NPTEL

NPTEL ONLINE CERTIFICATION COURSE

Discrete Mathematics
Graph Theory - 1

Spanning and induced subgraph - A result
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If I challenge you to give me a graph which is both induced and spanning,
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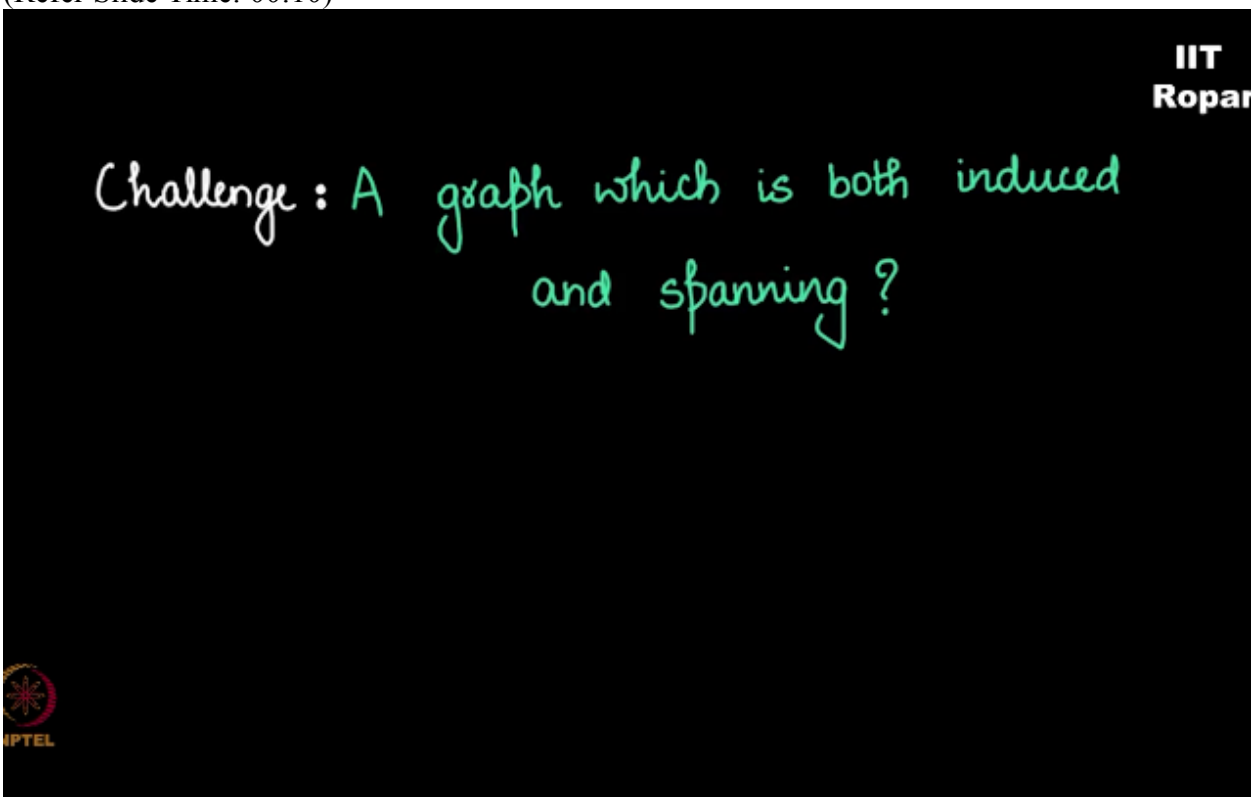

