

CSE 8A Lecture 6

- Reading for next class: 5.2.1-5.2.2
- PSA 3 is due Tuesday 1/29 11:59
 - Color Subtraction and TriColor effect
- Compile and run your code JUST BEFORE you submit. You will lose points (lots) if your code doesn't run.

CLICKERS OUT!

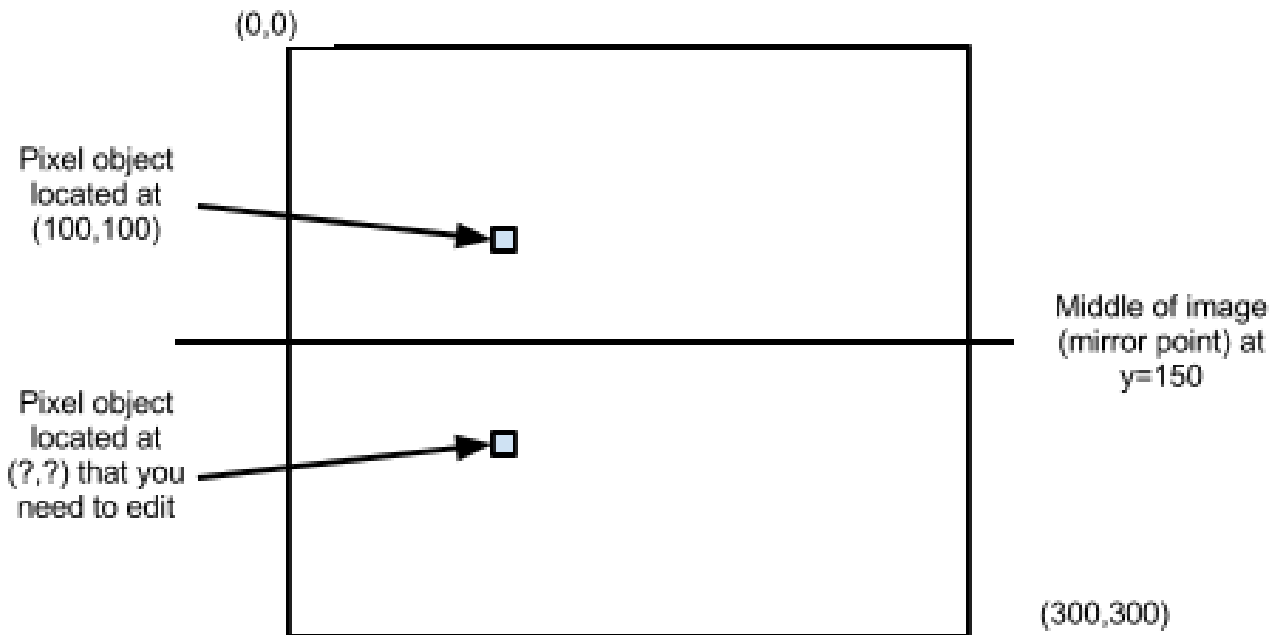
1. Can you have a for-loop in the body of another for-loop?

A. Yes you can

B. Yes, but you need special code at the top of the file to be able to do it.

C. No, that will give you a compiler error.

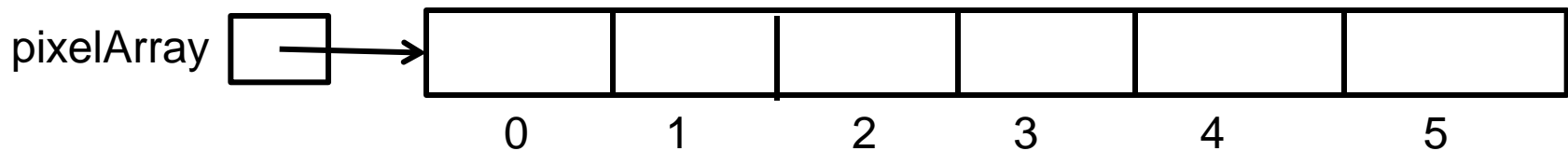
2. I have a Picture with a height of 300 pixels and width of 300 pixels. If I want to horizontally mirror the Pixel object located at (100,100) which Pixel object would I have to edit?



