

# Code Documentation for MonteCarloBirthdaySim Project

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## Overview

The purpose of the MonteCarloBirthdaySim project was to answer the question of “What is the probability that two students share a birthday in a x sized class?” with x being the size of the class. This project has three classes: Person, BirthdayProgram and BirthdayProgramTester, all which work together to give the user the answer to the question.

## How It Works

### Person

Person is the class responsible for holding information about a person, such as their birthday. This class contains getters and setters for two variables:

- int birthday
- int birthmonth

### BirthdayProgram

BirthdayProgram is the class responsible for running the simulations and calculating the probability of two people sharing a birthday. BirthdayProgram has four major methods:

- generatePeople
  - o Parameter: int numberOfPeople – The number of people in the class
  - o Functionality – Creates numberOfPeople Person objects that represent the people in the class.
  - o Returns: ArrayList<Person> - The list of people to use in the simulation
- runTrials
  - o Parameters: int trials – the number of trials to be run, int people – the number of people in the class
  - o Functionality – Calls the generatePeople method to create the list of people needed for the trial, runs the trials, and then calculates the percentage of times two people shared a birthday.
  - o Returns: double – The percentage of times two people shared a birthday during the trials

- checkForBirthday
  - Parameters: Person person1 – One of the people in the class to be compared to person2, Person person2 – Another person from the class to be compared to person1
  - Functionality – Compares the birthdays of person1 and person2.
  - Returns: true – if the two people share a birthday, false – if the two people do not share a birthday
- calculatePercentage
  - Parameters: int matchedBirthdays – the number of times two people matched birthdays during the trials, int numberOfTrials – the number of trials run
  - Functionality – Calculates the percentage of times two people shared a birthday during a given trial.
  - Returns: double – The percentage of times two people shared a birthday

## **BirthdayProgramTester**

BirthdayProgramTester is the class that contains the main method and runs the program. It contains a tester object of the BirthdayProgram class. It runs the trials and outputs the calculation to the user.

## **Output**

The program outputs the probability that two people will share a birthday in a given class size.

## **Screenshots**

```
The probability that two people share a birthday in a 20 person sized class: 41.115
Process finished with exit code 0
```

```
The probability that two people share a birthday in a 33 person sized class: 77.697
Process finished with exit code 0
```

```
The probability that two people share a birthday in a 40 person sized class: 89.066
Process finished with exit code 0
```