NPTEL

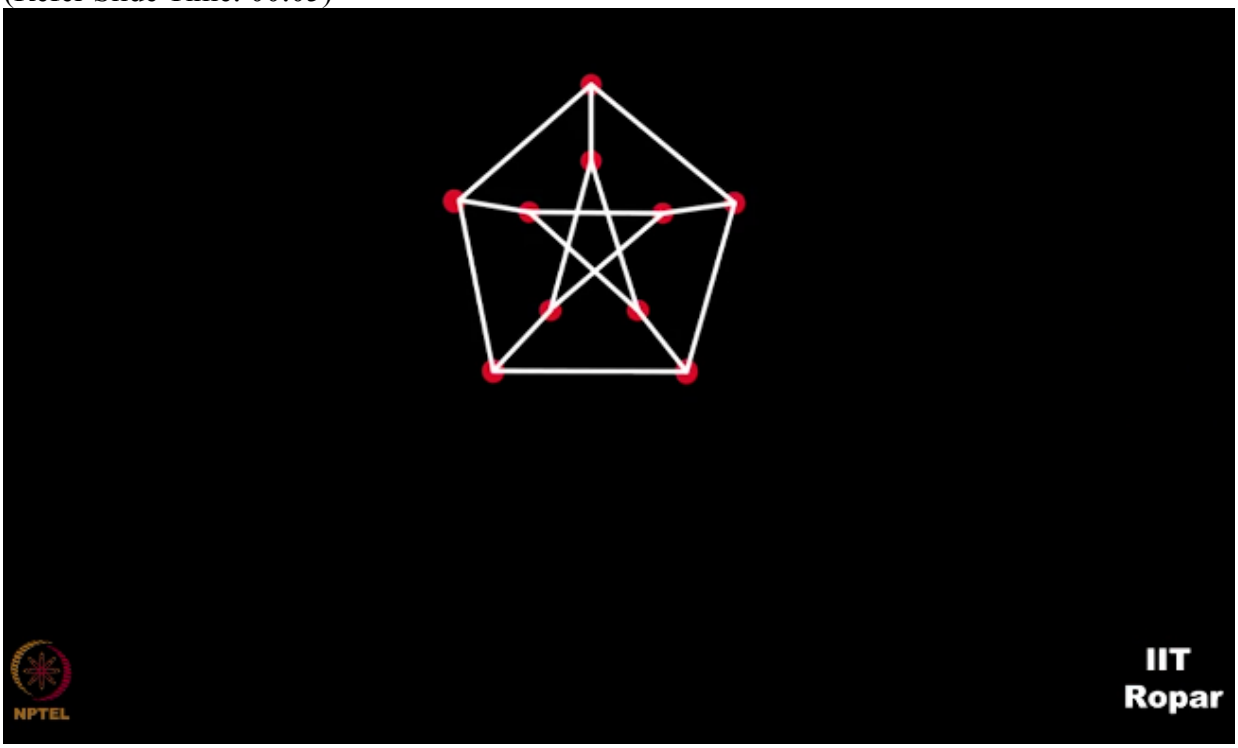
NPTEL ONLINE CERTIFICATION COURSE

Discrete Mathematics
Graph Theory - 1

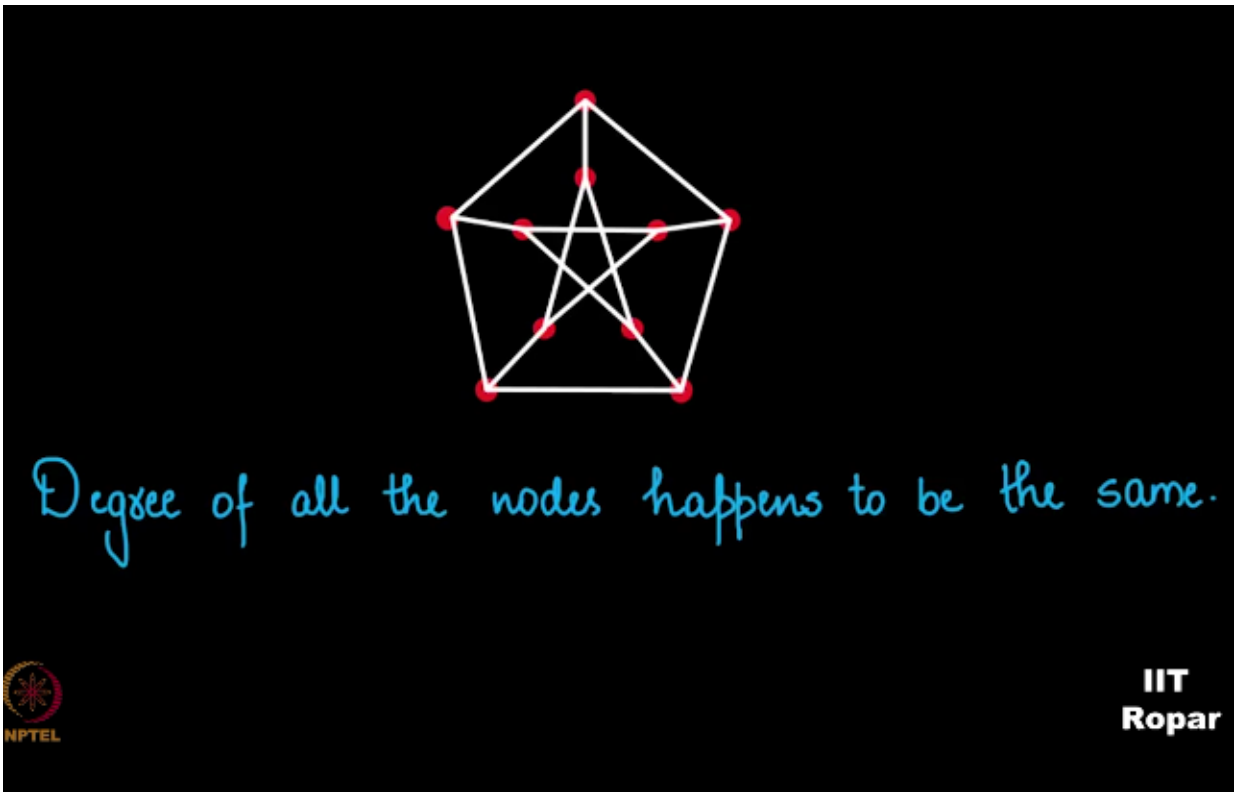
Regular graph and irregular graph

By
Prof. S.R.S Iyengar
Department of Computer Science
IIT Ropar

Look at this graph
(Refer Slide Time: 00:05)

