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Lab Title: AC12001 assignment 2: Sets

# Introduction

The aim of this lab is to learn how to design and code a program that allows you to ‘play’ a lottery game using the Set interface from the Java collection classes.

# Requirements

1. Allow a player to select 6 lottery numbers, validate them and store them in a Set.

2. Run the lottery, i.e. generate 6 numbers between 1 & lottery max using a random number generator and place these in a set too.

3. Find out if the user has won, and if so, how much they have won, display this to screen.

4. Enable the user to define the range of lottery numbers to use.

11 for a small lottery which would give each player a greater chance of winning, your program should be able to run with the range specified by the user.

5. Extend your program to ask the user for several weeks of lottery draws they would like you to run. Then run the draw this number of times, checking whether they have won anything.

6. Extend your program to cater for more than one player with each lottery run.

7. Modify your design to create your own set class to handle the complexity of the set operations, including an intersection method.

I was able to complete successfully all the requirements this week, even the optional ones.

# Design

## Class Diagram

|  |
| --- |
| Lottery() |
| MySet lotteryNumbers  LinkedList<MySet> userNumbers  int lotteryMax  int cardinalityMax  int numberOfPlayers;  int weeks |
| Lottery()  playTheLottery()  displayWinnings()  calculateWinnings()  getPlayerNumbers()  selectNumbers()  generateNewLotteryNumbers()  generateRandomNumbers()  changeNumberOfPlayers()  changeWeeks()  changeLotteryMax()  changeInt()  getRandomNumber()  checkInt() |

|  |
| --- |
| MySet() |
| Set<Integer> set |
| MySet()  MySet(Set<Integer> set)  addToSet(int value)  isSetEmpty()  getCardinality()  printSet()  getSet()  intersection(MySet otherSet)  clearSet() |

|  |
| --- |
| Tester |
| MySet test1, test2;  Lottery testLottery; |
| main()  init()  process()  runMySetTests()  runLotteryTests() |

|  |
| --- |
| Menu |
| Lottery lottery |
| main()  runMenu()  displayMenu()  checkInt() |

## Pseudocode

PlayTheLottery();

1. declare local fields
2. get player numbers
3. for each week
   1. get lottery numbers
   2. display this weeks lottery numbers
   3. for each player display winnings and update total and netGain
4. for each player display total and netGain

# Test Plan & Results

Test number/date/version: 16/02/20

Test Notes: Tests run on submitted assignment

|  |  |  |  |
| --- | --- | --- | --- |
| **Test Description** | **Test Data** | **Expected result** | **Worked?** |
| Add To Set then print set | 1,2,3,19,12,63 | [1,2,3,19,12,63] | Y |
| Get Cardinality of set | 1,2,3,19,12,63 | 6 | Y |
| Check if empty when empty | Empty set | true | Y |
| Check if empty when not empty | A set | false | Y |
| Get intersection of 2 sets | 2 sets with some intersecting points | A new sect and the intersection | Y |
|  |  |  |  |
| Test lottery with one user and low max lottery number | User set, | get some hit some numbers miss others, | Y |
| Test lottery with 1 user, multiple weeks & low max lottery number | User set | get some hit some numbers miss others, | Y |
| Test lottery multiple user, multiple weeks & low max lottery number | Multiple user sets | get some hit some numbers miss others, | Y |
| Test change number of players | A number within the range | Change value | Y |
| Test change number of weeks | A number within the range | Change value | Y |
| Test change max lottery number | A number within the range | Change value | Y |
| Input Invalid set number | Number out of range | Error message | Y |
| Input invalid number of players | Number out of range | Error message | Y |
| Input invalid number of players | Number out of range | Error message | Y |
| Input invalid max lottery number | Number out of range | Error message | Y |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

# Self-Evaluation

I think I did overall quite well in this assignment. There where thing I found quite hard though. Getting the intersection method in the MySet wrapper class to work, but I got it working in the end. There were probably a few things that could be improved, for example making the code more efficient.