How to Draw a House in Python

Python is one of the most infamous computer programming softwares of all time. Created in 1989, Python allows users to code a variety of different programs that can range from showing users a simple message that says "Hello World!" to helping solve complex mathematical equations that would take a long time to calculate by hand. One of the most unique aspects of Python that makes it stand out from other programming languages, is its built-in library, turtle, which allows users to make their own drawings and animations based on their code. With this tutorial, we will introduce you to turtle and show you how to use the library to draw a house.

Getting Started and Setting Up Turtle

Before we begin, please make sure that you open up whatever software you have Python in (i.e. Virtual Studio, IDLE, Replit) and write : import turtle so that your program knows to call the library so that we can utilize the tools in turtle to draw our house.

Within the turtle library, there are a multitude of things we can do to customize our drawing like changing the image of our cursor, using different colors, and how fast we want our cursor to draw our image.

To change the cursor's image, we can use the following function, `turtle.shape("")` and put the shape we want within the quotations. For this tutorial, let's use the star shape by using the code: `turtle.shape("turtle")`

To change how fast our cursor draws our image, we can use the function, `turtle.speed()` and put a number between 0 and 10 to change the speed of the cursor (0 is the fastest and 1 is the slowest and the speed increases as

the number placed gets higher). Let's use 5 for this lesson and place it in the function so that we have the following code: `turtle.speed(5)`

Turtle automatically uses the color black when running the program but we can change that using the `turtle.color("")` function which will change the color to be whatever color is placed inside the quotations. We will use a variety of colors within the tutorial, but you can change it to whatever color you want.

After setting everything up, your code should look like this so far:

```
import turtle
turtle.shape("turtle")
turtle.speed(5)
turtle.color("red")
```

Now let's start drawing our house!

Drawing the Walls

To draw the walls of the house, we need to use `turtle.forward()` and `turtle.left()` to move our cursor forward and turn to the left based on the number we put inside the parentheses. To build the walls of the house, write the following instructions within your program:

1. `turtle.forward(100)`
2. `turtle.left(90)`
3. `turtle.forward(100)`
4. `turtle.left(90)`

5. `turtle.forward(100)`
6. `turtle.left(90)`
7. `turtle.forward(100)`
8. `turtle.left(180)`

Now, run your program and make sure the image turtle draws looks similar to this:
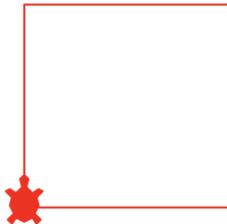

Drawing the Roof

Before we draw the roof, we first need to move our cursor forward so that it is in position so let's use `turtle.forward(100)` and let's use a different color for the roof . Put in your program, `turtle.color("blue")` to make the color of our roof blue or change it to a different color you prefer.

To draw the roof, write the following code into your program so that the cursor creates a roof for your drawing:
1. `turtle.right(30)`
2. `turtle.forward(100)`
3. `turtle.right(120)`
4. `turtle.forward(100)`

Your drawing should now look like this:
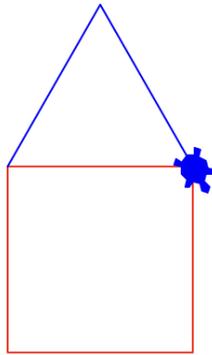
Now let's draw a door for our house!

Drawing a Door

Let's move our cursor into the correct position so that we can draw our door. Write the following code into your program so that your cursor can move into the correct spot:
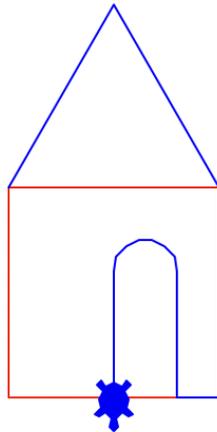
1. `turtle.right(30)`
2. `turtle.forward(100)`
3. `turtle.right(90)`
4. `turtle.forward(20)`
5. `turtle.right(90)`

Since our cursor is finally in position, we can use the following steps to code our cursor to make a door:

1. `turtle.forward(60)`
2. `turtle.circle(15, 180)`
3. `turtle.forward(60)`

You might be curious what `turtle.circle(15, 180)` does to our drawing. This piece of code tells our cursor to make a circle that has a radius of 15 and to only rotate 180 degrees so that we have a semicircle on top of our door.

Run your program again and you should get the following drawing:

To finish off our piece, let's make a window!

Drawing a Window

Let's move our cursor to the correct position so that we can start the window. Move the cursor using the following steps of code:

1. `turtle.penup()`
2. `turtle.right(90)`
3. `turtle.forward(20)`
4. `turtle.right(90)`
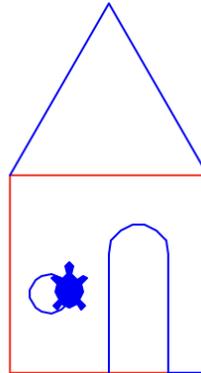5. `turtle.forward(40)`
6. `turtle.pendown()`

Using `turtle.penup()`, it tells our cursor not to draw anything until we use the `turtle.pendown()` function which allows us to move in between the whitespaces of our drawing without creating any extra lines.

Now that we are in position: Use the following step to program our cursor to make a round window:

1. `turtle.circle(10)`

Final Drawing and Code

Congrats! You just made your first drawing with turtle! To make sure you did it right, your final drawing should look like this:

To check if you coded everything correctly, make sure that your code within your program looks similar to this:

```python
# Setting Up Turtle
import turtle

turtle.shape("turtle")

turtle.speed(5)

turtle.color("red")

# Drawing the Walls of our House
turtle.forward(100)
turtle.left(90)
turtle.forward(100)
turtle.left(90)
turtle.forward(100)
turtle.left(90)
turtle.forward(100)
turtle.left(180)

# Moving our Cursor to Roof
turtle.forward(100)

# Drawing Our Roof
turtle.color("blue")
turtle.right(30)
turtle.forward(100)
turtle.right(120)
turtle.forward(100)

# Moving Cursor to the Door Position
turtle.right(30)
turtle.forward(100)
turtle.right(90)
turtle.forward(20)
turtle.right(90)

# Drawing the Door
turtle.forward(60)
turtle.circle(15, 180)
turtle.forward(60)

# Moving Our Cursor to the Window's Position
turtle.penup()
turtle.right(90)
turtle.forward(20)
turtle.right(90)
turtle.forward(40)
turtle.pendown()

# Drawing the Window
turtle.circle(10)
```

The functions that we used to draw our house can be used to draw a variety of other interesting artworks and animations. You can try using these functions to add onto your artwork like adding a chimney or even a garden!