

Turtle Graphics



Turtle Graphics

- How to Turtle
- Instances
- For Loop
- Range function
- More Turtle Methods

How to Turtle

```
1 import turtle                # allows us to use the turtles library
2
3 wn = turtle.Screen()         # creates a graphics window
4
5 alex = turtle.Turtle()      # create a turtle named alex
6
7 alex.forward(150)           # tell alex to move forward by 150 units
8 alex.left(90)               # turn by 90 degrees
9 alex.forward(75)            # complete the second side of a rectangle
10
11 wn.exitonclick()           #wait for a user to click on the canvas
```

Objects & Methods

```
1 import turtle           # allows us to use the turtles library
2
3 wn = turtle.Screen()    # creates a graphics window
4
5 alex = turtle.Turtle()  # create a turtle named alex
6
7 alex.forward(150)       # tell alex to move forward by 150 units
8 alex.left(90)          # turn by 90 degrees
9 alex.forward(75)       # complete the second side of a rectangle
10
11 wn.exitonclick()       #wait for a user to click on the canvas
```

Turtles
are
Objects

Objects
Have
Methods

How to Turtle

```
1  import turtle
2
3  wn = turtle.Screen()
4  wn.bgcolor("lightgreen")      # set the window background color
5
6  tess = turtle.Turtle()
7
8  tess.color("blue")           # make tess blue
9  tess.pensize(3)              # set the width of her pen
10
11 tess.forward(50)
12 tess.left(120)
13 tess.forward(50)
```

Your Turn to Turtle

```
1  import turtle
2
3  wn = turtle.Screen()
4  wn.bgcolor("lightgreen")      # set the window background color
5
6  tess = turtle.Turtle()
7
8  tess.color("blue")           # make tess blue
9  tess.pensize(3)              # set the width of her pen
10
11 tess.forward(50)
12 tess.left(120)
13 tess.forward(50)
```

Instances

```
1 import turtle
2
3 wn = turtle.Screen()           # Set up the window and its attributes
4 wn.bgcolor("lightgreen")
5
6
7 tess = turtle.Turtle()        # create tess and set some attributes
8 tess.color("hotpink")
9 tess.pensize(5)
10
11 alex = turtle.Turtle()        # create alex
12
13 tess.forward(80)              # draw with tess
14 tess.left(120)
15
16 alex.right(90)                # draw with alex
17 alex.forward(90)
```

Instances - Tracing

```
import turtle

wn = turtle.Screen()
wn.bgcolor("lightgreen")

tess = turtle.Turtle()
tess.color("hotpink")
tess.pensize(5)

alex = turtle.Turtle()

tess.forward(80)
tess.left(120)

alex.right(90)
alex.forward(90)
```

What If?



What If?

```
tess.forward(80)
tess.left(90)
tess.forward(80)
tess.left(90)
tess.forward(80)
tess.left(90)
tess.forward(80)
tess.left(90)
```

```
tess.left(10)
```

```
tess.forward(80)
tess.left(90)
tess.forward(80)
tess.left(90)
tess.forward(80)
tess.left(90)
tess.forward(80)
tess.left(90)
```

```
tess.left(10)
```

```
tess.forward(80)
tess.left(90)
tess.forward(80)
tess.left(90)
tess.forward(80)
tess.left(90)
tess.forward(80)
tess.left(90)
```

```
tess.left(10)
```

