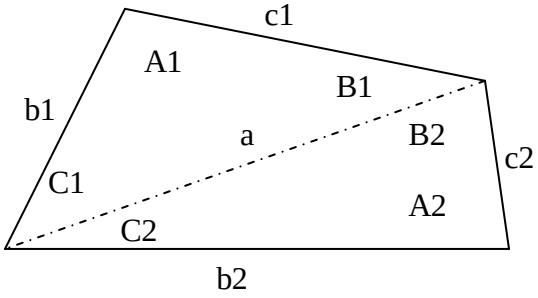
CS 151L – Summer 2017
Programming Assignment 1

Due: Monday, June 12, 2017 at 11:59 PM

You will need to submit your program on learn for grading. The name of the file should be **cs151su17assn1.m**. Be sure to include your name and section number as comments in the m-file.

The four-sided figure shown below consists of two triangles having a common side *a*. The law of cosines for the top triangle states that $a^2 = b_1^2 + c_1^2 - 2b_1c_1 \cos A_1$ and a similar equation can be written for the bottom triangle. You may also need to use the law of sines to solve this problem and for the top triangle, it is $\frac{\sin A}{a} = \frac{\sin B_1}{b_1} = \frac{\sin C_1}{c_1}$. In the figure, *a*, *b1*, *c1*, *b2*, and *c2* are the dimensions of the sides and *A1*, *A2*, *B1*, *B2*, *C1*, and *C2* are the dimensions of the angles (as shown).



Develop a procedure for computing the length of side *c2* if you are given the lengths of the other three sides and the two angles *A1* and *A2*.

A Step-by-step Procedure

1. Assign single values to the variables representing each side of the figure. (b1 is 175 meters, b2 is 162 meters, and c1 is 117 meters).
2. Assign values to the two angles A1 and A2 where A1 is 2.25 radians and A2 is 1.68 radians.
3. Solve for side a of the top triangle using the law of cosines (you will need to use functions to take the square root and the cosine function - note that there are cosine functions that can use either radians or degrees).
4. Solve for the angle B2 (in degrees) by using the law of sines (you will need to use the arcsine and sine functions – again note that there are functions for both radians or degrees).
5. Solve for the angle C2 (in degrees) by knowing that all three angles in a triangle must add up to 180 degrees.
6. Finally, solve for the side c2 by using the law of cosines (make sure that this final answer prints to the screen for verification).
7. You should get the following **approximate** values as answers for the steps above
   a = 265
   B2 = 37
   C2 = 46
   c2 = 192