



Homework Exercise 6: Functions

Goal: To get practice writing functions, especially using parameters.

In Chapter 8 of *R & F*, the authors use a cute little owl to illustrate several programming ideas, functions being the main one. Find the file `owl.txt` with this assignment. It is the (slightly simplified) owl program. The function for the owl is as follows:

```
void owl (int x, int y) {
  stroke(0);
  strokeWeight(70);
  line(x, -35+y, x, -65+y); // body
  noStroke();
  fill(255);
  ellipse(-17.5+x, -65+y, 35, 35); // left eye dome
  ellipse( 17.5+x, -65+y, 35, 35); // right eye dome
  arc(0+x, -65+y, 70, 70, 0, PI);
  fill(0);
  ellipse(-14+x, -65+y, 8, 8); // left eye
  ellipse( 14+x, -65+y, 8, 8); // right eye
  quad(0+x, -58+y, 4+x, -51+y, x, -44+y, -4+x, -51+y);
}
```

Notice that the owl is a 70 x 100 figure.

Part 1: Add Parameter. Change the `owl()` function so that it accepts one more input parameter, namely a variable of type `color`. A legitimate colored input could be, say, `color(0,0,0)` which continues the black theme, or `color(160, 106, 6)` which makes a brown owl. In any case the owl should have black eyes and black beak. Comment the additions to the program.



Part 2: Add Function. Write a new function with the following specification:

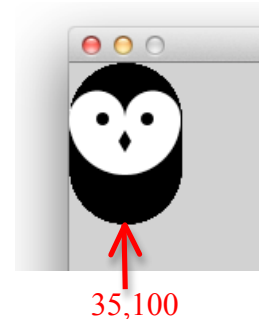
Name: `pick`

Parameters: *none*

Returned type: `color`

Returned value: `color(random(255), random(255), random(255))`

The returned value will create a random color. Here's how it works. The Processing function `random()` returns an unpredictable value every time it is called. The number comes from the range (*0-arg*), and since the *arguments* here are 255, the random number is a random RGB value. Do it three times, and you have a random color! The function is only one line long.



Part 3: Make A Flock. Make a function to draw a row of 8 owls each of a random color. They should be in a row, and they should be tight together, as shown above. Call your function `owl8()`. It should have two parameters:

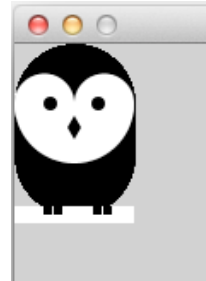
`x, y` are integers, which are the starting position of the first owl (left most) of the sequence,

Notice that the argument for the color parameter of `owl()` calls will be a call to the `pick()` function. That is, it's OK to call a function as a parameter. That's what we did in `color()` above. Be sure to comment your program.

If the flashing drives you crazy, remove `pick()` and use a specific color while you work on the following.

Part 4: Make Extra Flocks. Make a function to draw six rows, each containing 8 owls. The function should have two parameters, `x, y` for the position of the initial row. Comment your program.

Part 5: Finish Up: Add a branch and “claws” to make the owl look like its sitting on the branch. (They're just 4x4 black boxes!) All copies of the owl should have the branch, and it should look like one continuous branch if more than one owl is drawn. See figure at right. Comment your program.



Wrap Up: You have practiced writing functions, calling functions and including parameters. These skills will be used throughout your computational thinking.

Turn in your `.pde` code to the class dropbox.