*Exercise 1*

*Using Matlab generate a large number of samples of a random walk X(tn), that has the following properties:*

1. *Each sample starts from zero at t0=0;*
2. *Consists of 1000 time steps*
3. *The probability at each step to go up or down is equal*

*Prove the following:*

1. *E[X(tn)]=0*
2. *Var[X(tn)]=n*

*The process is not ergodic*

*Hint: Use the rand function to generate random numbers uniformly distributed in [0 1]*