NPTEL

NPTEL ONLINE CERTIFICATION COURSE

Discrete Mathematics
Graph Theory - 1

Havel Hakimi theorem Part 2

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The professor said that there does not exist a graph with the degree sequence 1, 1, 1,
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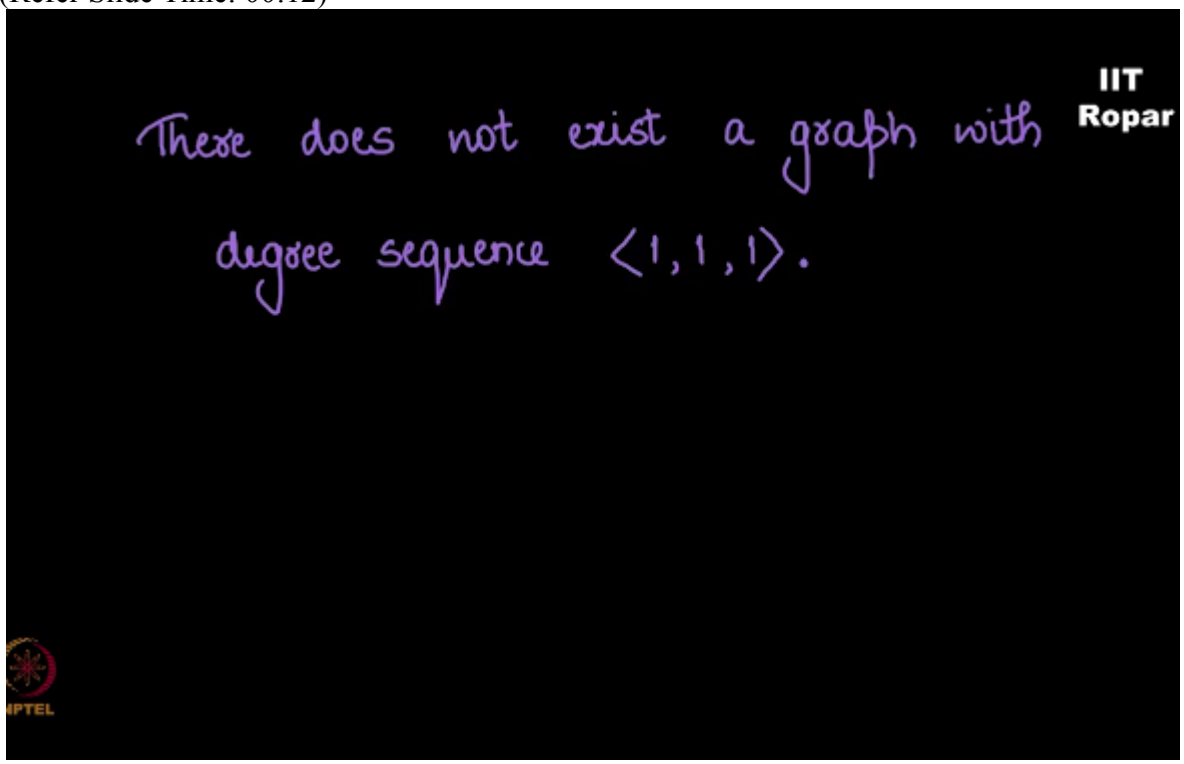

