

Two-Dimensional Arrays and Nested Loops – part 3

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Learning Goals

- Understand at a conceptual and practical level
 - How to copy pixels from one picture to another
 - How to declare, initialize and change several variables in a for loop
 - How to copy pixels from one picture to a specified location in another picture

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Copying Pixels to a New Picture

- Need to track the source picture x and y
 - And the target picture x and y
- We can use a blank picture
 - As the target picture
- Several blank pictures are available
 - 640x480.jpg
 - 7inX95in.jpg

1	2
3	4

1	2		
3	4		

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Copy Picture Algorithm

- Copy a picture to the 7 by 9.5 inch blank picture
 - Create the target picture object
 - Invoke the method on the target picture
 - Create the source picture object
 - Loop through the source picture pixels
 - Get the source and target pixels
 - Set the color of the target pixel to the color of the source pixel

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Copy Algorithm to Code

- Loop through the source pixels

```
// loop through the columns
for (int sourceX = 0, targetX = 0;
     sourceX < sourcePicture.getWidth();
     sourceX++, targetX++)
{
    // loop through the rows
    for (int sourceY = 0, targetY = 0;
         sourceY < sourcePicture.getHeight();
         sourceY++, targetY++)
    {
```

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Copy Algorithm to Code – Cont

- Get the source and target pixels

```
sourcePixel =
sourcePicture.getPixel(sourceX,sourceY);
targetPixel = this.getPixel(targetX,targetY);
```

- Set the color of the target pixel to the color of the source pixel

```
targetPixel.setColor(sourcePixel.getColor());
```

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Copy Method

```
public void copyKatie()
{
    String sourceFile =
        FileChooser.getMediaPath("KatieFancy.jpg");
    Picture sourcePicture = new Picture(sourceFile);
    Pixel sourcePixel = null;
    Pixel targetPixel = null;

    // loop through the columns
    for (int sourceX = 0, targetX = 0;
        sourceX < sourcePicture.getWidth();
        sourceX++, targetX++)
    {
```

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Copy Method - Continued

```
        // loop through the rows
        for (int sourceY = 0, targetY = 0;
            sourceY < sourcePicture.getHeight();
            sourceY++, targetY++)
        {
            // set the target pixel color to the source pixel color
            sourcePixel = sourcePicture.getPixel(sourceX,sourceY);
            targetPixel = this.getPixel(targetX,targetY);
            targetPixel.setColor(sourcePixel.getColor());
        }
    }
}
```

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Trying the copyKatie Method

- Create a picture object using the 7inX95in.jpg file in the mediasources directory
 - Picture p1 = new Picture(FileChooser.getMediaPath("7inX95in.jpg"));
- Show the picture
 - p1.show();
- Invoke the method on this picture object
 - p1.copyKatie();
- Repaint the picture
 - p1.repaint();

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Result of copyKatie Method



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Copying Pixels to a New Picture

- What if we want to copy the target to a different location in the source
 - Than 0,0
 - Say startX and startY
- What is an algorithm that will do this?

	0	1		
0	1	2		
1	3	4		

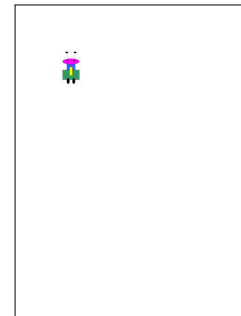
	0	1	2	3
0				
1			1	2
2			3	4
3				

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Copy to Position Exercise

- Write a method copyRobot to copy
 - robot.jpg
 - To location
 - 100, 100 in 7inX95in.jpg
- Test with

```
String file =
    FileChooser.getMediaPath(
        "7inX95in.jpg");
Picture p = new Picture(file);
p.copyRobot();
p.show();
```



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Summary

- To copy pixels from one picture to another
 - Keep track of the sourceX, sourceY and targetX and targetY
- You can declare, initialize, and change more than one variable in a for loop

```
for (int sourceX = 0, targetX = 0; sourceX <
    sourcePicture.getWidth();
    sourceX++, targetX++)
```
- To copy one picture to a location in another
 - Just change the start values for targetX and targetY

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