NPTEL

NPTEL ONLINE CERTIFICATION COURSE

Discrete Mathematics
Graph Theory – 3 &
Generating Functions

NetworkX – Isomorphic graphs Part 1

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Let us now see if two graphs are isomorphic, now I am going to first import NetworkX as NX,
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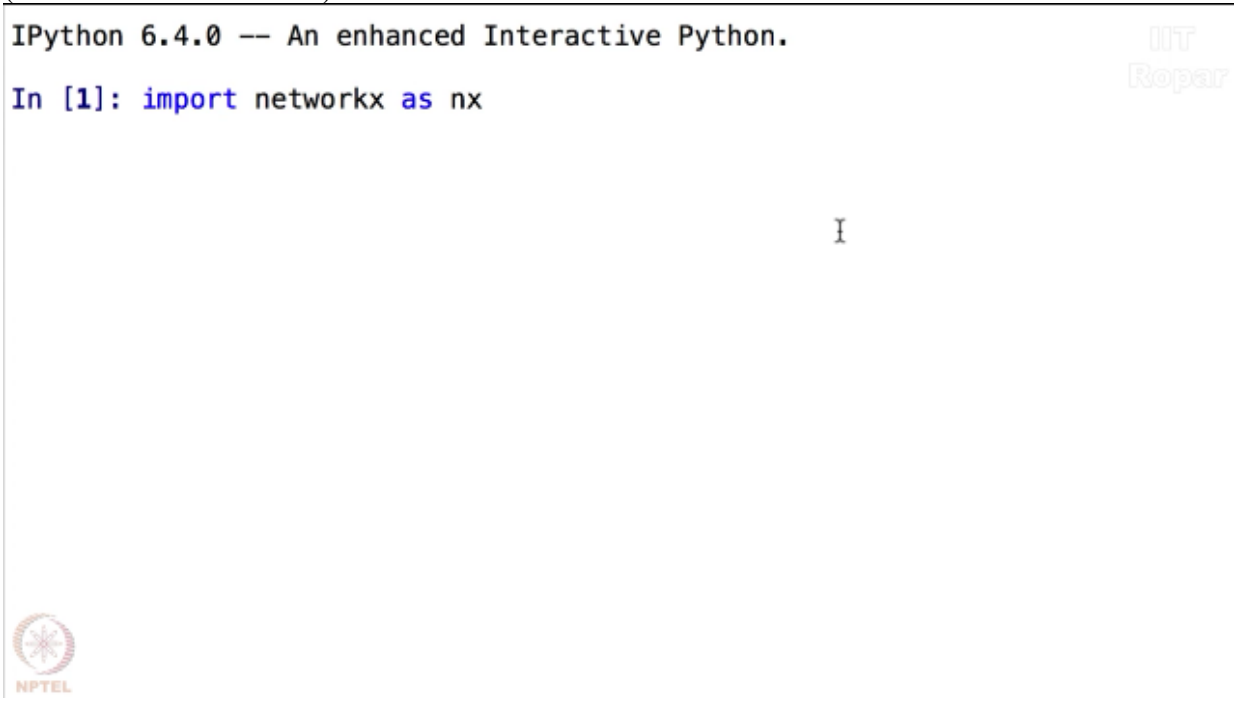

