

## Solutions to Section #6

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### 1. How Prime

```
public class SieveOfEratosthenes extends ConsoleProgram {
    private static final int UPPER_LIMIT = 1000;

    public void run() {
        boolean[] resolved = new boolean[UPPER_LIMIT + 1];
        for (int i = 2; i <= UPPER_LIMIT; i++) {
            resolved[i] = false;
        }
        for (int n = 2; n <= UPPER_LIMIT; n++) {
            if (!resolved[n]) {
                println(n);
                for (int k = n; k <= UPPER_LIMIT; k += n) {
                    resolved[k] = true;
                }
            }
        }
    }
}
```

### 2. Image processing

```
private GImage flipHorizontal(GImage image) {
    int[][] array = image.getPixelArray();
    int width = array[0].length;
    int height = array.length;
    for (int row = 0; row < height; row++) {
        for (int p1 = 0; p1 < width / 2; p1++) {
            int p2 = width - p1 - 1;
            int temp = array[row][p1];
            array[row][p1] = array[row][p2];
            array[row][p2] = temp;
        }
    }
    return new GImage(array);
}
```

### 3. Name Counts

```

/* File: CountNames.java
 * -----
 * This program shows an example of using a HashMap. It reads a
 * list of names from the user and list out how many times each name
 * appeared in the list.
 */
import acm.program.*;
import java.util.*;

public class CountNames extends ConsoleProgram {

    public void run() {
        HashMap<String,Integer> nameMap = new HashMap<String,Integer>();

        readNames(nameMap);
        printMap(nameMap);
    }

    /*
     * Reads a list of names from the user, storing names and how many
     * times each appeared in the map that is passed in as a parameter.
     */
    private void readNames(Map<String,Integer> map) {
        String name;
        do {
            name = readLine("Enter name: ");
            if (!name.equals("")) {

                // See if that name previously appeared in the map. Update
                // count if it did, or create a new count if it didn't.
                Integer count = map.get(name);
                if (count == null) {
                    // auto boxing -- creates a new Integer with value 1
                    count = 1;
                } else {
                    // auto unboxing to get old value of count, and
                    // then auto boxing to create a new Integer for count
                    // with the new value that is 1 greater than old value.
                    count++;
                }
                map.put(name, count);
            }
        } while (!name.equals(""));
    }

    /*
     * Prints out list of entries (and associated counts) from the map
     * that is passed in as a parameter.
     */
    private void printMap(Map<String,Integer> map) {
        Iterator<String> it = map.keySet().iterator();
        while (it.hasNext()) {
            String key = it.next();
            int count = map.get(key); // auto unboxing
            println("Entry [" + key + "] has count " + count);
        }
    }
}

```