Junior Knights Python I - Week 12

Turtle

Agenda

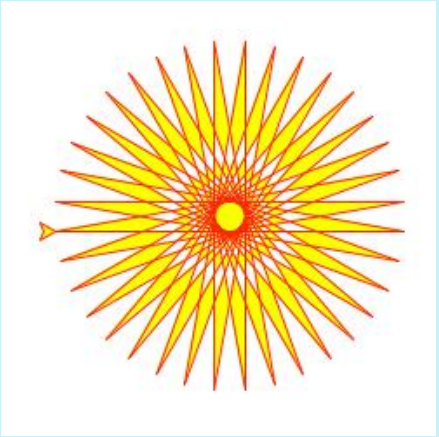
Getting Started

Moving the Turtle

Shapes & Colors

What is Turtle?

- In the early 1980s, a programming language called Logo was created to get kids interested in programming. It allowed the programmer to control a turtle that drew on a screen
- Python has implemented its own version of the turtle
- Turtle is a built-in Python library that allows us to draw pictures using code!
- You control a “turtle” that moves around the screen and draws



Getting Started

Import the library

```
import turtle
```

Each turtle function is called with the following syntax:

```
turtle.function(<parameters>)
```

Functions	Purpose
`penup()`	Picks the turtle's pen up
`pendown()`	Puts the turtle's pen down
`forward(n)`	Moves the turtle forward n pixels
`right(n)`	Turns the turtle's heading right by n degrees
`left(n)`	Turns the turtle's heading left by n degrees
`goto(x, y)`	Takes the turtle to a coordinate

Square Example

- Think of a square as nothing but going forward and turning right (or turning left), repeated 4 times
- Each turn is 90 degrees

```
import turtle
def main():
    screen = turtle.Screen()   // Stores the popup screen

    turtle.pendown()
    for cnt in range(4):
        turtle.forward(100)
        turtle.right(90)

            screen.exitonclick()                    // Keeps popup screen
open until click
    main()
```

Spiral Square Example

- If we change the length of each side, successively, we can make a spiral square design
  - Increase the length of the side by 10 each time through the loop

```
import turtle
def main():
     side = 10
     n = int(input("How many sides do you want on your spiral
square?\n"))
     turtle.pendown()
     for cnt in range(n):
          turtle.forward(side)
          turtle.right(90)
          side = side + 10
main()
```

Mountain Example

- User inputs the number of mountains to draw
- Each mountain is shaped like an upside-down "V" (45° slopes, 90° peak)
- Turtle moves to the left side of the screen before drawing
- Mountains are drawn from left to right across the screen
- X-range for drawing: from -300 to +300
- Variable size is half the base length of each mountain
- Each base = 600 // n where n is the number of mountains
- Each side = 300 // n
- Side length of the mountain = side * sqrt(2) (using 45-45-90 triangle rule)

Live Coding