now I am going to create the graph G1 as nx.graph, I'm going to add nodes G.add_nodes_from I am going to specify a list from where the nodes are to be taken, and it goes like this, KA stands for Karnataka, TN stands for Tamil Nadu, TL Telangana, I've missed a, so it's all strings you see TL, TN is over AP and then the last one KL, okay we can take one more Goa, right GO,
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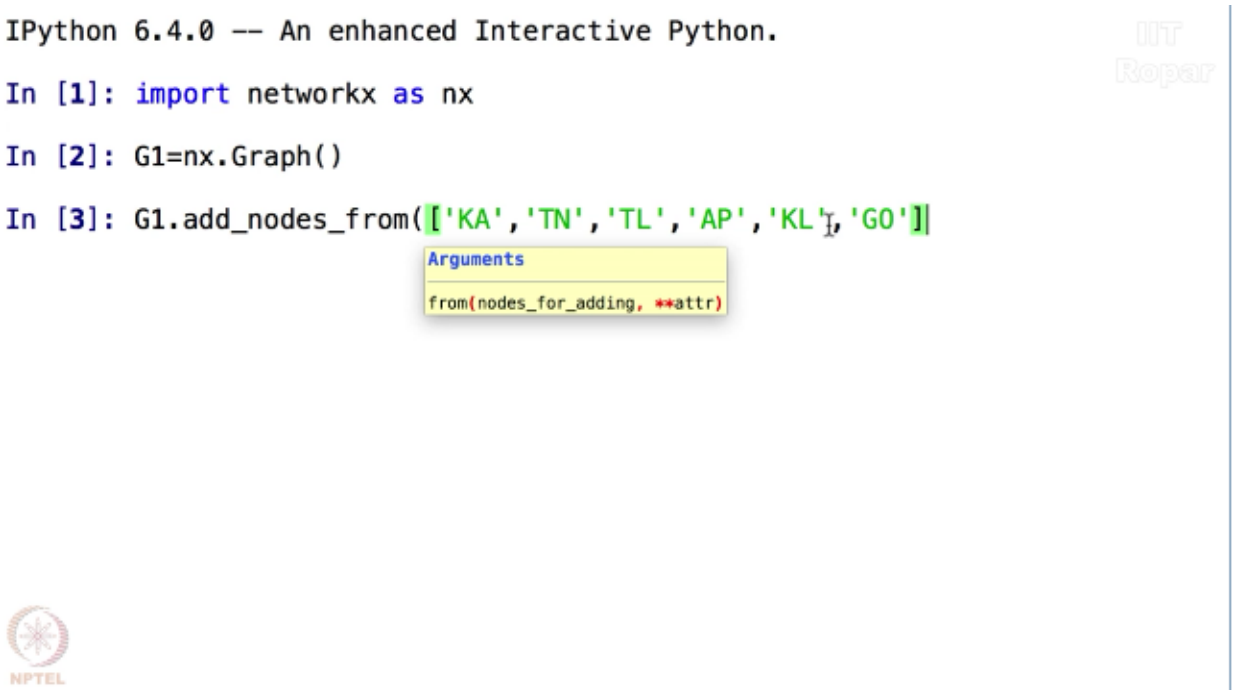

now I'm going to close the list, so I'm going to add nodes, so these are the nodes it's going to be added from this list, now I'm going to add edges like this, and edges from the list has been created, I'm going to create the list now, so how am I going to do that? It's going to be like this KA, right K in caps KA, let's say TN, we will go in an order TN and then the next one is going to be KA, TL, and then the next one is going to be KA, TL, and then we have KA, TL is over we have next in the list is AP, right, AP and then we have KA, KL, and then at the end we have KA, last one is going Goa, GO, right,