you see if I write a edge like this and another edge
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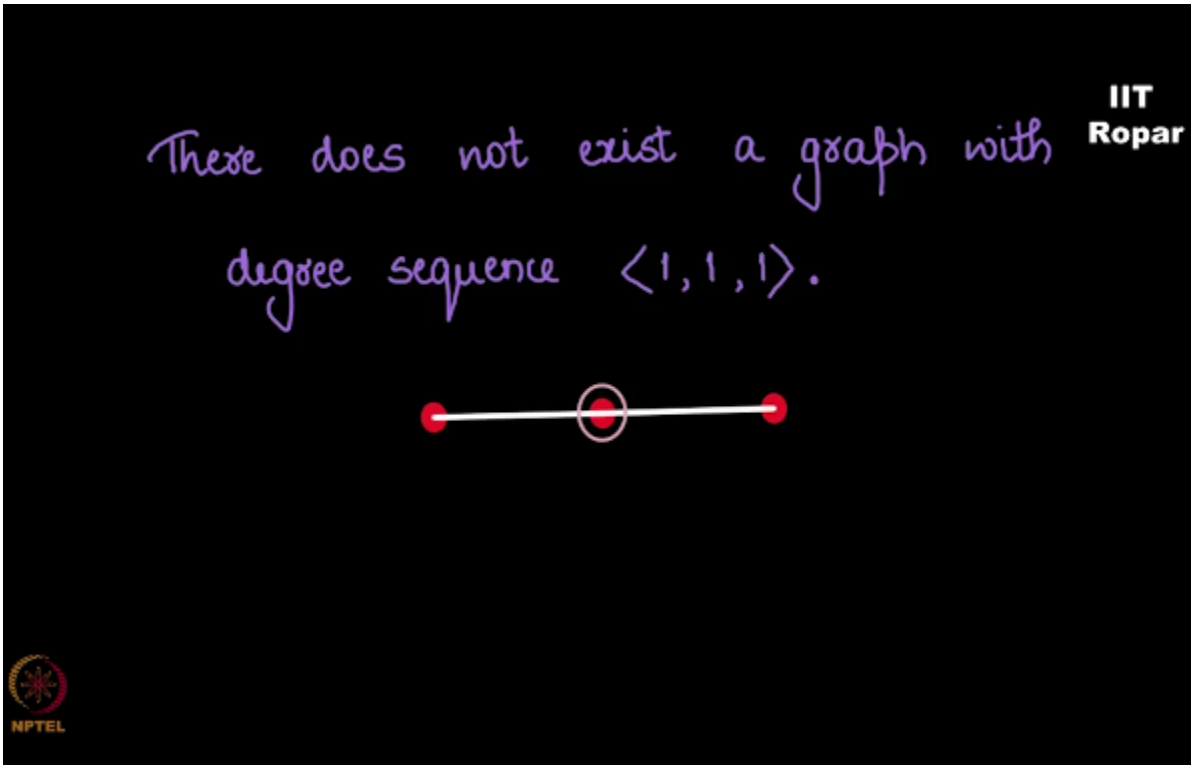

then the degree of this vertex becomes 2,

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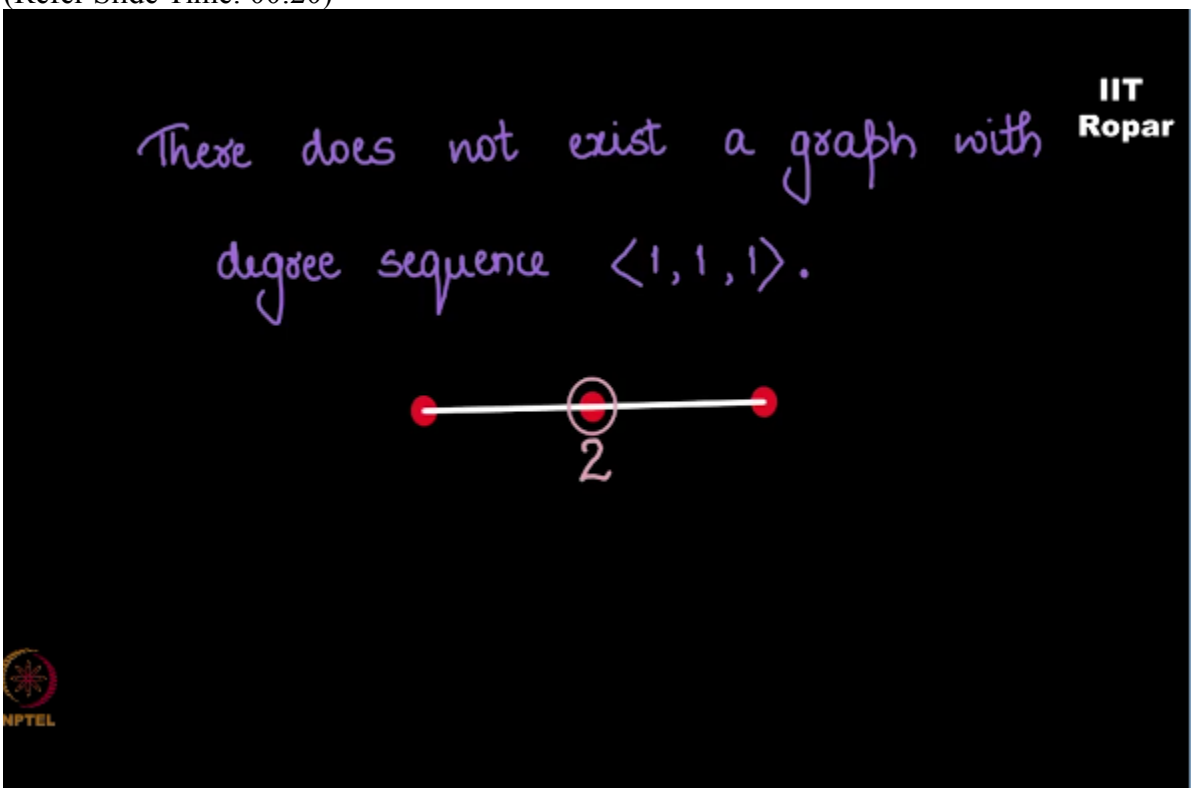

