STA2001 Probability and Statistics I
Computer-based Exercise 3

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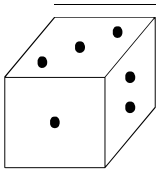
The goal of this exercise is to verify the motivation example for the mathematical expectation in the lecture note by using numerical simulation.

Problem 1. *An enterprising man proposes a game: let the player throw a fair six-sided die and*



then the player receives payment as follows:

$$A = \{1, 2, 3\} \rightarrow 1 \text{ } dollar$$
$$B = \{4, 5\} \rightarrow 2 \text{ } dollars$$

$$C = \{6\} \rightarrow 3 \text{ } dollars$$

The man charges the player 2 dollars for each play. What is the average payment the man needs to pay and can the man make profit if the game is repeated a large number of times?

The task is to simulate this random experiment 10000 times by computer and check the average payment the man needs to pay.

You should draw a figure to show the profiles of the average payment as the random experiement is repeated from 1 to 10000 times.

You are free to use any programming languages to answer this question.

- In Python, the module `random` should be used and the function `randint` can be used a random number generator to simulate the random experiment, i,e., to generate a random integer. Check the link below for more information: https://docs.python.org/3/library/random.html
- In Matlab, the function `randi` can be used as a random number generator to simulate the random experiment, i.e., to generate a random integer. You can find the reference of the function `randi` by typing in `help randi` in the command window of Matlab.

To answer this question, attach both your script and figure.