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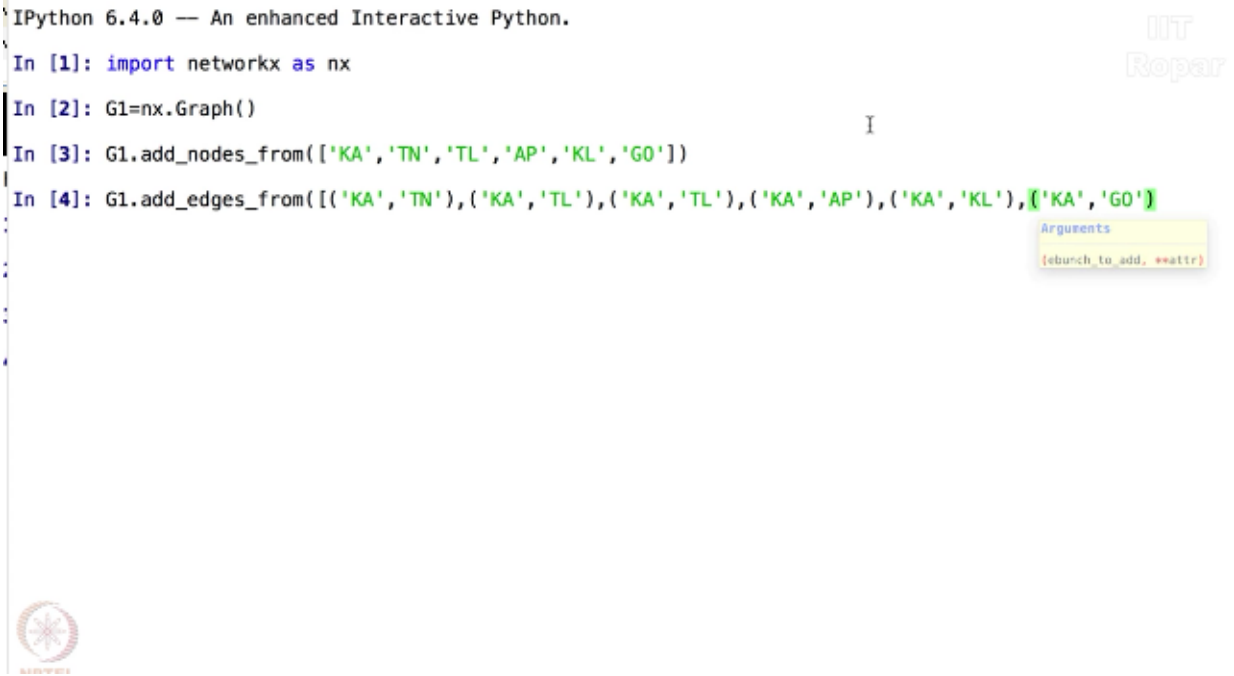

now I'm going to close the list.

Now let us draw the graph, nx.draw G1 with labels, right, with labels as true,
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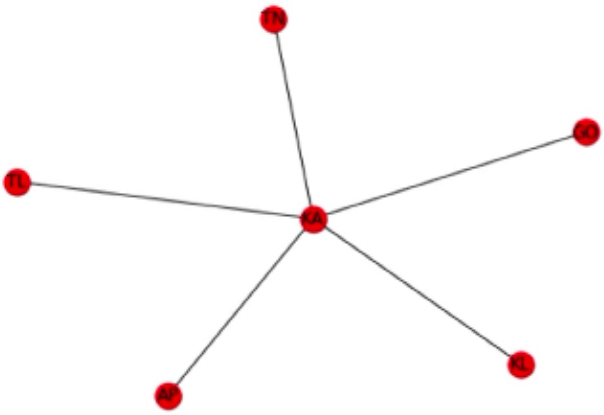
```
In [4]: G1.add_edges_from([('KA','TN'),('KA','TL'),('KA','TL'),('KA','AP'),(

In [5]: nx.draw(G1,with_labels=1)
```




```
In [6]:
```

so do you see in the graph here it's more or less like a star graph with KA in the center and all the others surrounding it, now I am going to create another graph G2, G2 as nx.star_graph like this, and let me say on 5 nodes,
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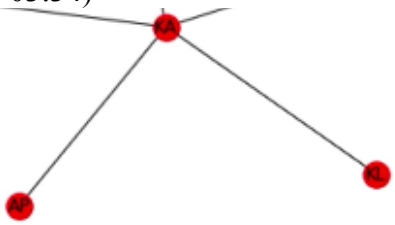


```
In [6]: G2=nx.star_graph(5)
```

so when I specify the number of nodes inside this bracket it means it's going to give me all the nodes outside the center vertex, the center vertex is not included in this 5 here.

