

# CS101: HW 3

Due: October 17, 2018

**Submission Instructions:** Type your answers to the following questions in a .doc or .txt file and submit on Canvas. You will also need to submit your code **in a separate file**.

## For Loop Exercises

Complete the exercises at <http://web.stanford.edu/class/cs101/image-3-exercises.html>

1. Describe the order that a for loop goes over pixels in an image. Which pixel is chosen first? Are they looked at row-by-row, column-by-column, or some other scheme? Hint: You can use the debugger or print the pixels out in the for loop.
2. The first code exercise involves removing the red from the image. What color are the flowers now, and why are they that color? Use your knowledge of colors (or the red/green/blue explorer) from last week to answer this question.
3. If there are 6 pixels in the image "6pixels.jpg", write the lines of code in the order that they are executed. If a line is executed more than once, then it should be included more than once. What is the value of x at the end of this code?

```
img = new SimpleImage("6pixels.jpg");
x = 2;
x = x + 3;
for (pixel : img) {
    x = x + 5;
}
x = x + 1;
```

## Thursday's Exercises

### If Statements

Complete the exercises at <http://web.stanford.edu/class/cs101/if-exercises.html>. Note that one of the questions has been moved to next week's homework, so please do all of the questions on this assignment.

4. Consider the following code:

```
for (pixel : img) {
    if (pixel.getRed() > 200) {
        if (pixel.getGreen() < 50) {
            if (pixel.getBlue() > 200) {
                print(pixel);
            }
        }
    }
}
```

What are the colors of the pixels that are printed? Please list the color (e.g. brown) instead of the actual red, green, and blue values.

5. Rewrite the following code snippets without **and** or **or**. Hint: you might need to use multiple conditionals. Try running your code to see what it does.

(a) `img = new SimpleImage("x.png");`  
`img.setZoom(20);`

```
for (pixel : img) {
    if (pixel.getX() == 0 || pixel.getY() == 5) {
        pixel.setRGB(255, 125, 0);
    }
}
print(img);
```

(b) `img = new SimpleImage("x.png");`  
`img.setZoom(20);`

```
for (pixel : img) {
    if (pixel.getX() >= 5 && pixel.getY() <= 7) {
        pixel.setRGB(0, 255, 255);
    }
}
print(img);
```

6. Describe the edge detection algorithm. How does it work, and what effect does it achieve?