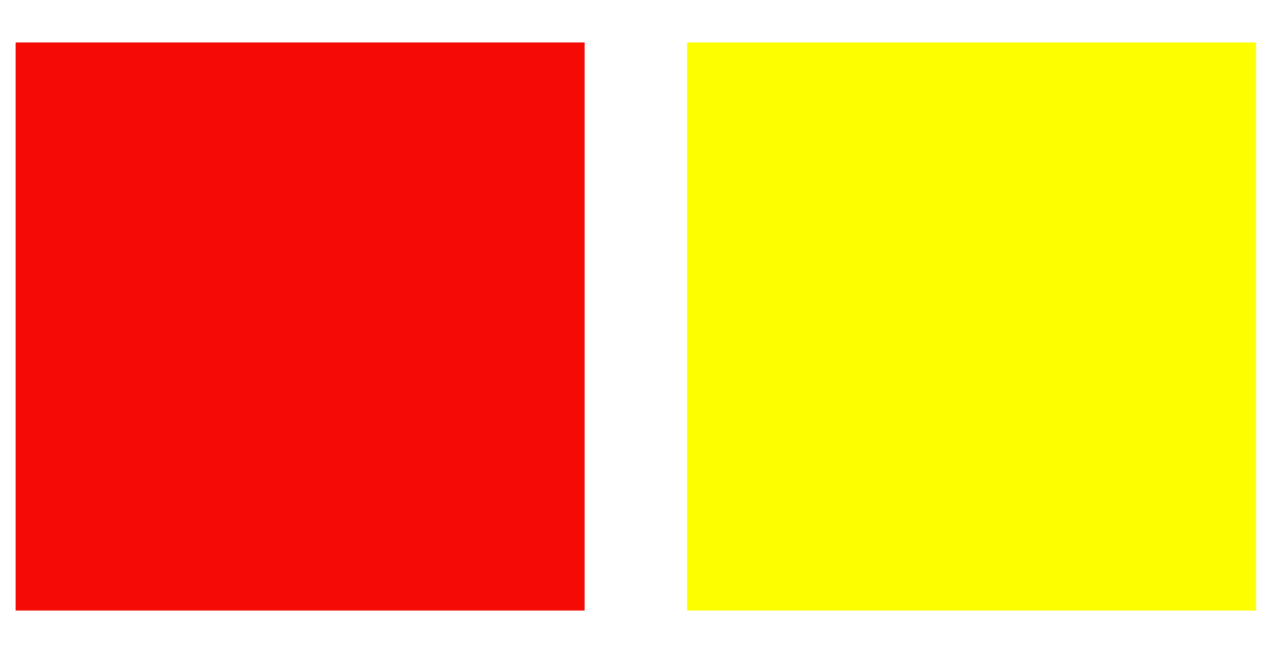
Congratulations! You passed!

Next Item

1. (1 / 1 points)

Consider the code and two images below, in which the starting image named **image** is all red (each pixel has red value 255, green value 0 and blue value 0) as shown below on the left and the resulting image shown on the right below is supposed to be all green, but is all yellow. The image is a 200 pixel by 200 pixel image.

```
for (var pixel of image.values()) {
    if (pixel.getRed() > 250) {
        pixel.setGreen(255);
    }
}
```



Which one of the following would be the most helpful in identifying what is wrong with this code?

- ( ) Print the width and height of the image.
- ( ) Print the x and y values of every pixel in the image before the for loop and again after the for loop.
- ( ) Print the x and y values of every pixel in the image before the for loop.
- (•) Print the red, green and blue values of one of the pixels before the for loop and again after the for loop.

  Correct
  Checking the RGB values for a pixel before and after the for loop could show how the for loop is affecting the pixel's color.

- ( ) Print the x and y values of every pixel with x < 10 and y < 10.
- ( ) Print the red, green and blue value of one of the pixels before the for statement.

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2. (1 / 1 points)

Which of the following options are steps in the scientific method approach to debugging? Choose the <u>three</u> best options below.

- [x] Observe a Phenomenon

  Correct
  If you are having trouble with this question, review the "Finding Bugs in Code" video.

- [x] Form Hypothesis

  Correct
  If you are having trouble with this question, review the "Finding Bugs in Code" video.

