

# Assignment 1 – Investigating Probability

MATHEMATICS OF GAMING

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## Introduction

The Report includes the investigating probability of Monty Hall and Yahtzee game. It lists the strategies to improve the game outcomes with valid simulation and mathematical explanation.

## Monte Hall Problem

### About the game

The Monty Hall problem is a situation which give the choice of picking 1 of 3 doors to the player. After picking a door the remaining losing doors will be revealed and player will have a choice to switch with the unrevealed door or remain with, they originally chose.

### Scenario

The included java file simulates the Monty Hall problem with

- 100 doors, where 1 is chosen and 98 revealed
- 10 doors, where 1 is chosen and 8 is revealed
- 3 doors, where 1 is chosen and 1 is revealed

### Investigating Strategy

Conjecture: **It is always best to switch**

### Results

The following pie charts states the result based on 1 million iterations of 100 doors, 10 doors and 3 doors respectively

### Graph

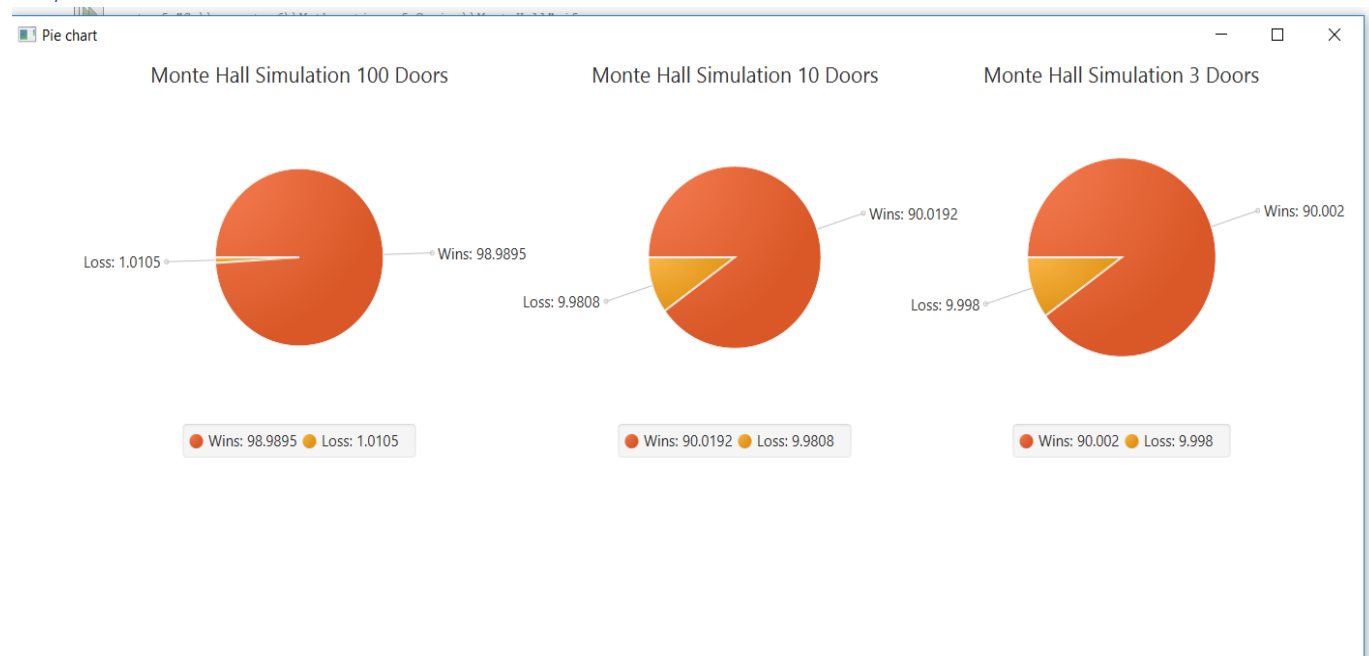


Figure 1 Monte Hall Simulation Result

### Summarizing Result

#### Mathematical Explanation

Player's Decision	Winning Probability
100 doors	
Switch	99/100
Not to Switch	1/100
10 doors	
Switch	9/10
Not to Switch	1/10
3 doors	
Switch	2/3
Not to Switch	1/3

### Conclusion

As per the simulation and mathematical explanation, as the number of doors increase in this problem, the winning probability increased if the player switches the door

Proved: It is best to switch the door, especially when the number of doors is more