and it violates the degree sequence, it should be 1, 1, 1, hence there is no possibility for us to write a graph with the degree sequence 1, 1, 1, but let me ask you one thing, what is the reason?

The reason is that, observe this degree sequence there are odd number of vertices having odd degree, is it possible?
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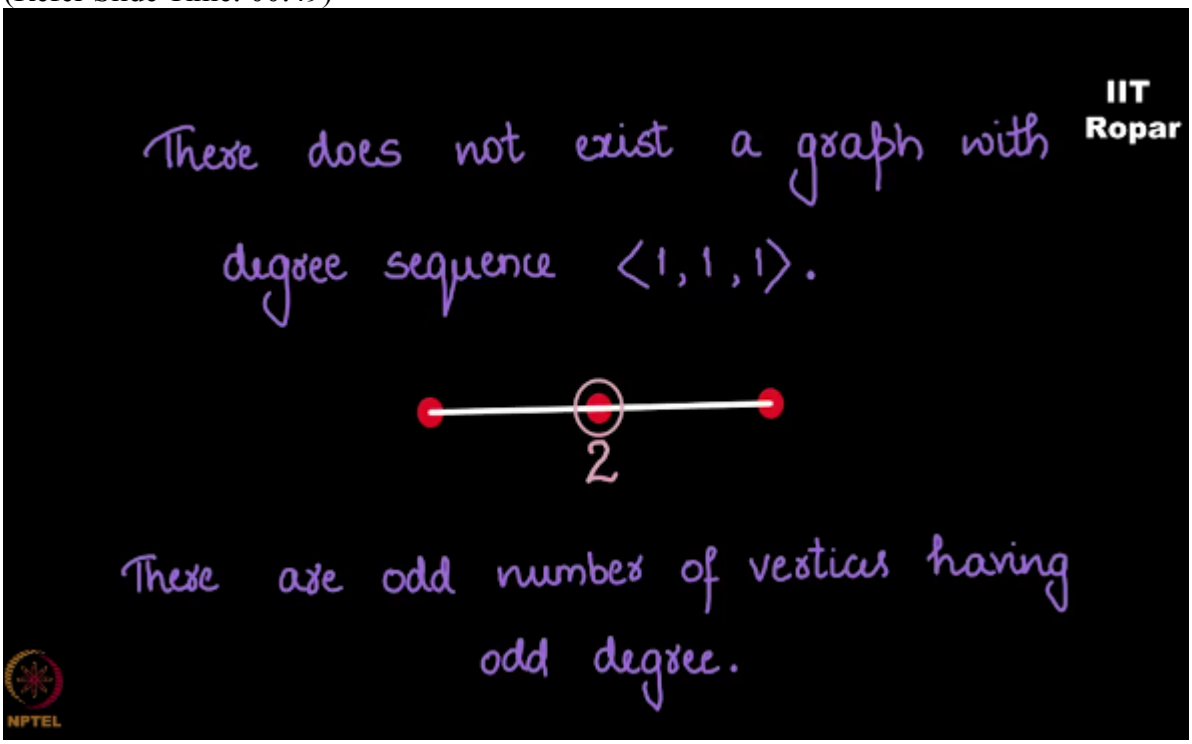

What had we seen earlier? We had seen that in any graph there are even number of vertices having odd degree and hence this sequence cannot have a graph.