- [ ] Ask for Help

  Un-selected is correct

- [ ] Find Patterns

  Un-selected is correct

- [ ] Publish your Results

  Un-selected is correct

- [x] Gather Info & Apply Expert Knowledge

  Correct
  If you are having trouble with this question, review the "Finding Bugs in Code" video.

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3. (1 / 1 points)

Which of the following are important characteristics of a good hypothesis? Choose the two best options below.

- [x] The hypothesis is testable

  Correct
  If you are having trouble with this question, review the "Finding Bugs in Code" video.

- [ ] The hypothesis is marketable

  Un-selected is correct

- [ ] The hypothesis is simple

  Un-selected is correct

- [x] The hypothesis is actionable

  Correct
  If you are having trouble with this question, review the "Finding Bugs in Code" video.

- [ ] The hypothesis is complex

  Un-selected is correct

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4. (1 / 1 points)

For which of the seven steps to solve a programming problem is the scientific method most useful?

- ( ) Work example by hand
- (•) Debug failed test cases

  Correct

- ( ) Check by hand
- ( ) Translate to code

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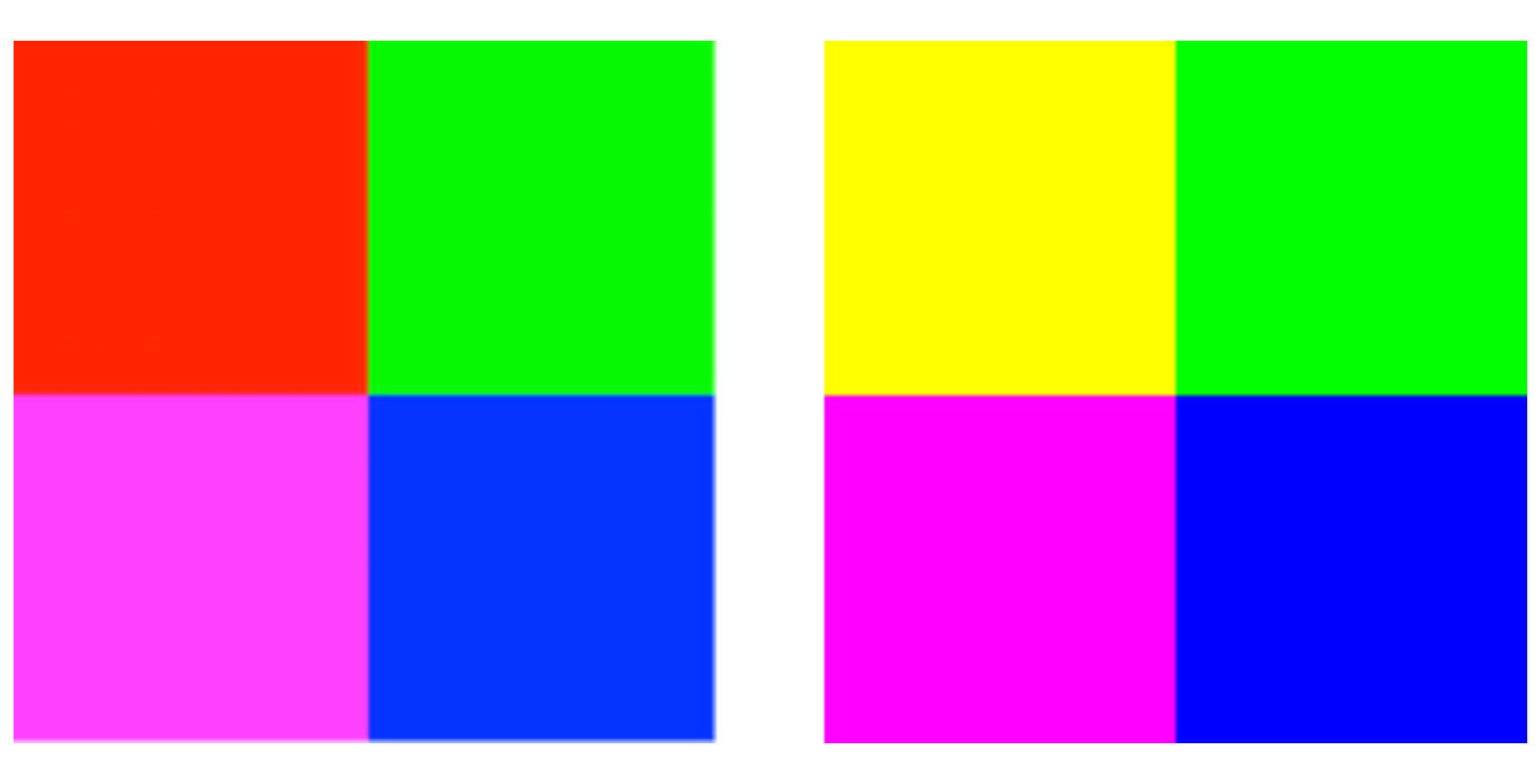
5. (1 / 1 points)