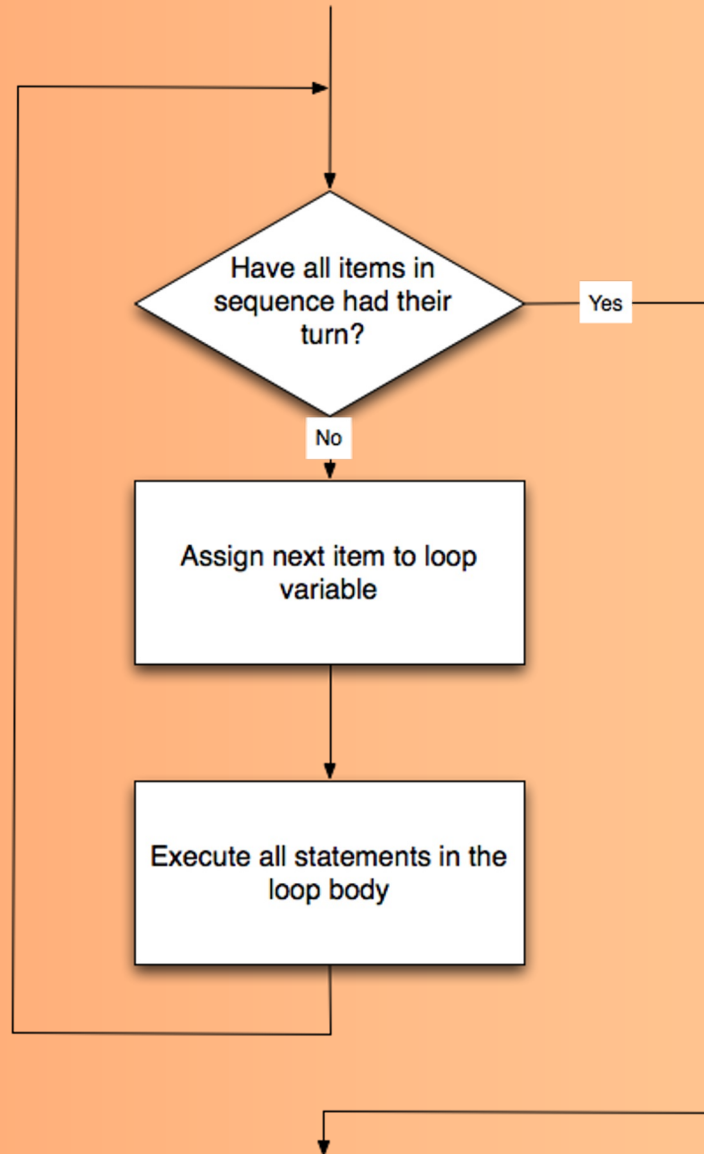
```
tess.forward(80)
tess.left(90)
tess.forward(80)
tess.left(90)
tess.forward(80)
tess.left(90)
tess.forward(80)
tess.left(90)
```

```
tess.left(10)
```

For Loop

- Used to run group of statement many times

For Loop



For Loop

```
for name in ["Joe", "Amy", "Brad", "Angelina", "Zuki", "Thandi", "Paris"]:  
    print("Hi", name, "Please come to my party on Saturday!")
```

For Loop

Loop Variable

```
for name in ["Joe", "Amy", "Brad", "Angelina", "Zuki", "Thandi", "Paris"]:  
    print("Hi", name, "Please come to my party on Saturday!")
```

For Loop

Loop Variable

Sequence

```
for name in ["Joe", "Amy", "Brad", "Angelina", "Zuki", "Thandi", "Paris"]:  
    print("Hi", name, "Please come to my party on Saturday!")
```

For Loop

Loop Variable

Sequence

```
for name in ["Joe", "Amy", "Brad", "Angelina", "Zuki", "Thandi", "Paris"]:  
    print("Hi", name, "Please come to my party on Saturday!")
```

Loop Body

ALWAYS Indented

For Loop

Loop Variable

Sequence

```
for name in ["Joe", "Amy", "Brad", "Angelina", "Zuki", "Thandi", "Paris"]:  
    print("Hi", name, "Please come to my party on Saturday!")
```

Loop Body

ALWAYS Indented

Iteration

loop variable assigned a value
from sequence

statements in loop body executed

For Loop

Loop Variable

Sequence

```
for name in ["Joe", "Amy", "Brad", "Angelina", "Zuki", "Thandi", "Paris"]:  
    print("Hi", name, "Please come to my party on Saturday!")
```

Loop Body

ALWAYS Indented

Iteration

loop variable assigned a value
from sequence
statements in loop body executed

End of Iteration

back to for to check for more values
in sequence

Range Function

```
>>>for count in range(4):  
...     print(count)  
...  
...
```

Range Function

```
for count in range(4):  
    print(count)
```

What Happened?

Range Function

```
>>>for count in range(1, 5):  
...     print(count)  
...  
...
```

Range Function

```
for count in range(1, 5):  
    print(count)
```

What Happened?

