EX #1: To generate sample functions $x(n)$ of a Bernoulli process with p=0.6:

1. Spin a wheel of fortune *once*, resulting in a number $\omega_o \in [0, 1)$.
2. Let ω_o have decimal expansion $0.w_1w_2w_3w_4w_5\ldots$ where $w_i = 0, 1\ldots 9$.
3. Set $x(n)$=1 if w_n=0,1,2,3,4 or 5 and $x(n)$=0 if w_n=6,7,8 or 9.

$$\omega_o = 0.141592653589793\ldots \rightarrow \{x(n)\} = \{1,1,1,1,0,1,0,1,1,1,0,0,0,0,1\ldots\}.$$
$$\omega_o = 0.718281828459045\ldots \rightarrow \{x(n)\} = \{0,1,0,1,0,1,0,1,0,1,1,0,1,1,1\ldots\}.$$

1. Different sequence of 0's and 1's associated with each $\omega_o \in \Omega$=[0,1). Each sequence is a *sample function* of the Bernoulli random process.
2. Digits independent of each other (if ω_o irrational); Pr[x(n)=1]=0.6.
3. Pr[ω_o irrational]=1 so this *almost surely* works (need ∞ precision).

EX #2: Monte Carlo simulation of compounded rate of return on investments:

1. Let $x(n)$ be the *annual* rate of return on investments in year 2000+n.
2. Let $x(n) \sim \mathcal{N}(0.1, 0.0004) \Leftrightarrow E[x(n)] = 10\%$ (historical average).
3. Confidence limits or intervals (see pp. 275-280 and recitation) are:

   $Pr[8\% < x(n) < 12\%] = 67\%$; $\quad Pr[6\% < x(n) < 14\%] = 95\%$.
4. Let $y(n) = \prod_{i=1}^{n}(1+x(i))$. Assume $x(n)$ iidrvs. Then $E[y(n)] = (1.1)^n$.
5. Generate 10 *sample functions* of $x(n)$ (Matlab's **randn**) and $y(n)$. Results plotted below. Curves are different *sample functions* of $y(n)$.

- Note that the actual return can vary **greatly** from the expected return! So don't plan on retiring too quickly! "Your performance may vary..."