Consider the following program:

```
1  var img = new SimpleImage(200,200);
2  for (var px of img.values()){
3      var x = px.getX();
4      var y = px.getY();
5      if (x < img.getWidth()/2){
6          px.setRed(255);
7      }
8      if (y>img.getHeight()/2){
9          px.setBlue(255);
10     }
11     else {
12         px.setGreen(255);
13     }
14 }
15 print (img);
```

It is supposed to produce the image on the left but it actually produces the image on the right.



Which of the following is the best hypothesis about how the program is broken?

- ( ) Only pixels in the upper right quadrant should have their green values set to 255 but green values of the pixels in the upper left quadrant are also being set to 255.
- (•) The upper left quadrant is yellow instead of red because line 12 inside the else statement applies to all pixels with a y value less than or equal to half the height of the image.

  Correct
  This hypothesis is <u>specific</u> and <u>actionable</u> because it describes where in the code the problem is.

- ( ) The upper left quadrant is yellow instead of red.

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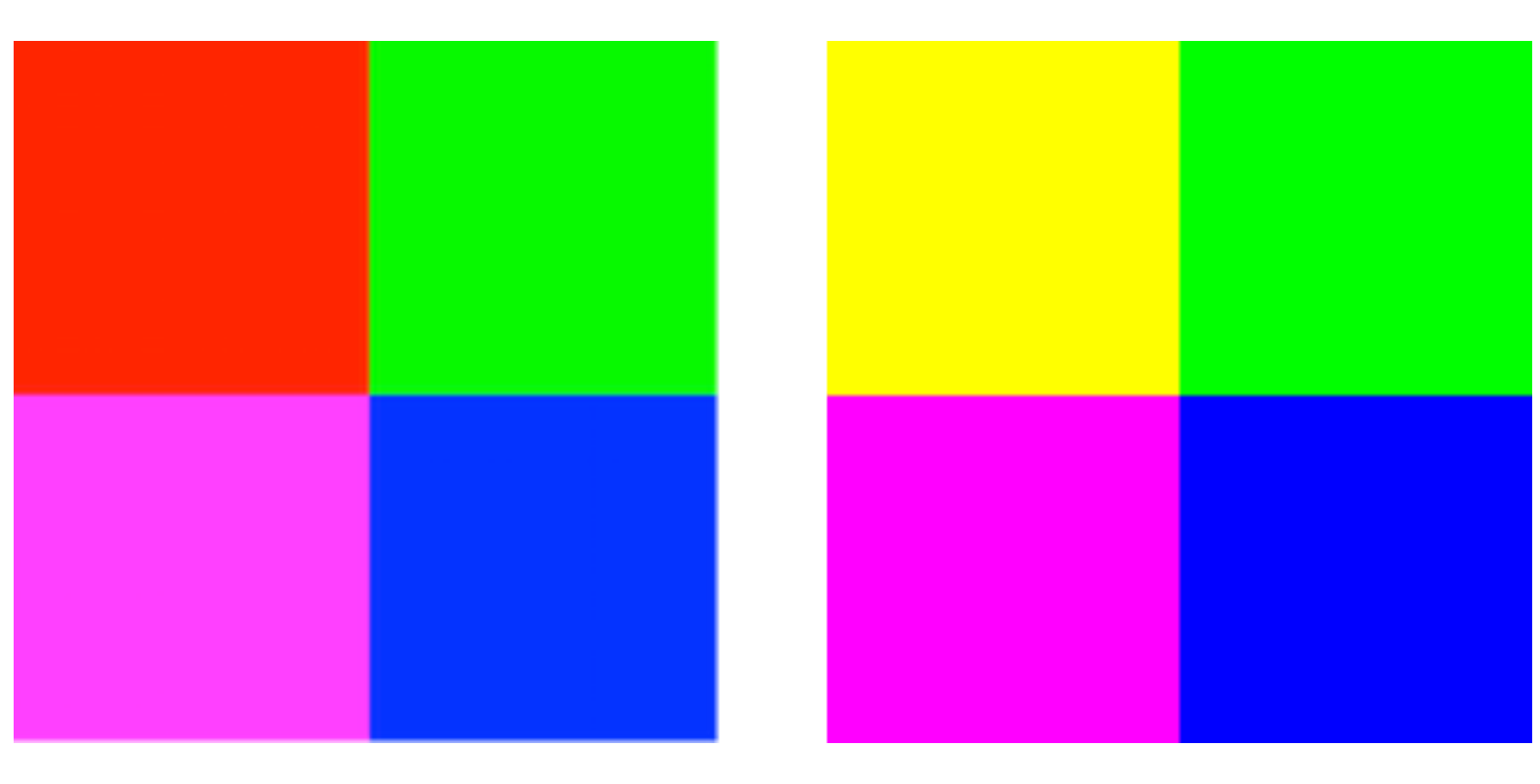
6. (0 / 1 points)