Range Function

`range(start, stop, step):`

Range Function

```
>>>for count in range(1, 10, 2):  
...     print(count)  
...  
...
```

Range Function

```
for count in range(1, 10, 2):  
    print(count)
```

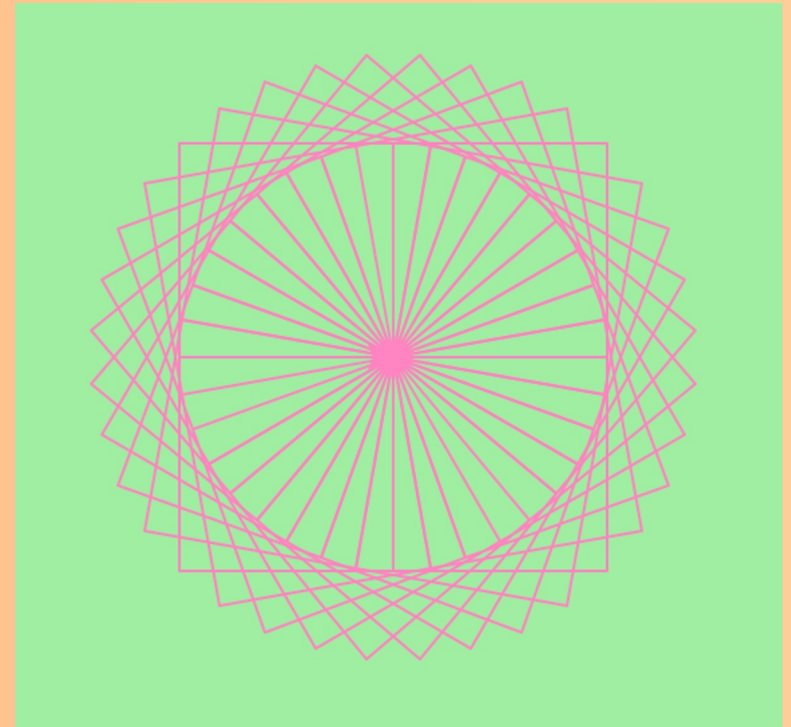
What Happened?

Range Function

```
1 import turtle
2
3 wn = turtle.Screen()
4 wn.bgcolor("lightgreen")
5
6
7 tess = turtle.Turtle()
8 tess.color("hotpink")
9
10 ▼ for squares in range(36):
11     tess.forward(80)
12     tess.left(90)
13     tess.forward(80)
14     tess.left(90)
15     tess.forward(80)
16     tess.left(90)
17     tess.forward(80)
18     tess.left(90)
19
20 └ tess.left(10)
21
22 wn.exitonclick()
```

Range Function

```
1 import turtle
2
3 wn = turtle.Screen()
4 wn.bgcolor("lightgreen")
5
6
7 tess = turtle.Turtle()
8 tess.color("hotpink")
9
10 ▼ for squares in range(36):
11     tess.forward(80)
12     tess.left(90)
13     tess.forward(80)
14     tess.left(90)
15     tess.forward(80)
16     tess.left(90)
17     tess.forward(80)
18     tess.left(90)
19
20 └ tess.left(10)
21
22 wn.exitonclick()
```



More Turtle Methods

Method	Parameters	Description
Turtle	None	Creates and returns a new turtle object
forward	distance	Moves the turtle forward
backward	distance	Moves the turtle backward
right	angle	Turns the turtle clockwise
left	angle	Turns the turtle counter clockwise
up	None	Picks up the turtles tail
down	None	Puts down the turtles tail
color	color name	Changes the color of the turtle's tail
fillcolor	color name	Changes the color of the turtle will use to fill a polygon
heading	None	Returns the current heading
position	None	Returns the current position
goto	x,y	Move the turtle to position x,y
begin_fill	None	Remember the starting point for a filled polygon
end_fill	None	Close the polygon and fill with the current fill color
dot	None	Leave a dot at the current position
stamp	None	Leaves an impression of a turtle shape at the current location
shape	shapename	Should be 'arrow', 'classic', 'turtle', or 'circle'

Review

- How to Turtle
- Instances
- For Loop
- Range function
- More Turtle Methods
- Objects and Methods



Superbly Excellent!



