Thursday, February 19, 2015

Where is Waldo? (Waldo is turtle created by tryTrig procedure).

Where is Waldo means what is the (xcor, ycor) location of the turtle with who # 0.

1. What is the xcor of this turtle (the turtle has WHO number = 0)? *Solve using Sine or Cosine. Show ALL your work and your process of arriving at the result. Focus on WHAT first, then focus on HOW to solve that what. Show this process!*

2. What is the ycor of this turtle? Solve using Sine or Cosine and show all of your work and drawings and process of arriving at the result.

3. Now solve the entire problem of finding both the xcor and the ycor, i.e. the (xcor, ycor) location of the turtle without using the COSINE. You can only use the SINE and the TANGENT in finding the exact (xcor, ycor) location of the turtle.

Recall the SOH, CAH and TOA for Sine and Cosine and Tangent. Sine is S, Cosine is C, Tangent is T. What about O, A and H? Sides! O = opposite side. A = adjacent side. H = hypotenuse.

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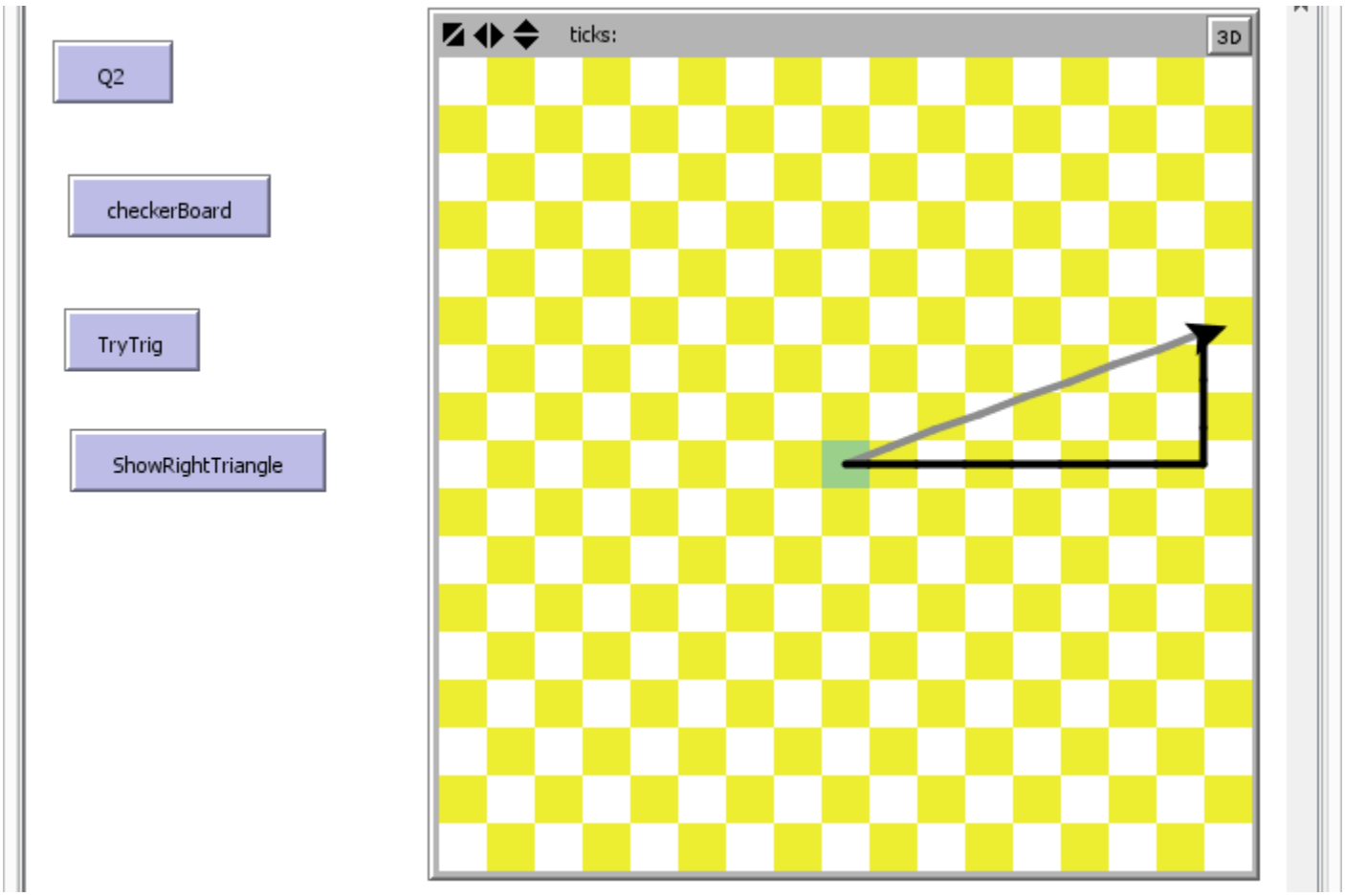
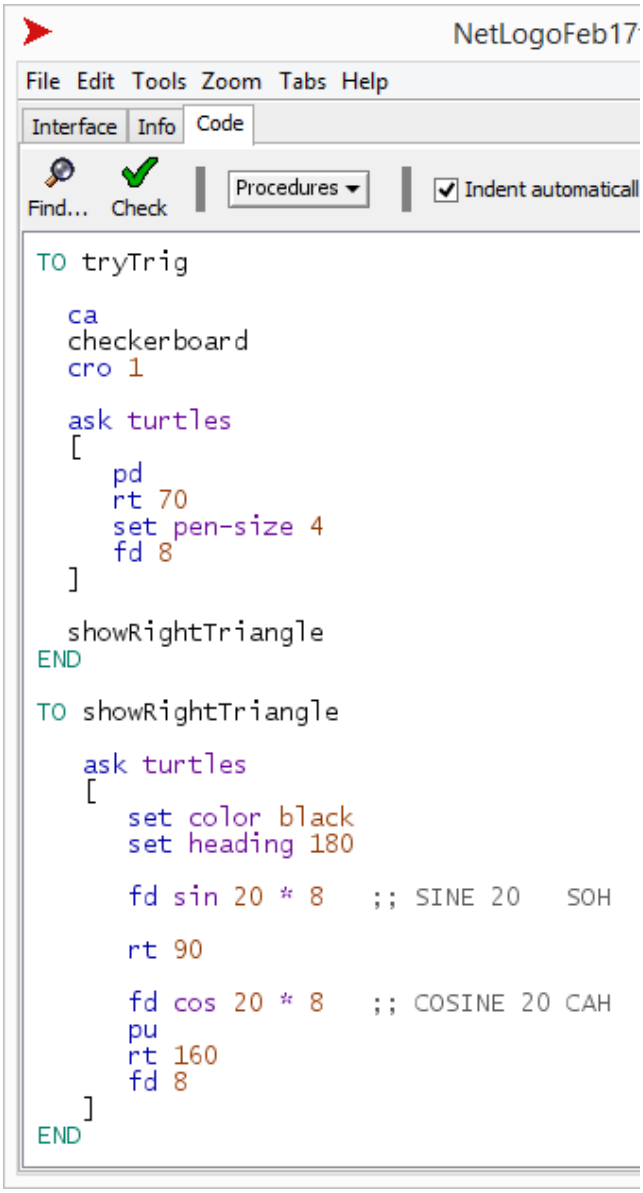
```
TO tryTrig
  ca
  checkerboard
  cro 1

  ask turtles
  [
     pd

     rt 70
     set pen-size 4
     fd 8
  ]
END
```