then will you be able to do it? Rather let me ask you how many such graphs can you give me which are both induced and spanning with respect to some graph,
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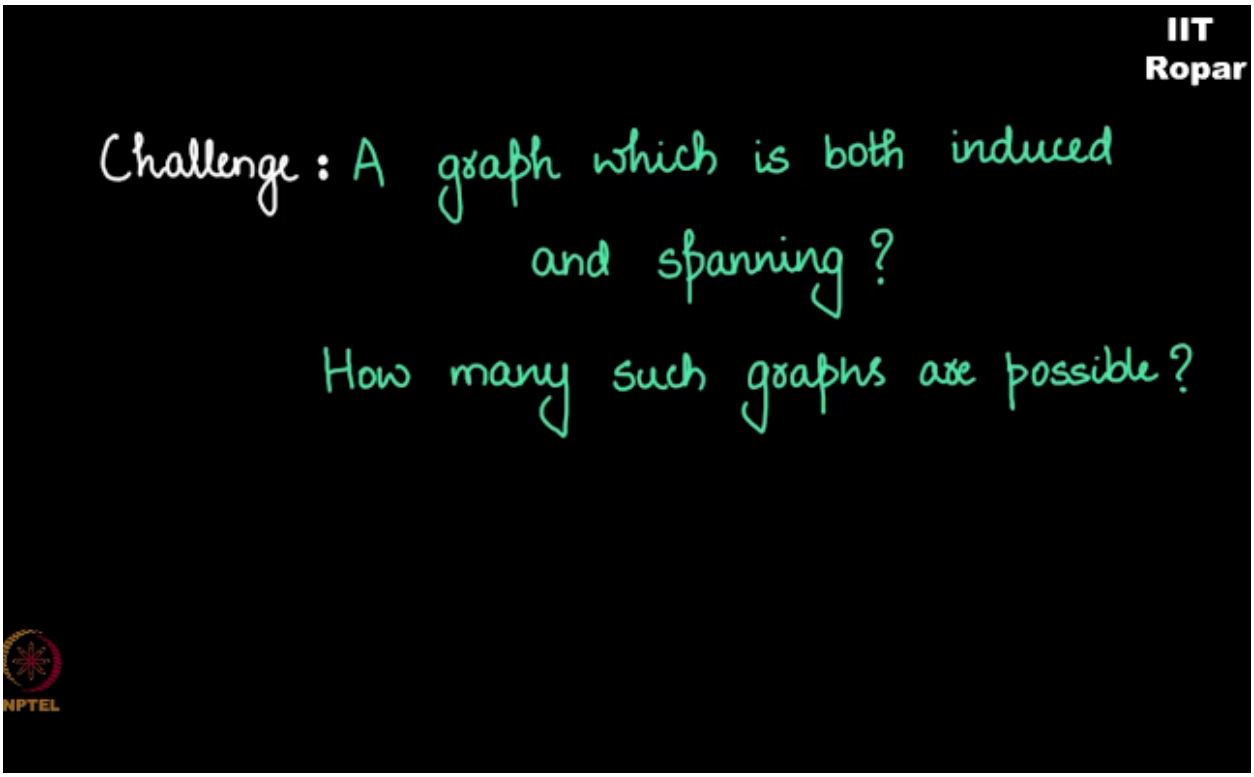

let me give you an example. Consider this simple graph,

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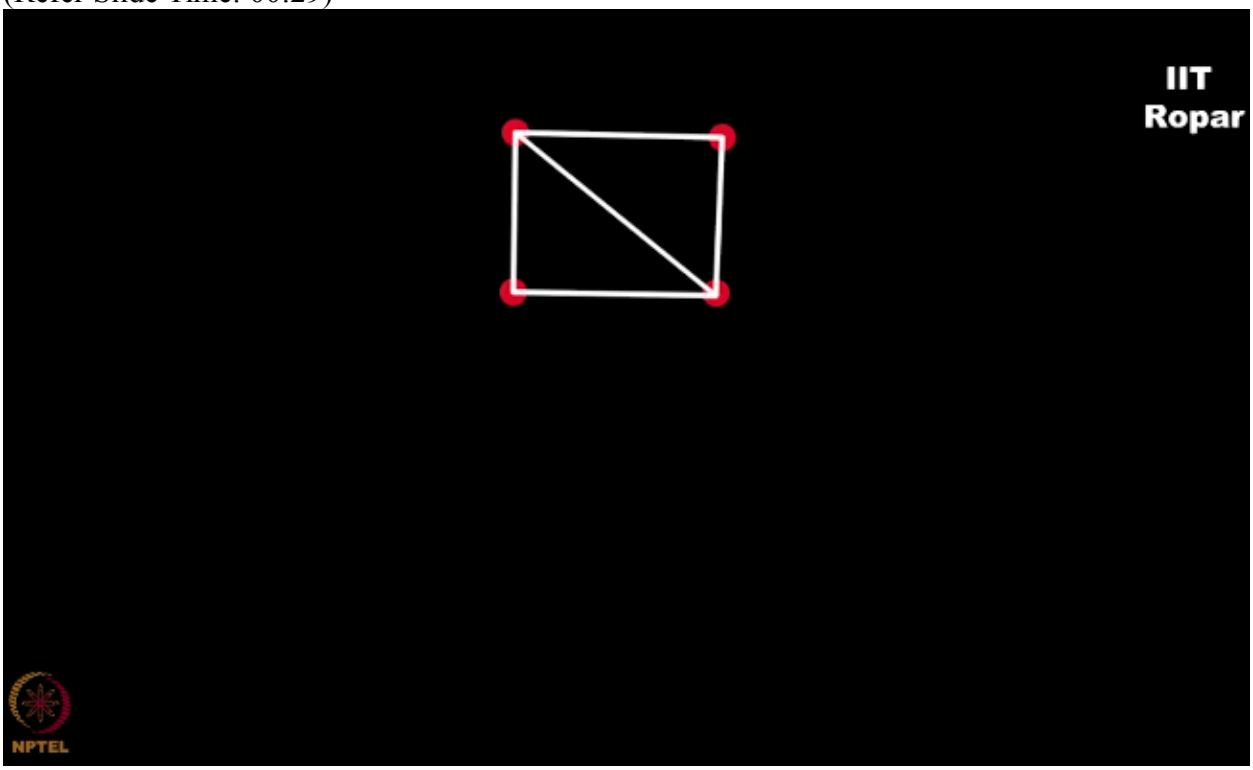