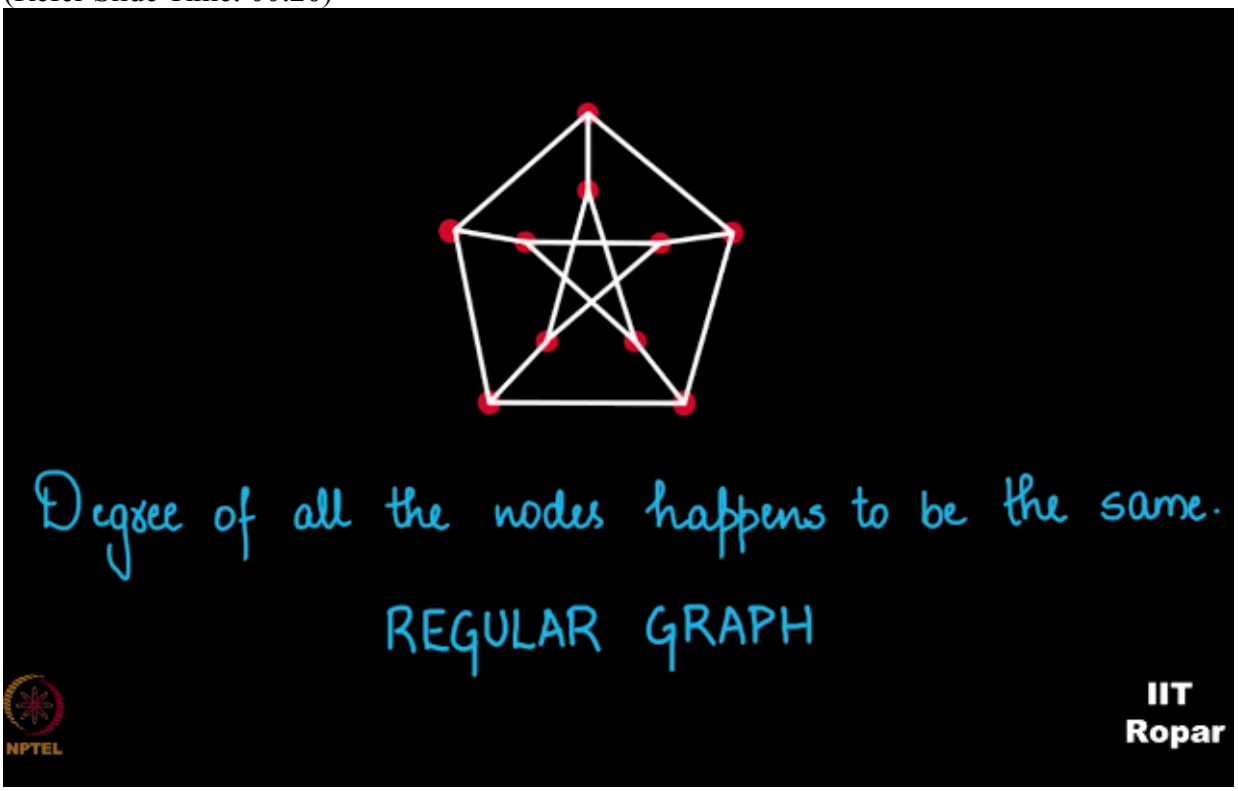


what is so nice about this graph? It appears symmetric, it appears beautiful, right, there is some sort of regularity here, as you looks up the degree of all the nodes happens to be the same,
(Refer Slide Time: 00:23)



