

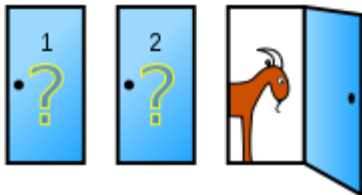
Home Work # 1. AMS 380

Name: _____ SBU ID: _____

Dear all, the homework is due on Thursday, Sep 2, 2021, at 1:15 PM. Please submit your homework to the Blackboard in a pdf or word (.doc) document.

Please include (1) R code; (2) Output from R; (3) Answers to all the questions asked.

1. Please generate a vector with following data and name it as 'myvec'
1.5 2.1 1.8 3.4 2.6 2.8 0.9 1.9
 - a. Please print a vector which contains 1st, 3rd and 6th elements in myvec
 - b. Please print the elements in myvec which is greater 2 but less than 3
 - c. Please calculate the mean and sum of the myvec
 - d. How many elements in myvec and how many elements in myvec is less than 2.5
2. Please load data set as a dataframe named 'data_q2' from the csv file 'HW1Q2.csv'
 - a. Please select the rows of 'data_q2' where column 'a' is greater than 0.05 and column 'b' is less than 0.1
 - b. Please select the rows of 'data_q2' where column 'a' is greater than 0.05 or column 'b' is less than 0.1
 - c. Please generate a new column 'c' in 'data_q2' which is the square of column 'b'.
3. The Monty Hall Problem
(http://en.wikipedia.org/wiki/Monty_Hall_problem)



"The **Monty Hall problem** is a [probability](#) puzzle loosely based on the American television game show [Let's Make a Deal](#) and named after the show's original host, [Monty Hall](#).

Suppose you're on a game show, and you're given the choice of three doors: Behind one door is a car; behind the others, goats. You pick a door, say No. 1 [but the door is not opened], and the host, who knows what's behind the doors, opens another door (*always a door you did not choose, and behind which there is no car), say No. 3, which has a goat. He then says to you, "Do you want to switch (*i.e. pick door No. 2), or to stay (*i.e., stay with door No. 1 you picked initially)?" Is it to your advantage to switch your choice? " (https://en.wikipedia.org/wiki/Monty_Hall_problem)

The answer will be clear by computing and comparing the following two probabilities:

- (1) What is your winning chance if your strategy is to stay?

(2) What is your winning chance if your strategy is to switch?"

a. Please compute the probabilities in (1) and (2) above, analytically, using probability formulas. (Please include handwriting solution or typed formula in the answer)

b. Please compute the probabilities in (1) and (2) above, numerically with 1000 times simulation, using R programming.