**Algorithm Activity Lesson Plan**

**Shifting Elements in an Array**

**Introduction**

In this activity, students will design an algorithm to shift elements in an array.  Once again talk to the students about the fact that the computer is not like a human who may be able to look at all values and immediately move the elements and wrap around to the beginning.

**Instructions**

* Have students work in pairs or groups of 3. Each group should take some time to brainstorm ideas for the process of shifting elements in an array a given amount of places. They should write down their process in a step by step format. When they have the steps to show you, give them index cards for testing.
* Students should test their algorithms using the cards in the group. One student should be on one side of the cards with only the index numbers showing. Another student should be on the side with the values. The student on the index side should read the algorithm exactly as it is written. The other student should do exactly what is read from the algorithm. If there is a 3rd student, he/she should be writing notes on what is working and what needs to be improved upon.
* When groups are done, pick a group or two to test the algorithm. To do this I have one student read the algorithm and I use cups of colored water to demonstrate the algorithm. NOTE: I intentionally pick groups who have made some common mistakes such as writing over elements or losing an element. These are clearly demonstrated when I spill one cup of water on a tray and it is lost forever or when I start mixing the colored water and it becomes a new, sometimes gross, color!
* After testing, adjustments should be made to the algorithm and feedback from other groups may be helpful.
* Based on the testing and feedback from the other group, each person should try to implement the java version of the algorithm in a class. NOTE: I usually have already started a java class with my students when we introduced array notes. I have students add a method to this class: public void shiftArrayElements(int places)