

COMP SCI 1200 Summer 2017

Programming Assignment 3

Monty Hall Problem Simulation

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July 16, 2017

Synopsis

The goal of this assignment is for you to apply your knowledge of probability theory to implement a simulation of an extension of the Monty Hall Problem as stated in your textbook with k doors where $k \in \mathbb{Z} \wedge k \geq 3$ and where Monty Hall opens all the non-selected doors except one (e.g., for $k = 3$, Monty Hall opens one of the two non-selected doors; if $k = 4$, Monty Hall opens two of the three non-selected doors; etc.).

Feel free to consult with your favorite search engine, the instructor, and your fellow classmates when you need help. Just make sure that what you turn in is your own work!

Problem statement

Write a randomized simulation¹ of the Monty Hall Problem to verify by empirical means the advantages of switching doors versus staying with your initial choice. Your program should take as command line input two parameters, the first indicating the number of doors and the second the number of simulated games, and provide as output the percentage of times that switching was beneficial and the percentage of times that staying was beneficial. The higher the number of simulated games, the higher the accuracy of the output should be.

Resubmissions, penalties, documents, and bonuses

If you submit before the deadline, then you may resubmit up to a reasonable number of times till the deadline but not thereafter, your last on time submission will be graded. If you do not submit before the deadline, then your first late submission will be graded.

The penalty for late submission is a 5% deduction for the first 24 hour period and a 10% deduction for every additional 24 hour period. So 1 hour late and 23 hours late both result in a 5% deduction. 25 hours late results in a 15% deduction, etc. Not following submission guidelines can be penalized for up to 5%, which may be in addition to regular deduction due to not following the assignment guidelines.

Some assignments may offer bonus points for extra work, but note that the max grade for the average of all assignments is capped at 100%.

Deliverables & Due Date

The deliverables of this assignment are:

¹This is called a ‘Monte Carlo simulation’

1. Your source code with at the top of each file your name and the course's name.
2. Any necessary support files such as makefiles, project files, etc.)
3. A readme file that explains how to compile/execute your submission on a Windows or Linux computer in CLC 212/213 of the Computer Science Building.

Submit all files in a .zip, .7z, or gzipped tar ball format. The due date for this assignment is 11:59 PM on Friday July 28, 2017.

Grading

The maximum number of regular points you can get is 50. The point distribution is as follows:

Algorithmic (e.g., does it provide the correct output for a given input)	30
Good programming practices including code reliability/efficiency/readability and commenting	15
Output to user (e.g., clearly state solution found, provide helpful error messages for invalid user input)	5

Up to 10 bonus points can be earned by extending your simulation to make the number of non-selected doors opened by Monty Hall user definable.