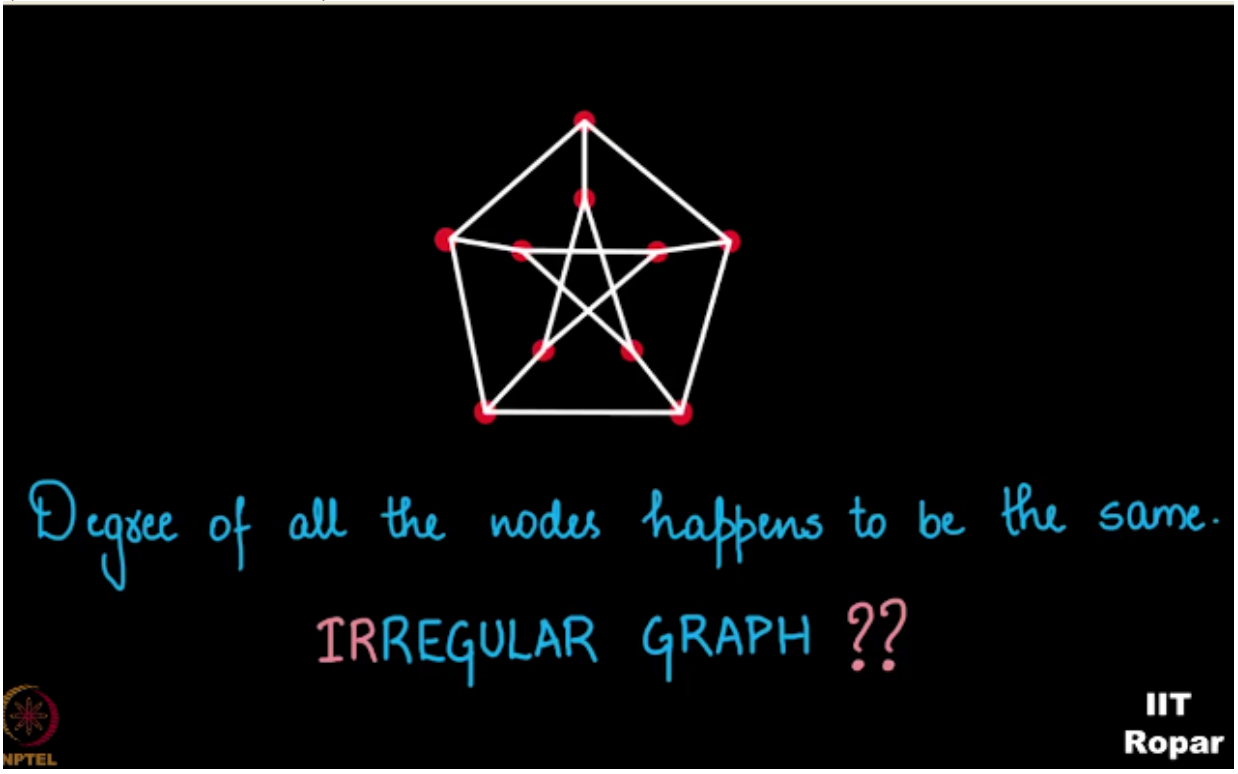
such a graph is called a regular graph,

(Refer Slide Time: 00:26)