simple and both that, it is simple graph as well as looks very simple, so if I give you this graph, how many graphs can you give me which are both induced and spanning, I think you must pause here for a minute and try it yourself.

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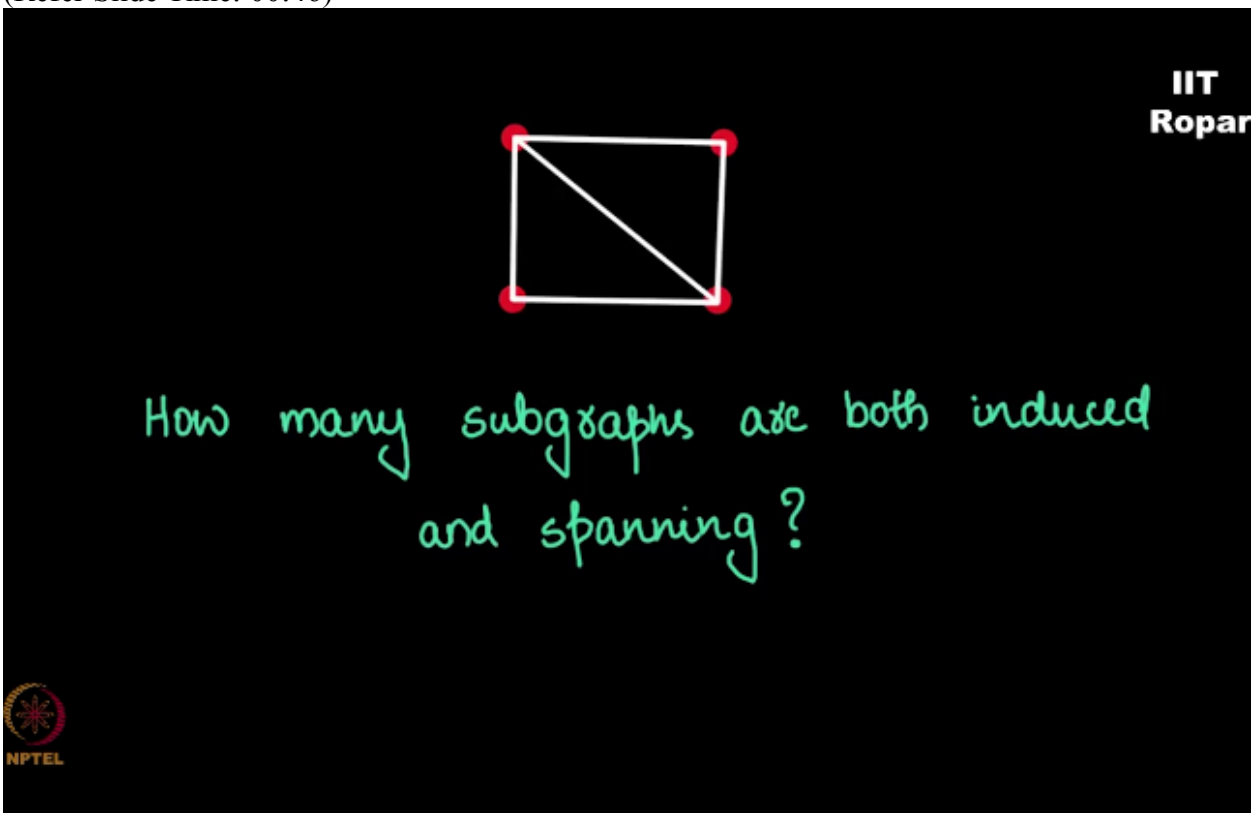