Now let me change the degree sequence, 5, 5, 5, 5, 2, 2, 2
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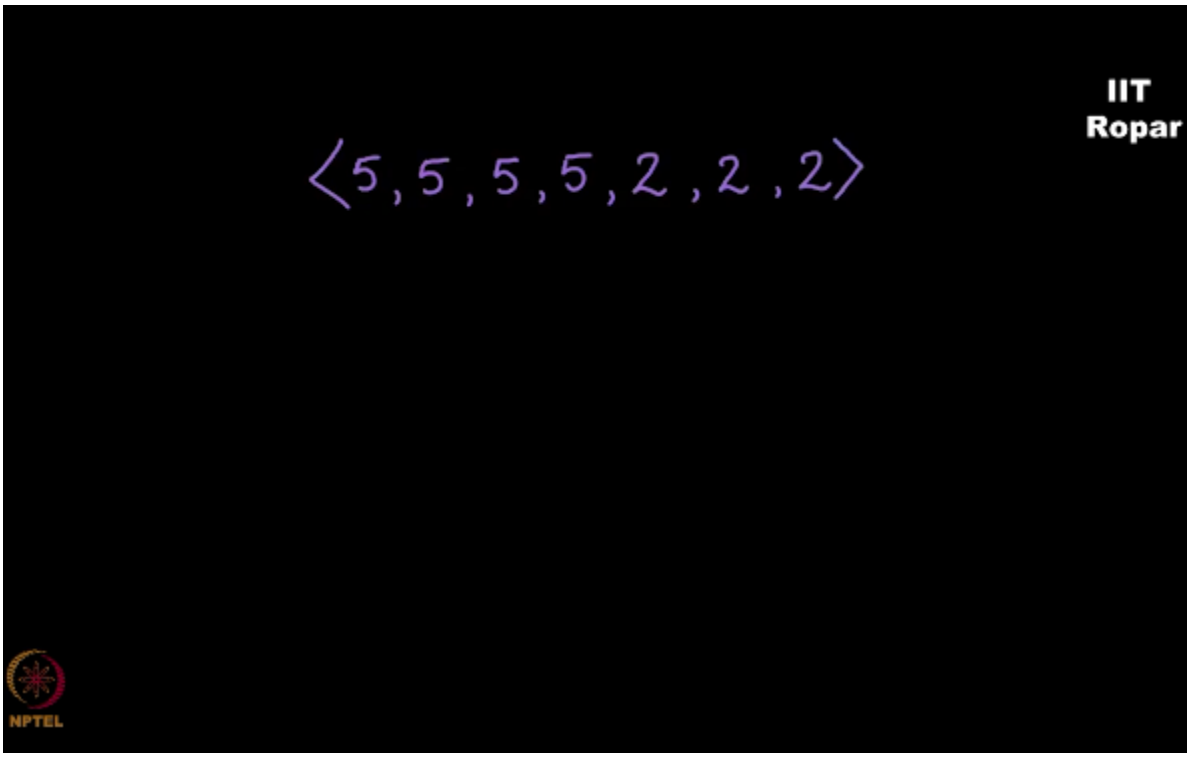