- A. The Pixel object located at (100, 0)
- B. The Pixel object located at (0, 100)
- C. The Pixel object located at (100,200)
- D. The Pixel object located at (200,200)

CS Concept: Variable Tracing

```
Pixel[] pixelArray = this.getPixels();  
Pixel p;  
Pixel q;  
for(int index = 0; index < pixelArray.length; index++)  
{  
    p = pixelArray[index];  
    q = pixelArray[index+1];  
    p.setRed(q.getRed());  
    p.setBlue(q.getRed());  
    p.setGreen(q.getGreen());  
}
```



index



- 1) Solo: (30 sec)
- 2) Discuss: (2min)
- 3) Group: (30 sec)

while vs. for vs. for each

- True or False: The following code could be written using a for-loop.

```
Pixel[] pixelArray = this.getPixels();  
int index = 0;  
while ( index < pixelArray.length )  
{  
    Pixel pix = pixelArray[index];  
    pix.setGreen(255);  
    index = index + 1;  
}
```

- A. True
- B. False

while

```
Pixel[] pixelArray = this.getPixels();  
int index = 0;  
while ( index < pixelArray.length )  
{  
    Pixel pix = pixelArray[index];  
    pix.setGreen(255);  
    index = index + 1;  
}
```

for

```
Pixel[] pixelArray = this.getPixels();  
for ( int index = 0; index < pixelArray.length; index++ )  
{  
    Pixel pix = pixelArray[index];  
    pix.setGreen(255);  
}
```

for each

```
Pixel[] pixelArray = this.getPixels();  
for ( Pixel pix: pixelArray )  
{  
    pix.setGreen(255);  
}
```

Which do you prefer?
Why?

- 1) Solo: (30 sec)
- 2) Discuss: (2min)
- 3) Group: (30 sec)

while vs. for vs. for each

- So when to use each? Sometimes it's a matter of style, sometimes it's ease of functionality