The code for checkerboard is as follow:

```
TO CheckerBoard
    ask patches
    [
       set pcolor white
       if abs (remainder (pxcor + pycor) 2 ) = 1
       [
          set pcolor yellow
       ]
    ]
END
```

The turtle turned right 70 degrees and has a heading of 70 degrees. The cro operation always creates the first turtle (who number = 0) with a heading of 0 degrees, i.e. it is facing north or straight upward on the grid.

The turtle moved forward a distance of 8 using the fd command, i.e. fd 8.

The two legs of the right triangle were drawn using a different color so they stand out from the original hypotenuse.

Set heading 180 means the turtle is facing straight south and will go down the grid drawing a vertical line.

How far does the turtle need to go? Trigonometry tells the answer, after you draw a picture of WHAT you want and label everything that you are given, and label what your goal is? What is the goal? What are the givens?

The goal is to know the length of the vertical leg of the triangle. If you know the length of any other side and know one of the angles beside the 90 degree angle, then all you need to know is some basic trigonmetry (SOH, CAH, and TOA) you can determine the answer.

How much does the turtle need to turn to get ready to draw the horizontal leg of the triangle?

How long is that horizontal leg of the triangle? How can you find that distance? What formulas do you know? What facts do you know? The number of degrees of some angles in the right triangle? The length of one of the other sides in the right triangle? What do you know? What is your goal? How can you get to that goal, using what you know? What facts you know and what fact you want to know can be sometimes connected by a formula you have learned.

The trig formulas (SOH, CAH, and TOA) that we have been using have 3 parts. You should find in this problem that your GOAL or the UNKNOWN will be 1 of the 3 parts, and that you are directly or indirectly given the other 2 parts. That is the HOW you get from the given inputs or knowns to the desired output or unknown or to be found. The HOW is the 2nd step of the problem solving process.

Separate the WHAT from the HOW, the first step of problem solving understanding WHAT you have from the second step, the developing the HOW to solve the problem.