

9 - TURTLE ANGLE CALC

Your program will read in 2 points from the user, and then use the methods in the turtle module to draw a line from 0,0 to the 1st point, and from the 1st point to the second point. You will also use geometry to calculate the acute (smaller) angle between the 2 lines you draw.

Main components of program

1. output a brief, descriptive message when it first starts, indicating the purpose of the program and the user-required input and output that will be provided.
2. prompt the user for the x coordinate of the first point, then for the y coordinate. Repeat for the 2nd point.
3. print the acute angle between the 2 lines (1st line from 0,0 to 1st point, 2nd line from 1st point to 2nd point).
4. using the turtle module, draw the 2 lines on the screen. At the end of the 2nd line, write the angle previously calculated.

Useful information

- To use turtle, it must be imported: **import turtle**
- The turtle will always start at (0,0)
- To make the turtle move, for now use **turtle.goto(x,y)**
- To write using the on the screen with the turtle use **turtle.write(x)**
- To finish using the turtle use **turtle.done()**
- To calculate the acute angle between two lines where (x1, y1) and (x2, y2) are 2 points on the line the formula is: $\frac{y_2 - y_1}{x_2 - x_1}$
- To calculate the angle between two lines where m1 and m2 are the slopes of the 2 lines, and m2 is larger than m1 the formula is: $\tan \phi = \frac{m_2 - m_1}{1 + m_1 m_2}$
- To ensure that you always subtract the smaller value from the larger, you will need the absolute value which is built into python with: **abs()** e.g. **abs(-47) = 47**
- To use tan, you must import math: **import math**
- The tan function **atan** returns radians, to convert to degrees the formula is **(angle in radians)*180/pi**
- Pi can be accessed with **math.pi**