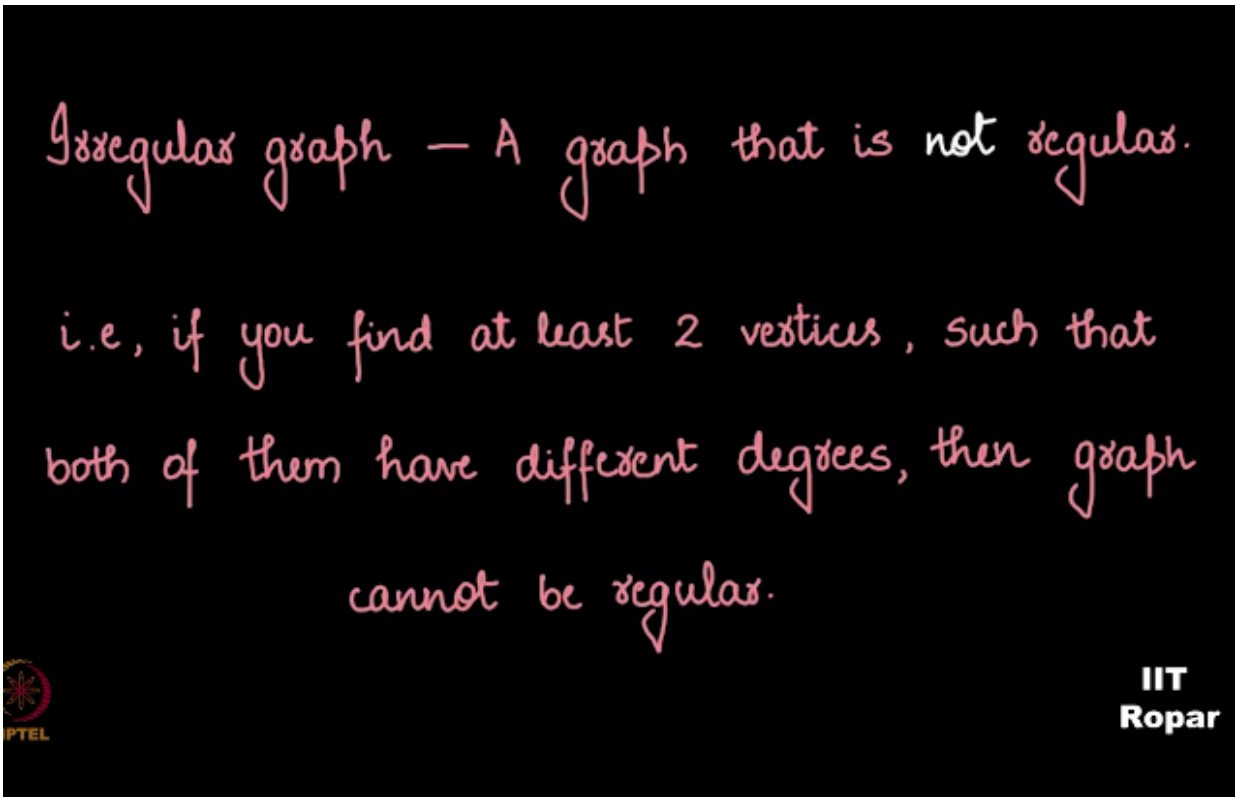


so a definition of a regular graph happens to be, for every single vertex in the vertex set if it has the same degree then you call it a regular graph.

Now can you guess what when we say irregular graph?
(Refer Slide Time: 00:40)

