3 New Labs

- 3 labs
  - Magpie Chatbot – Strings, if statements, loops and arrays (4 – 8 hours)
  - Picture – 2D arrays, loops, if statements (Barb Ericson – Media Computation) (7 – 15 hours)
  - Elevens – Object-Oriented Design, inheritance (16 hours)
  - Total Time: 27 – 39 hours

- Each lab includes
  - Teacher Guide
  - Student Guide
  - Starter Code
Benefits of the 3 New Labs

- Labs are shorter in length
- Labs are easier to integrate throughout the year
- Exam questions will focus on essential concepts
- More variety so that students do not get bored
- Real-world context
- Labs are less intimidating than the large scale of GridWorld
Activity 1: Getting Acquainted with Chatbots

- Intro ideas– what experience do your kids have with chatbots. They probably know Siri. Have they every interacted with one over the phone or online?
- Exploring Chatbots Discussion: How do you think chatbots work? What String methods do you think are being used?
Activity 2: Intro to Magpie Class

- You may want to introduce your kids to the trim() method in String first, and what it does.
- Student explore Magpie and MagpieRunner by entering some preset prompts.
- Students will alter the code to add more responses.
- Questions at the end will get students thinking.
Activity 3: Better Keyword Detection

- String Explore Lab– you may want to do earlier and integrate into your String unit. An example lab is included in the dropbox.
- Tracing findKeyword. A pseudocode example may help students to better understand what is happening in this method.
- May be better to have students add their own additions, instead of using the next set of starter code. This way they aren’t losing the additions from previous sections.
Activity 4: Responses that Transform Statements

- Again, have students add method to existing code.
- Student will then write their own after looking at two examples.
Activity 5: Arrays and the Magpie

- Replaces the if statement in the random selection with an array.
- May be better to use in an array section, and have students write the array code.
- The provided code uses the Random class. You may want to stay within the subset and use Math.random instead.
Picture Lab Activities

- Activity 1: Introduction to digital pictures and color
  - How are pictures stored?
  - What are pixels?
  - What are RGB values?
  - Binary number system
Activity 2: Picking a color
- Use of a new class ColorChooser
- Intro to the Color class
- What are packages?
Activity 3: Exploring a Picture
- Uses the PictureExplorer class.
- Picture dimensions
- Creating a new Picture object
- Adding your own pictures
Activity 4: Two-dimensional arrays in Java
- 1D arrays
- 2D arrays
- Access of arrays
- IntArrayWorker class – used to explore 2D Arrays
- Excellent section to introduce array and 2D Array OR to review these concepts
Activity 5: Modifying a Picture
- Inheritance from SimplePicture
- Implementation of an interface DigitalPicture
- UML class diagrams
- ArrayList and List interface
- PictureTester class, used to test methods written in Picture
- zeroBlue, negate, grayscale
Picture Lab Activities

- Activity 6: Mirroring Pictures
  - Mirror pictures vertically, horizontally, and diagonally
  - Make hands on with post-it notes.

- Activity 7: Mirroring part of a Picture
  - Loop iterations
  - Nested loops
Activity 8: Creating a collage
  ◦ Copying a picture
  ◦ Using methods we already created
  ◦ Putting it all together

Activity 9: Simple edge detection
  ◦ More activities ... colorDistance
Pre–Eleven Activities

- Play online game of eleven
- Explain the rules
- Explain the difference between rank, suit and point value.
Activity 1: Design and Create a Card Class
- Override annotation for overriding methods
- Basic class outline
  - Constructor
  - get methods
  - toString
  - Matches – compares cards
Activity 2: Initial Design of a Deck Class
- Arrays as parameters
- ArrayList is constructed
- Several examples of what cards are in a deck based on the array parameters might be necessary
- Deal algorithms
- Has-a relationships
Activity 3: Shuffling the Cards in a Deck
- You may want to start with a YouTube video or a demonstration on shuffling cards
- Math.random – flip method
- Selection
- Shuffler.java class

Activity 4: Adding a Shuffle Method to the Deck Class
- Add Shuffle to the Deck Class
Elevens Lab Activities

- Activity 5: Testing with Assertions (Optional)
- Activity 6: Playing Elevens
  - Jar file of the game.
  - It is NOT their game
  - May want to do this first, since card games are not as popular as they once were and many students don’t have exposure to them.
- Activity 7: Elevens Board Class Design
  - A series of questions...
Elevens Lab Activities

- Activity 8: Using an Abstract Board Class
  - Explore related games such as Thirteens and Tens
  - Inheritance
  - Is-a relationships
  - Abstract classes

- Activity 9: Implementing the Elevens Board
  - Create Abstract methods

- Activity 10: ThirteensBoard(Optional)

- Activity 11: Simulation of Elevens(Optional)