Lab 3

1. Write a program to generate a graph of 10,000 nodes such that each pair of nodes may be connected with each other with probability p. Generate the 100 instances of such a graph such that value of p in each instance is varying with a interval of 0.01. It means that that you have to generate the first graph when p=0.01, second graph when p=0.02, third graph when p=0.03 and so on. You have to generate it up to when p=1 or when it becomes a deterministic graph.
2. In the graph generated above, you have to write your observations associated with each of the graphs such that how many edges are there in each value of p, how many paths of length 2, how many paths of length 3 and so on. You have to find out the degree of each node in each of the 10,000 nodes and plot the degree distribution for each of these 100 graphs. You have to also investigate the size of each component of the graph and make a list of the size of each component. (It may be possible that some of the nodes are isolated i.e. they are not connected with any other nodes). You have to also report the size of the giant component and the smallest component for each of these graphs. You have to also find out the number of disconnected sub-graphs of size greater than 1. Write your observation in details about each of these graphs.
3. You have to also visualize each of these 100 graphs with the help of suitable graph visualization tool.