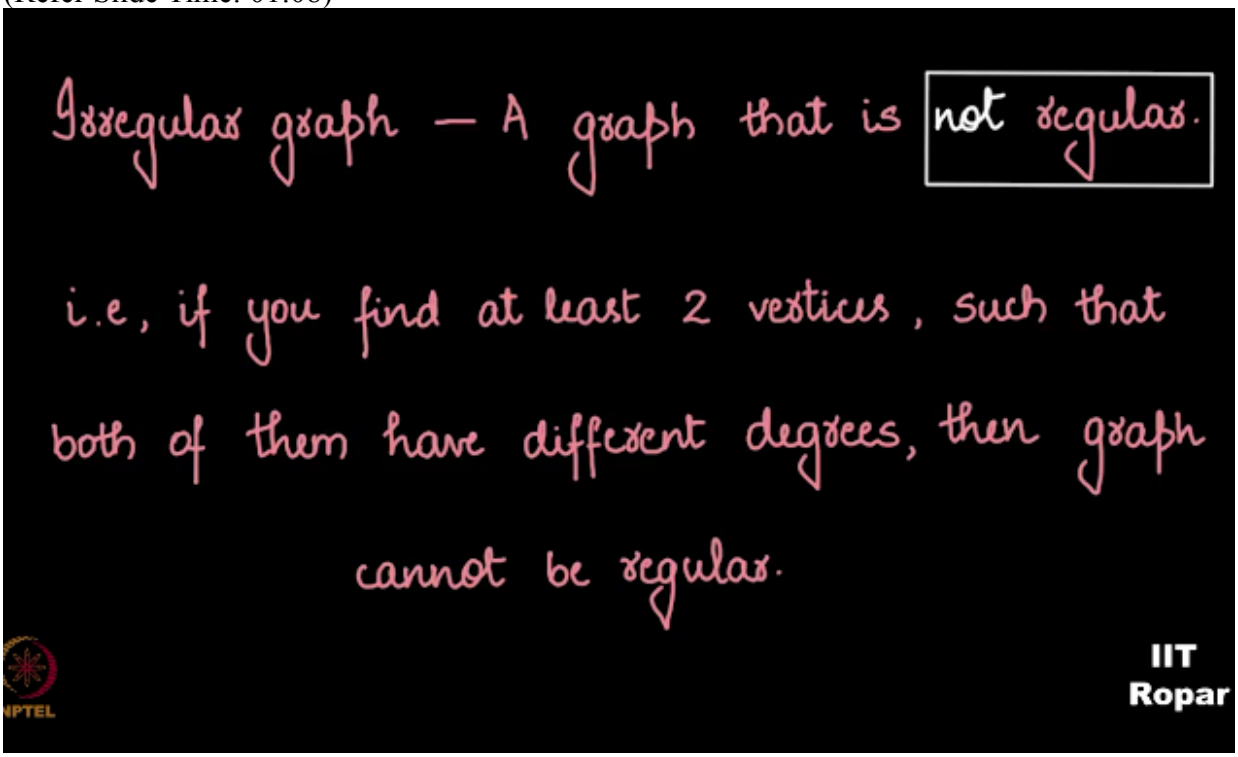


An irregular graph is a graph that is not regular, with that I mean if you can find at least 2 vertices such that they both have different degrees it cannot be irregular, so such a graph is called irregular.
