

Lesson 76: Picture Lab #1 (W25D2)

Balboa High School

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Prepare an Eclipse project for this lab:

- Create new project: PictureLab
- Download JAR from [here](#) and save to /tmp
- Import the JAR file contents:
 - 1 right-click **project folder** (not src) in Eclipse
 - 2 Import...
 - 3 type is *General/Archive File*
 - 4 Next
 - 5 browse to downloaded JAR file (make sure *Into Folder* is PictureLab)
 - 6 Finish

Aim

Students will gain more experience with 2D arrays and learn about digital images via the College Board's *Picture Lab*.

- You will learn about digital pictures (pixels and their color values) and write image filters (methods) in Java.

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- Class time will include reading, answering questions, and working on exercises from the [student manual](#) — *save a copy to your locker folder¹ for quick reference!*

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- Expect HW after each class, due by the start of the following class.
- **Late HW will not be accepted!** Make sure you keep up with the assigned HW each day.

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A1: Intro to Digital Pics and Color

- Read §A1 (p3)
- Answer questions 1-3 (p3), recording your answers on a piece of paper (or in a text editor)

A1: Intro to Digital Pics and Color

Solutions to questions 1-3 (p3):

A1Q1	8 bits
A1Q2	3 bytes for RGB — 1 byte or 8 bits (0 → 255) for each color; 4 bytes if you include Alpha (transparency)
A1Q3	$640\text{px} \times 480\text{px} = 307,200\text{px}$ (.3 megapixels)

A2: Picking a Color

- Read §A2 (p4)
- Refer to the [java.awt.Color API document](#) and the ColorChooser app to answer these questions, paying attention to the constructors section of the API:
 - 1 To make a Color object representing yellow, complete this statement:
`Color yellow = new Color(?, ?, ?);`
 - 2 `Color white = new Color(?, ?, ?);`
 - 3 Look at the fields section of the API and answer the last question in another way: `Color white = ???`

A3: Exploring a Picture

- Read §A3 (p5)
- Answer questions 1-7 (p5), recording your answers on a piece of paper (or in a text editor)

A3: Exploring a Picture

Solutions to questions 1-7 (p5):

A3Q1	0
A3Q2	0
A3Q3	639
A3Q4	479
A3Q5	top to bottom
A3Q6	left to right
A3Q7	Yes, you should be able to see the pixels since the zoom level is set so high.

A3: Creating and Exploring Other Pics

- Read the last part of §A3 (p6).
- Work on exercises 1-2 (p6). For #2, you might download an image from [Google Images](#).

A4: 2D Arrays in Java

- Read A4 (pp7-9) to learn/review the following:
 - row-major vs. column-major
 - how a 1D array could store 2D data
 - 2D array syntax in Java
 - using for-each() loops to access 2D array data

A4: 2D Arrays in Java

- Work on exercises 1-3 (p9). Advice:
 - Uncomment one statement in `main()` of `IntArrayWorkerTester` for each exercise, which may also require you uncomment (or even create) methods in the tester class.
 - The tester class will show you what parameters your new methods are expected to take and what the return types should be.
 - Your methods in `IntArrayWorker` will operate on the `matrix[][]` field, which is a 2D array of `ints`

- Finish the §A4 exercises
- Remember to finish the exercises in time for next class!