 | 4 | 5 | 6 |
| 5 | 5 | 0 | 0 |
| 5 | 5 | 5 | 10.82531755…… |

4. Pseudocode

Begin program

Declare Float a, b, c, s, Area

// Ask for, and accept, the lengths of the three sides

Print “Please enter the first side”

Input a

Print “Please enter the second side”

Input b

Print “Please enter the third side”

Input c

// Do the computations per Heron’s Formula

Set s = (a + b + c)/2

Set Area = Sqrt(s\*(s - a)\*(s - b)\*(s - c))

//Show the result

Print “The Area is “ + Area

End program

Note 1: This example differs from Example1 in that it has three inputs instead of one, and does a different calculation. Assignment 1 differs from this example in that there are even more inputs, and another different calculation.

Note 2: Sqrt refers to finding the square root of a number. The square root of a number x is a number y such that y\*y=x. For example, the square root of 9 is 3, because 3\*3 = 9. Nearly every programming language includes a tool for finding square roots, and it is almost always called Sqrt.