(Refer Slide Time: 00:55)

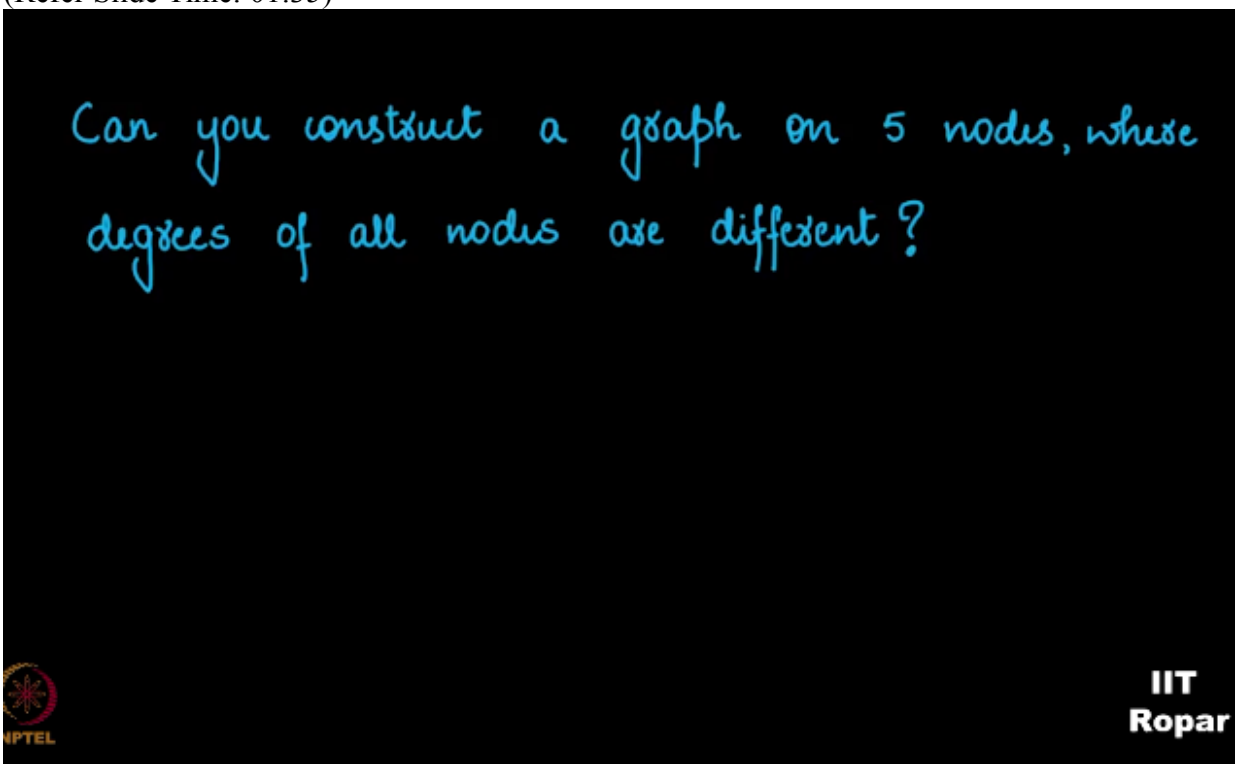


Please don't confuse irregular to be that graph with degree of all nodes to be different, that is not irregular, irregular simply means not regular.