So next what I'm going to do is draw nx.draw G2, let me say with labels that's true,
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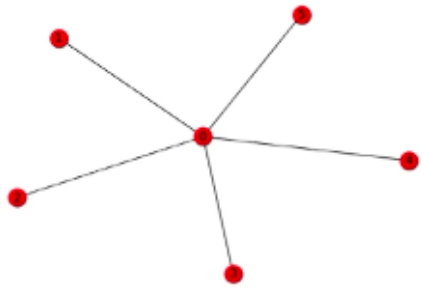
```
In [6]: G2=nx.star_graph(5)

In [7]: nx.draw(G2,with_labels=1)
```



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In [8]:
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so you see we have obtained another star graph here on 5 vertices with label 0, 1, 2, 3, 4, 5, now do you think these two graphs which I have drawn are isomorphic, let us see, the command for that is very simple and it goes like this, nx.is_isomorphic and we have to specify the graphs G1 and G2 like this in bracket, yes, so it says it is true, so G1 and G2 turns out to be isomorphic.
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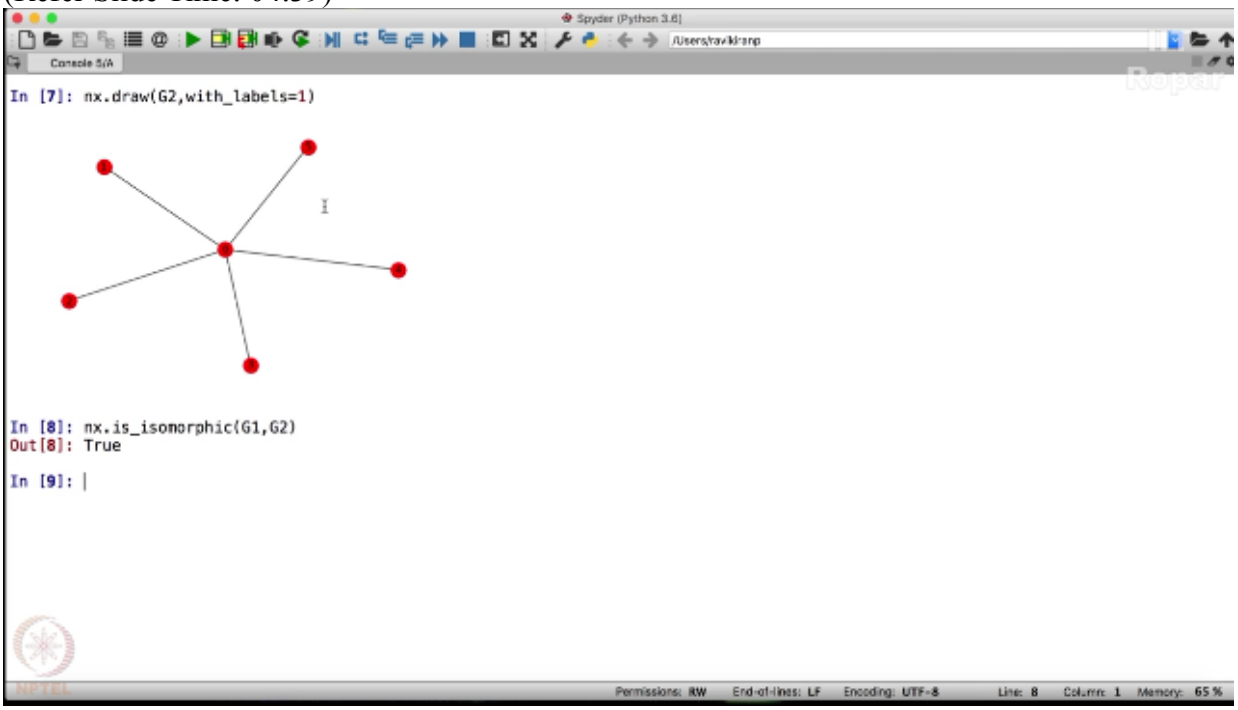

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