CSCI 141

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Turtles
Goals

• Know how to use the turtle module to:
  • Create a Turtle object
  • Call the turtle object's methods (functions) to move it around the screen and draw simple shapes: (forward, left, right, penup, pendown)
turtle module

Python has a module called turtle!

```python
import turtle
```
turtle module

Python has a module called turtle!

```python
import turtle
scott = turtle.Turtle()
```

What does this do?
turtle module

Python has a module called turtle!

```python
import turtle
scott = turtle.Turtle()
```

What does this do? Let’s play with it.
Demo: basic turtle usage
Demo: basic turtle usage

• forward, backward
• left, right
• pendown/down
• penup/up
Creating and Using Objects

```python
import turtle
scott = turtle.Turtle()
```

What is this about?

No new syntax here:
We import a module called `turtle` that has a function called `Turtle`
Creating and Using Objects

```python
import turtle
scott = turtle.Turtle()
```

The `Turtle()` function starts with a capital letter. By convention this indicates that a constructor that creates (and returns) new objects of type `Turtle`.

The variable `scott` now refers to a newly created `Turtle` object.

what is an object? what can it do?
Creating and Using Objects

```python
import turtle
scott = turtle.Turtle()
```

Objects can have functions associated with them, accessed via the dot notation:

```python
# move the turtle forward 10 units:
scott.forward(10)
# turn the turtle left 90 degrees:
scott.left(90)
```

*functions that belong to an object are called its methods*

What methods do Turtles have? Lots!

Check the docs: [https://docs.python.org/3/library/turtle.html](https://docs.python.org/3/library/turtle.html)
Modules vs Objects

import a module

import random
num = random.randint(0, 9)

call one of its functions

call one of that object's methods

import a module

import turtle
scott = turtle.Turtle()
scott.forward(100)

call one of its functions

which creates an object

Demo: make more than one turtle
Basic turtle methods

- **forward**: moves the turtle forward
- **left/right**: turns the turtle
- **penup/pendown**: turns drawing on and off
Task: Write pseudocode for an algorithm to draw a square with side length 100:
Algorithms with Turtles

**Task:** Write pseudocode for an algorithm to draw a square with side length 100:

1. Move forward 100
2. Turn left 90 degrees
3. Move forward 100
4. Turn left 90 degrees
5. Move forward 100
6. Turn left 90 degrees
7. Move forward 100
8. (Turn left 90 degrees)

Can we do better?
Task: Write pseudocode for an algorithm to draw a square with side length 100:

Repeat 4 times:
1. move forward 100
2. turn left 90
Demo
Demo

• turtle_square.py: Write a loop-based program that makes a turtle and draws a square with it.