Choose the best loop to use in each of these situations

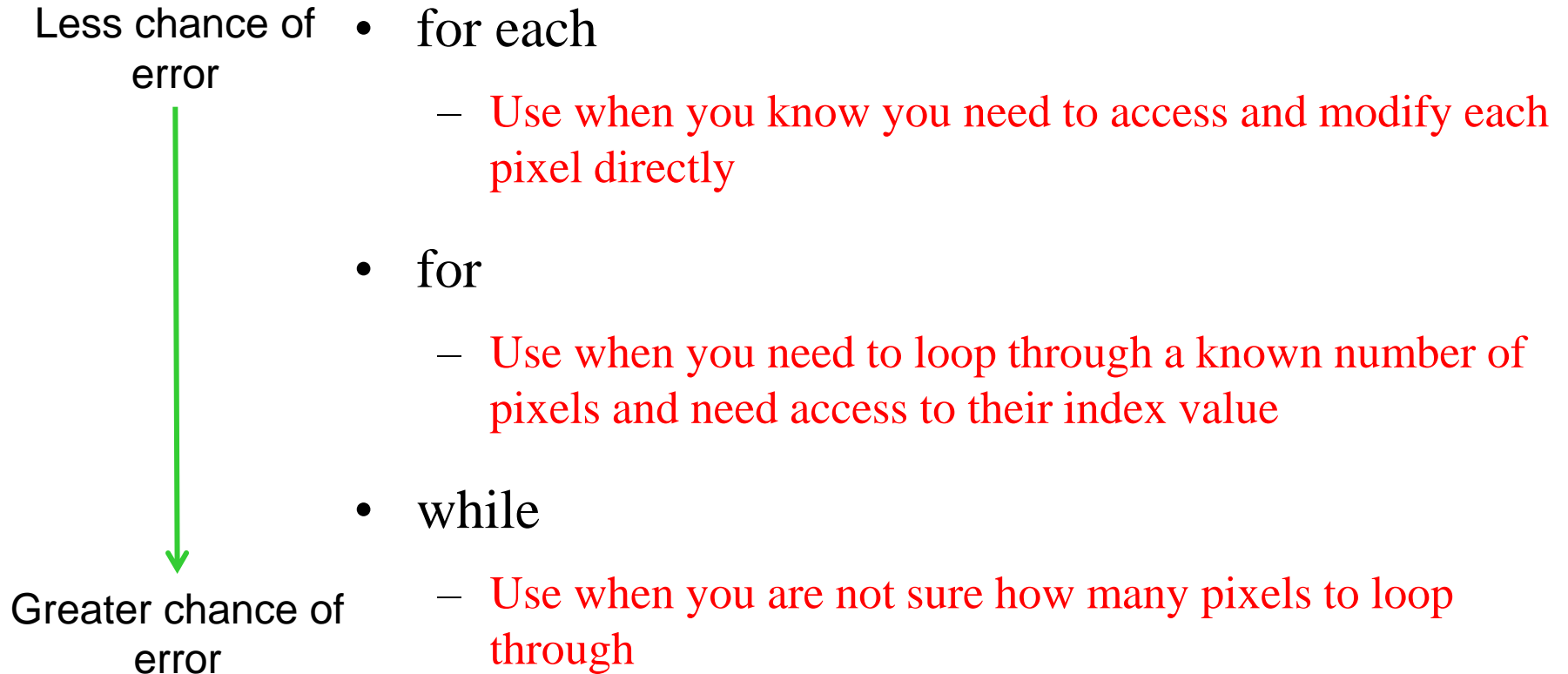
A. For

B. For each

C. While

1. You want to loop through a picture until you find a pixel that is all black. Then you want your loop to stop.
2. You want to loop through all the pixels in a picture and set each pixel's red value equal to its green value
3. You want loop through the pixels in the first half of the picture and make them all black.

while vs. for vs. for each: Summary



Often, though, you can just choose the loop you like best

- 1) Solo: (30 sec)
2) Discuss: (2min)
3) Group: (30 sec)

Nested Loops: How do they work?

What order are pixels changed?

- A method in Picture.java... what does it print if width is 2 and height is 3?

```
Pixel p;  
for (int foo = 0; foo < getWidth(); foo++)  
{  
    for (int bar = 0; bar < getHeight(); bar++)  
    {  
        System.out.println( foo.toString() +" "+ bar.toString() );  
    }  
}
```

turns the variable into a string for printing

A 0 0
0 1
1 0
1 1
2 0
2 1

B. 0 0
1 0
2 0
0 1
1 1
2 1


C. 0 0
0 1
0 2
1 0
1 1
1 2

D. 0 0
1 1
2 2

Nested Loops: Tracing code

- A method in Picture.java... what does it print if width is 2 and height is 3?

```
Pixel p;  
for (int foo = 0; foo < getWidth(); foo++)  
{  
    for (int bar = 0; bar < getHeight(); bar++)  
    {  
        System.out.println( foo.toString() + bar.toString() );  
    }  
}
```



turns the variable into a string for printing

foo	<input type="text"/>
bar	<input type="text"/>

- | |
|--------------------|
| 1) Solo: (30 sec) |
| 2) Discuss: (2min) |
| 3) Group: (30 sec) |

Nested Loops: How do they work? What order are pixels changed?

- A method in Picture.java...

```
Pixel p;  
for (int foo = 0; foo < getWidth(); foo++)  
{  
    for (int bar = 0; bar < getHeight(); bar++)  
    {  
        p = getPixel(foo, bar);  
        p.setColor(Color.BLACK);  
    }  
}
```

What do these Picture methods do? What are their return types?

- `getPixel(int x, int y)`
- `getHeight()`
- `getWidth()`

- 1) Solo: (30 sec)
 - 2) Discuss: (2min)
 - 3) Group: (30 sec)

Why does this have an error?

