

```
//Main.java
/*I affirm that I have carried out the attached academic endeavors with full academic honesty,
 * in accordance with the Union College Honor Code and the course syllabus.
 * Corbin Martin
 * CSC-150-01
 * 1/16/2017
 */
```

```
package birthdayproject;
```

```
public class Main
```

```
{
    public static void main(String[] args) {
        //run experiment from 5-100 people with increments of 5 and
        // 10 iterations per sample size
        runExperiment(5, 100, 5, 10);
    }

    //Logic loop for running the experiment.
    public static void runExperiment(int minPeople, int maxPeople, int peopleIncrement, int
    experiments) {
        int matches;
        BirthdayList birthdayList = new BirthdayList(minPeople);

        //increment from 5 to 100 by 5, allowing for different sample sizes
        for (int i = minPeople ; i <= maxPeople ; i = i + peopleIncrement) {

            matches = 0;
            //Run 10 experiments with the current list size and check for matches
            for (int x = 0; x < experiments ; x++) {
                if (birthdayList.matchInList())
                    matches++;
                //generate a new list of birthdays after each experiment
                birthdayList.regenerateBirthdays();
            }

            System.out.println("The birthday experiment worked " + matches
                + "/" + experiments + " times for " + i + " people.");

            //Set birthdayList to a new size and automatically generate a new list
            birthdayList.setSize(i);
        }
    }
}
```

```
//BirthdayList.java
```

```
package birthdayproject;
```

```
import java.util.Arrays;
```

```
public class BirthdayList {
    final int DEFAULT_SIZE = 5;

    private int[] populatedList;
    private int size;

    //default constructor that sets size to default size and
    //populates a birthdaylist
    BirthdayList() {
        size = DEFAULT_SIZE;
        regenerateBirthdays();
    }
}
```

```
}

//alternative constructor that sets given size and
// populates a birthdaylist
BirthdayList(int people_size) {
    size = people_size;
    regenerateBirthdays();
}

//internal method for populating internal list of birthdays
private void populateBirthdays() {
    for (int i = 0 ; i < size ; i++) {
        //set current position in list to a random number between 1-365 (inclusive)
        populatedList[i] = (int) (Math.random() * 365) + 1;
    }
    //Use Java's pre-built solution for sorting arrays
    Arrays.sort(populatedList);
}

//size setter that automatically generates a new list
public void setSize(int newSize) {
    size = newSize;
    regenerateBirthdays();
}

//size setter with option to generate new list
public void setSize(int newSize, boolean regenerate) {
    size = newSize;
    if (regenerate) {
        regenerateBirthdays();
    }
}

//Checks for atleast 2 of the same birthdays in the birthdayList
// and returns true if one is found and false if none are found
public boolean matchInList() {
    boolean matchFound = false;

    //iterate through list
    for (int i = 0 ; i < populatedList.length - 1 ; i++) {
        //Assumes the list is properly sorted (all internal methods have it
        //sorted and it cannot be accessed publicly, so safe assumption) and
        // checks if the current position is equal to the next position.
        if (populatedList[i] == populatedList[i+1]) {
            matchFound = true;
            break;
        }
    }
    return matchFound;
}

//Regenerates the current birthday list with the internal size.
public void regenerateBirthdays() {
    populatedList = new int[size];
    populateBirthdays();
}
}
```