

Question 4 [30 points]

In this question, you will write code to simulate a board game based on the fable, “The Tortoise and the Hare”.

The idea of the game is as follows:

- (a) There are 100 spaces on the board and each piece must travel in order through the board.
- (b) Both characters start on space 0.
- (c) The Hare always gets to move first. The Hare randomly moves forward 5 spaces (when running) or moves forward 0 spaces (when sleeping), with equal probability.
- (d) Then the Tortoise moves forward either 2 spaces or 4 spaces, with equal probability.
- (e) The game ends when one of the characters reaches a total of 100 spaces or greater.

[10 points] Write a function below, `one_turn`, which simulates a single turn in the game, i.e. steps (c) and (d) above. The function should take two arguments, the current space of the Hare and the updated space of the tortoise. The function should return the updated space of the the Hare and the upated space of the Tortoise after one turn.

Hint: You can use the `sample` function in R to choose the number of spaces each player moves forward.

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[20 points] Write a new function which uses your function in part (a) to simulate one entire **game**, from steps a) to e) above. Your function should take in one argument: a random seed so that you can replicate the results of the game. Your function should return a list containing two elements: the name of the winner of the game (i.e. “Hare” or “Tortoise”) and a tibble containing the history of all spaces travelled by both players .

Answer: