**Scenario #4**

**Scenario Description**

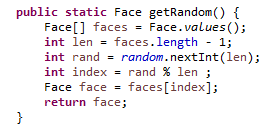
* The odds in the game are incorrect. The game should have an approximate win : lose ratio very close to 0.42% (error < 0.01 over 10000 games).
* For example, if 10000 games are played in batch mode the win:lose ratio should be very close to 0.42%.

**Hypothesis of problem**

From the results found in the replication and simplification of scenario problem 4, the game’s odds of win:lose ratio not being 0.42% was found to be true. The programs problem must be in the die or face class of the random face picker not being random enough or the odds not being calculated properly. This could also be caused by users and replication results being very unlucky of getting the odds close to the predicted odds.

**Location of the problem**

The location of the problem found was in the face class in getRandom() method where it uses java.util.Random and then rand % len to get the face. As rand, len and index are int variables it rounds the random % len of index to the nearest int making the odds slightly lower or higher than predicted.



**Solution/Resolution**

To solve this problem in the program of the games odds not being correct the getRandom() method in face class needs to change the variable of index to a double to remove the round of the actual random result. This isn’t as easy as changing index to a double as then picking the face would not be able to happen as there are only 6 sides so further changes would be needed to be added. As the odds are fairly close to the predicted chance of 0.42% the best solution would to leave the problem as it is close enough.