now can a graph be drawn for this sequence?
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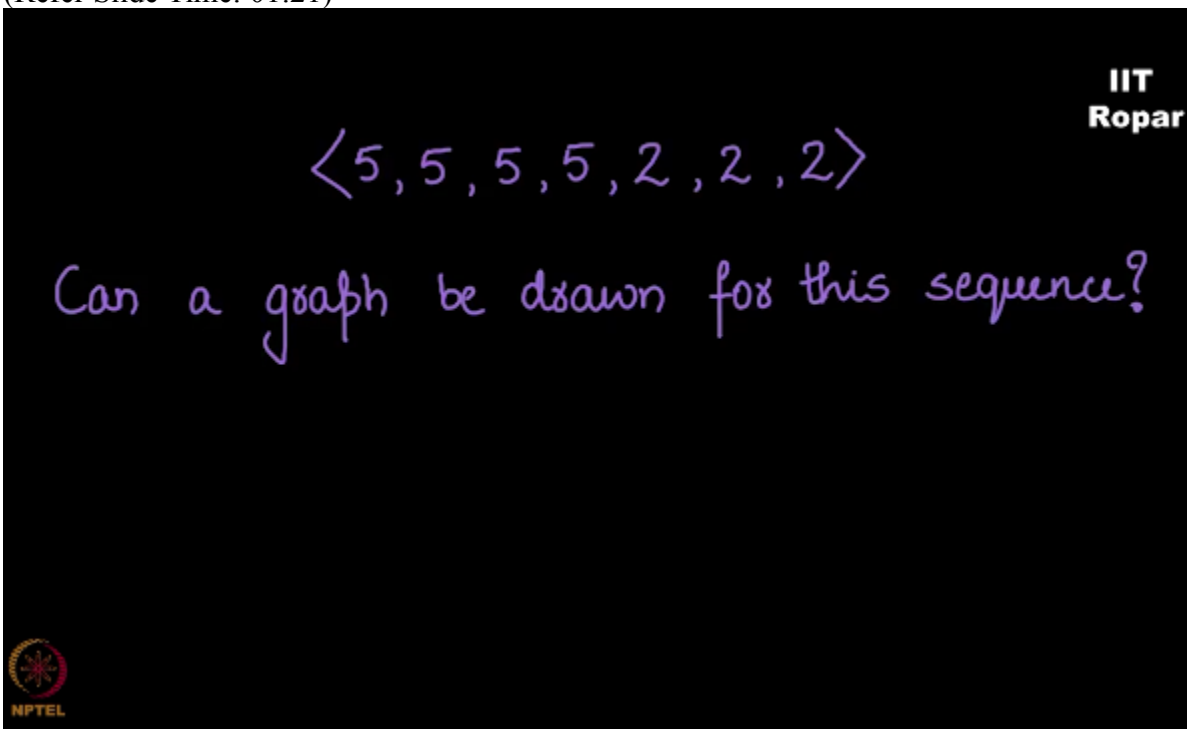

You must pause here and try it yourself, what do you observe here? You observe that there are 4 vertices of odd degree,
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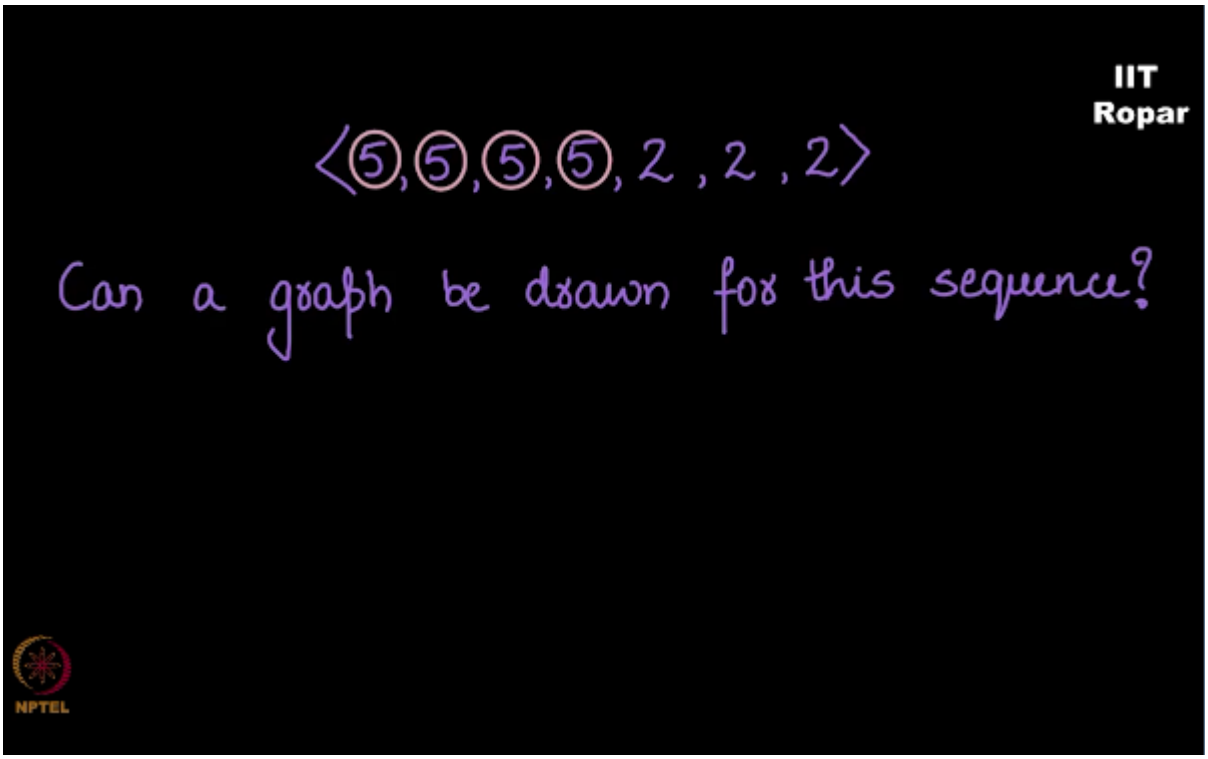

