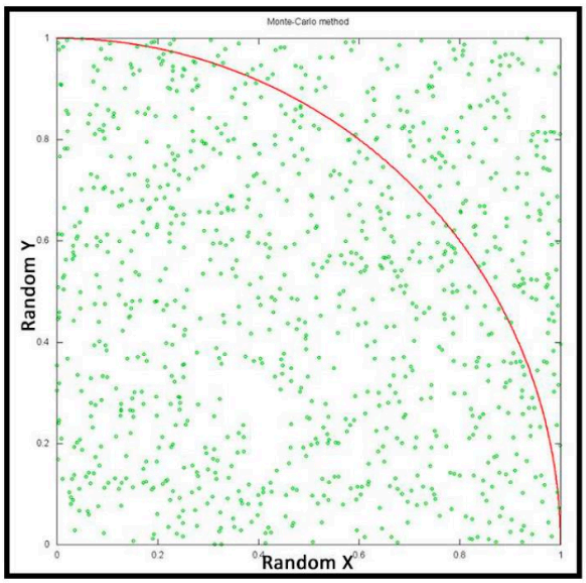
Radius of Circle = 1 Unit
Area of Quarter Circle = PI * R * R / 4
= PI * 1 * 1 / 4
= PI / 4 sq. units

Side of Square, a = 1 Unit
Area of Square = a * a
= 1 sq. unit

Probablity of Random Point, R(x,y) being inside the circle and square P=
Area of Quarter Circle / Area of Square
= PI / 4.

For N samples, M points lie within the circle and the square, and N-M points lie outside the circle but inside the square.

Using the probablitly, M for N samples
=> M = N*PI/4
=> PI = 4*M/N



A student needs to get 65 points over 100 questions in a test to pass. Questions have equal grades as 1 and each question has five choices: (a, b, c, d, e).

There is no penalty for a wrong answer.

The student does not want to study and s/he always answers the questions **in a random way.**

The student can take the test once a year and the correct answers of the test and her/his random answers change each year.

Start from this year and find the year that the immortal student passed the test.

Note [You do **not** have to use this!]**:**
You can produce a single random number in the closed range **[1,n]** using the MATLAB command **randi(n)**. To produce a(k,m) matrix you can use **randi(n,[k,m])**.

A drunken man wants to go home. Now, he is in front of the bar and his home is at the opposite side of a circular street. Suppose he is standing at the 50^{th} meter of the street and you can denote the location of his home as at the 100^{th} or the 0^{th} meter of the street.

He is so drunken that he steps forward with a possibility of 50% and another 50% backwards. The step size of the man is 1 meter.

Write a Monte-Carlo random walk simulation and find how many steps should the drunken man walk to get his home. Plot his position versus steps (i^{th} position - i^{th} step).

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

The problem can be stated as the following:

Suppose you are on a game show and you are given the choice of three doors:
Behind one door is a car; behind the others, goats.

You pick a door, say No. 1, and the host, who knows what's behind the doors, opens another door, say No. 3, which has a goat.

He then says to you, "Do you want to pick door No. 2?"

Is it to your advantage to switch your choice to win the car?

Simulate 10000 games to give an answer to this problem.

Two players are playing a game:

- The game involves a path with 100 steps with 3 holes which are located randomly (the first step, namely path(1) and/or the last step, namely path(100) cannot be a hole). The locations of the holes remain the same throughout the game. (You do not need to use vectors. However, you can use vectors if you wish.)

- The game finishes when one of the players completes the path. (If the current position is larger than or equal to 100.)

- Initially, Player 1 and Player 2 are both in path(1).

- Player 1 starts the game.

- The player rolls a dice with sides [1,2,3,4,5,6] and moves according to the result. (e.g. if the current position is 50 and the dice is 3, the player moves to the position 50+3=53.)

- If the player's current position is a hole, s/he restarts the game from the beginning. (Her/his location is changed to path(1) but the game is not finished yet.)

- After Player 1, Player 2 rolls the same dice and plays accordingly with the same rules, on the same path. (The locations of Player 1 and Player 2 can coincide.)

- After Player 2, Player 1 plays her/his move by rolling the dice, and so on.

- When a player reaches path(100) or further, the game finishes.

Simulate this game and print the winner on the screen.