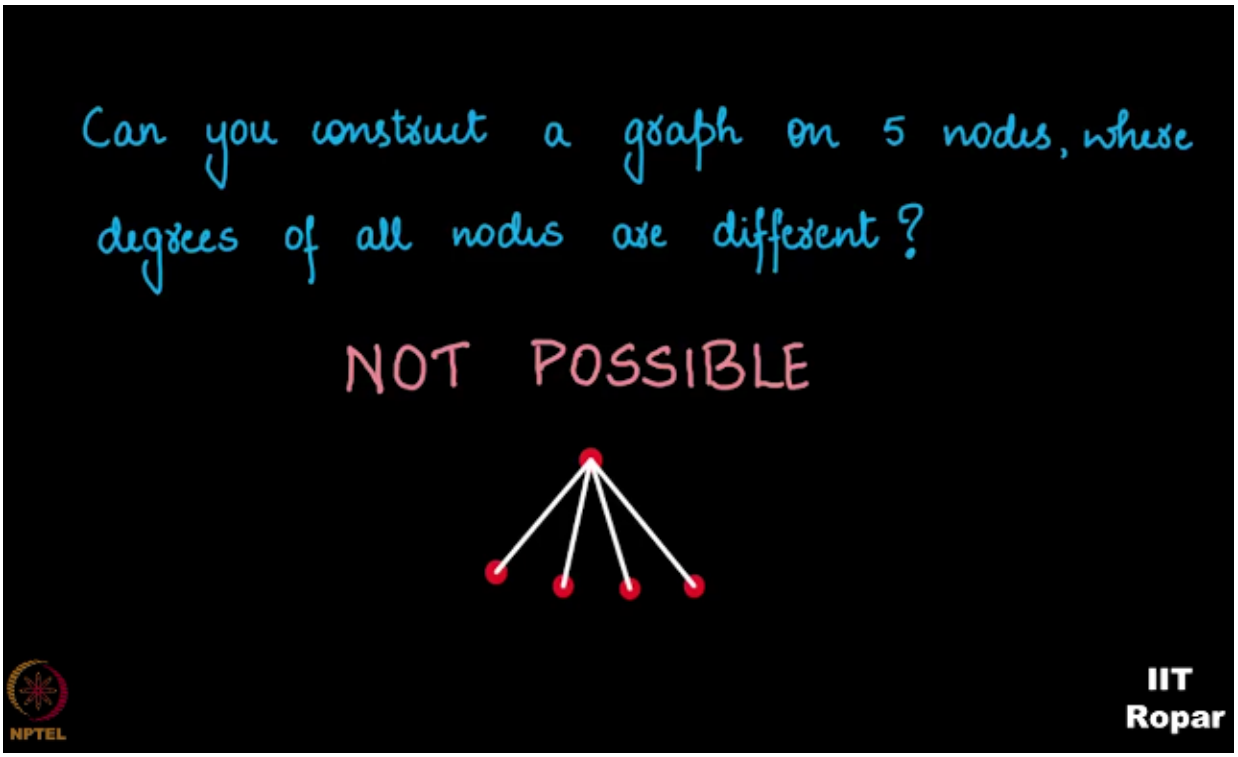
(Refer Slide Time: 01:08)



Coming to the conversation of trying a graph G with degree of all nodes different, if you can recollect, we discussed that in prisoner both principles, right, we will discuss that once again here if you don't remember if not prisoner or principle, can you construct a graph on 5 nodes, where degree of individual nodes each of these 5 nodes are all different,
(Refer Slide Time: 01:35)



is that even possible? It's not possible, it's because degree of a node can be 1, 2, 3, or 4 even 5 nodes and you have 5 nodes here
(Refer Slide Time: 01:46)



which means if the degree is 1, 2, 3, 4 if you attend to create nodes with different degrees you will be stuck because there are 5 nodes and only 4 possible degrees, and hence you cannot have a connected graph G with all the nodes having different degree, I just gave you an example for 5 nodes, it was true for any numbers.