let me ask the same question to you, can you draw a graph for this degree sequence? Please remember what did the professor tell? He said that given any sequence there may or may not exist a graph,

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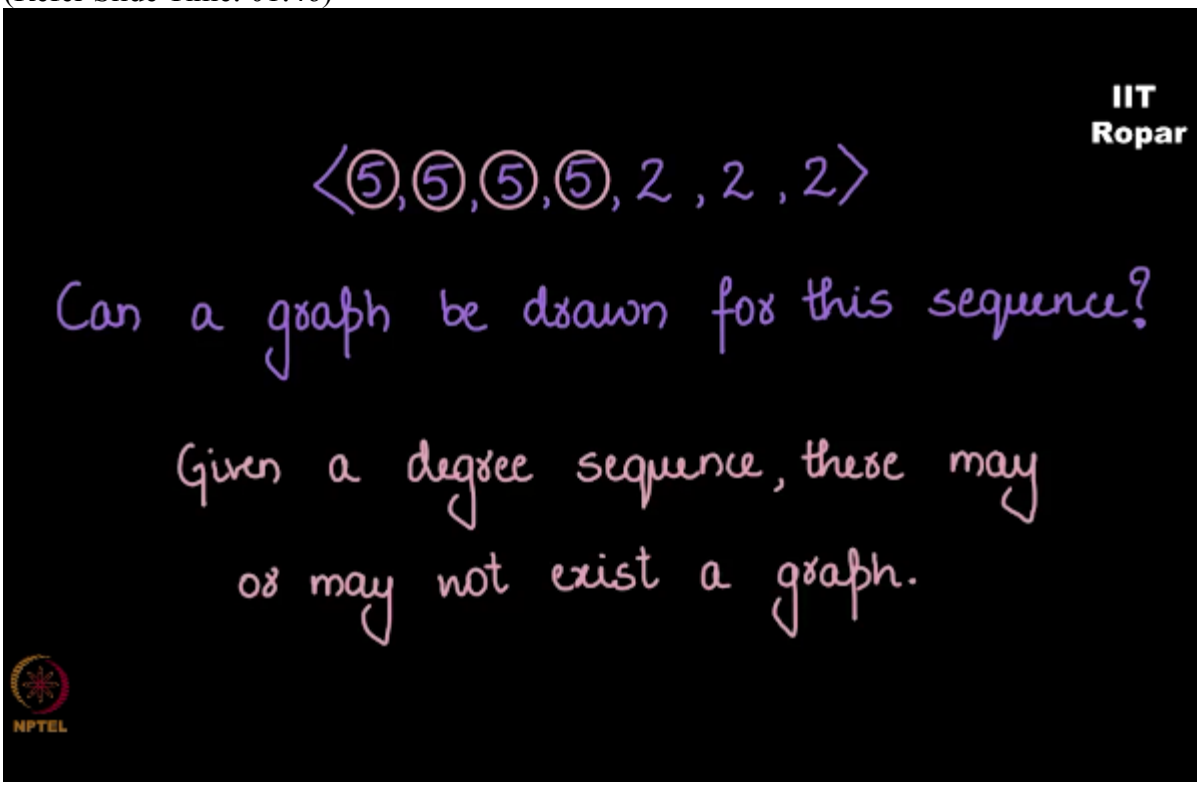

we really don't know if there exist a graph for this sequence, try it yourself, we'll give the answer in the next video.

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