Consider the program in the previous question, shown again here:

```
1  var img = new SimpleImage(200,200);
2  for (var px of img.values()){
3      var x = px.getX();
4      var y = px.getY();
5      if (x < img.getWidth()/2){
6          px.setRed(255);
7      }
8      if (y>img.getHeight()/2){
9          px.setBlue(255);
10     }
11     else {
12         px.setGreen(255);
13     }
14 }
15 print (img);
```

As a reminder, it is supposed to produce the image on the left but instead it produces the image on the right.



Which of the following changes to the code would fix the problem and produce the correct image?

- (•) Remove the else statement.

  This should not be selected
  This leaves the upper right quadrant black.

- ( ) Move the else block to be after the first if statement instead of after the second.
- ( ) Add another if statement after the else statement to change the red values of pixels in the upper left quadrant to 255.
- ( ) Change the else to an if statement that checks whether a pixel is in the upper right quadrant.

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7. (0.67 / 1 points)

Consider the function **addBorder** that has a parameter **image** and another parameter **thickness**. This function returns **image** with an added black border around each side of the image that is **thickness** pixels wide. It calls a function **setBlack** (which changes the color of a single pixel to black) to change the color of border pixels.

For example, calling addBorder with the image on the left and a thickness of 10 pixels results in the image on the right.

Which of the following <u>methods</u> must be used in the **addBorder** function? Select all that apply.

- [ ] getBlue()

  Un-selected is correct

- [ ] getRed()

  Un-selected is correct

- [x] getY()

  Correct
  This method must be called to determine whether pixels are within the borders and need to be changed to black.

- [x] setRed()

  This should not be selected
  This method is used in the **setBlack** function that **addBorder** calls so it does not need to be used in the **addBorder** function. Review the last programming exercise. If you're having trouble completing that exercise, ask for help in the forums.

- [x] values()

  Correct
  This method must be called to iterate over all the pixels in the image and change the color of the border pixels.

- [ ] getHeight()

  This should be selected

- [x] getX()

  Correct
  This method must be called to determine whether pixels are within the borders and need to be changed to black.

- [ ] setBlack

  Un-selected is correct

- [x] setBlue()

  This should not be selected
  This method is used in the **setBlack** function that **addBorder** calls so it does not need to be used in the **addBorder** function. Review the last programming exercise. If you're having trouble completing that exercise, ask for help in the forums.

- [x] setGreen()

  This should not be selected
  This method is used in the **setBlack** function that **addBorder** calls so it does not need to be used in the **addBorder** function. Review the last programming exercise. If you're having trouble completing that exercise, ask for help in the forums.

- [x] getWidth()

  Correct
  You need to know the width of the image to determine whether pixels are within the borders and need to be changed to black.