

Assignment: G8

(1) One out of eleven American men is color-blind. You would like to do some research on color-blind men, and need to interview 15 color blind men. How many American men should you solicit from the general population if you want the probability that at least 15 of them are color-blind to be as large as possible?

(2) In a specific card game, face cards (A, K, Q, J) are the only cards of value, and they have equal value. A card is drawn from a deck and then replaced. This is repeated 6 times and the number of face cards is counted.

(a) Construct the *binomial* probability distribution to the right.

(b) Draw a bar graph of the distribution below.

(c) What is the shape of this probability distribution?

(d) Compute the mean.

(e) If the game is played without replacement, this not a binomial experiment. Explain why.

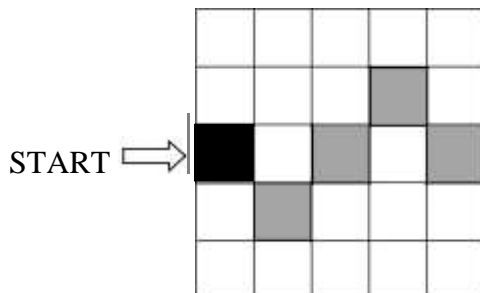
(3) Construct the probability distribution for flipping 4 coins and counting the number of heads (*this has been done a number of times in class*). Then, test classical binomial probability with empirical trials. In your group, have each group member flip four coins a total of 50 times each and record **the number of heads** on each toss in a frequency distribution (that will be a total of $3 \times 50 \times 4 = 600$ coins being tossed overall).

How closely does it match the probability distribution?

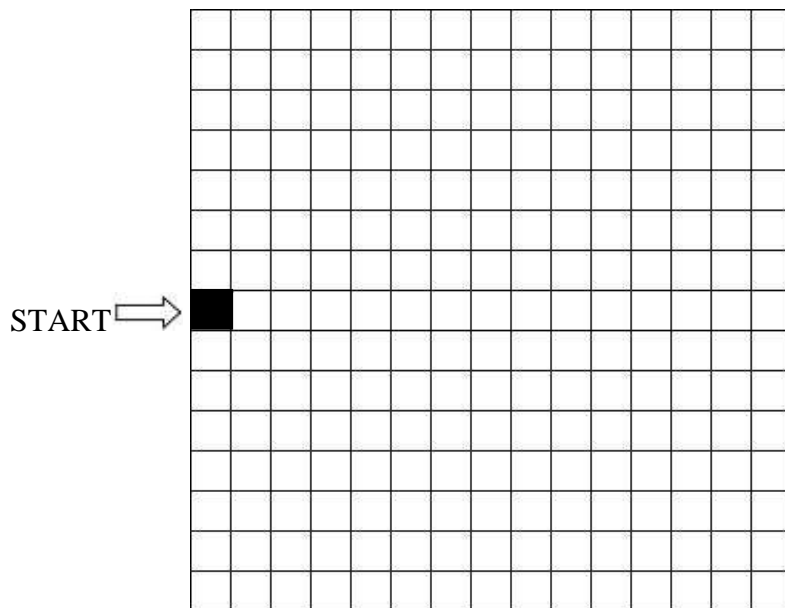
(4) Consider the process called a *random walk* where a die is rolled to determine the way an object moves. Here are the instructions for the walk we will take:

- For 1 or 2, move one box up and one box to the right.
- For 3, 4, 5, or 6 move one box down and one box to the right.

As an example, a random walk on a 5×5 grid determined by the four rolls $4 - 2 - 2 - 3$ (in that specific order) ends up directly across from where it started.



Just to get used to the process, use the die you brought with you to class to perform a random walk on this 15×15 grid. Then answer the following questions.



- What is the probability that a random walk on the 15×15 grid ends directly across from the start point?
- What is the probability that a random walk on the 15×15 grid ends two boxes higher than it started?
- What is the probability that a random walk on the 15×15 grid ends two boxes lower than it started?
- What is the probability that a random walk on the 15×15 grid ends in one of the corners of the grid?