- In a method in Picture.java... assume height=50,width=100

```
Pixel p;  
for (int bar = 0; bar < getWidth(); bar++)  
{  
    for (int foo = 0; foo < getHeight(); foo++)  
    {  
        p = getPixel(foo, bar);  
        p.setColor(Color.BLACK);  
    }  
}
```

- A. It doesn't, this loops across rows, top to bottom
- B. It doesn't, this loops down columns, left to right
- C. It tries to index a pixel off the end of a row (x value too big)
- D. It tries to index a pixel off the end of a column (y value too big)

Exam 1

- Median: 80.0
- High score: 20/20 (101 people scored over 90%)
- If you scored lower than 70%:
 - Don't panic, you're lowest score is dropped
 - Get help!
 - Do the reading, with a partner
 - Make sure you really REALLY understand everything

You may not be *really* understanding...

- Suggestions:
 - **PLAY** with code in the compiler.
 - Ask yourself – what will happen if I change this variable value from 5 to 10? Why?
 - Type in code from book and change it. But don't just accept that you can type it in.
 - Do you know WHY greyScale works?
 - Do you know WHY negative works?
 - Read the book **with** someone else in class. Talk after every page.
 - Try to explain the text to the other person in your own words
 - Don't "just read" it and think, yeah I get that (you don't)
 - Redo the labs

Exam 1 Review

1) **LIST** the line(s) that are INVALID:

LINE(S) _____

CHAR midInitial; // 1

integer count = 2; // 2

boolean isHoliday; // 3

Exam 1 Review

2) What gets printed?

```
public class Q1b
{
    public static void main( String args[] )
    {
        int  mlk = 5, aDream = 2;
        System.out.println( 1 + 4 * 2 % 3 );
        System.out.println( mlk <= 5 );
        mlk      = aDream;
        aDream   = 21;
        System.out.println("MLK is " + mlk);
    }
}
```

Exam 1 Review

3) **WRITE** code to declare a variable named "**age**" to hold a whole number. (1 pt)

4) **WRITE** in the **data type** of the given Java literal values (2 pts)

a) 1.23 _____

b) true _____

Exam 1 Review

a) How many objects are instantiated/created? _____

b) DRAW in the output box the result: **OUTPUT:** _____

```
World world1 = new World (200, 100);  
Turtle shari = new Turtle(20, 20, world1);  
Turtle vinay = new Turtle(100, 100, world1);  
Turtle alberto = new Turtle(100, 50, world1);  
shari.forward(30);  
shari = alberto;  
shari.turnRight();  
alberto.forward(50);  
shari.turnRight();  
alberto.forward(50);
```

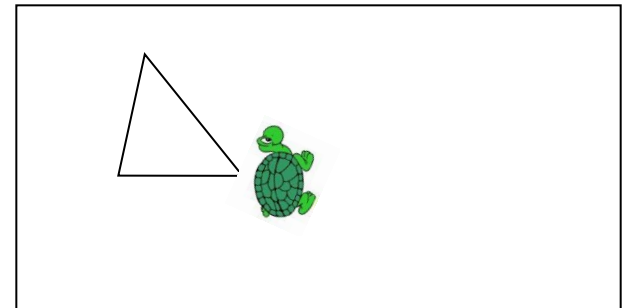
Exam 1 Review

6) `World world1 = new World(200,100);`

`// Your object`

a) For your Turtle object, how do you call a new method,
`drawHouse()`, heading **`public void drawHouse()`**

b) **WRITE** a sequence of method calls to draw an **equilateral triangle (60 degree angles)** using your Turtle object (question #6) with side lengths of 40 steps to match the picture below. HINT: **Turtle turns 120 degrees to create 60 degree inner angle** and starts in the center.



TODO

- Turn in PSA3 deadline Tu 1/29 11:59pm
- Read next class: 5.2.1-5.2.2
- Do the reading quiz
- **PLAY WITH CODE!**
 - Get stuck, then figure out how to get unstuck – it's how you learn!