So if I consider this subgraph of this graph,

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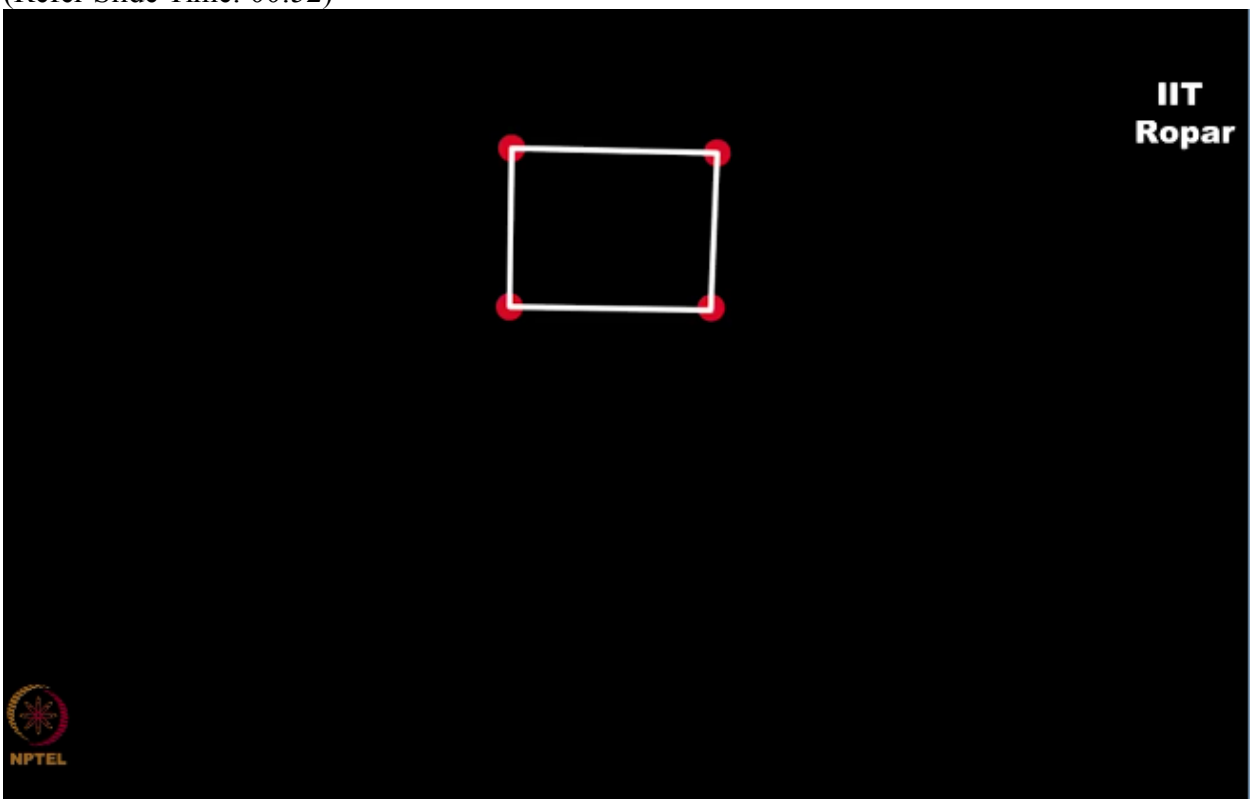

I'm giving you the solution now, I hope you will do it yourself, see if I give you this subgraph, this is definitely spanning, right,
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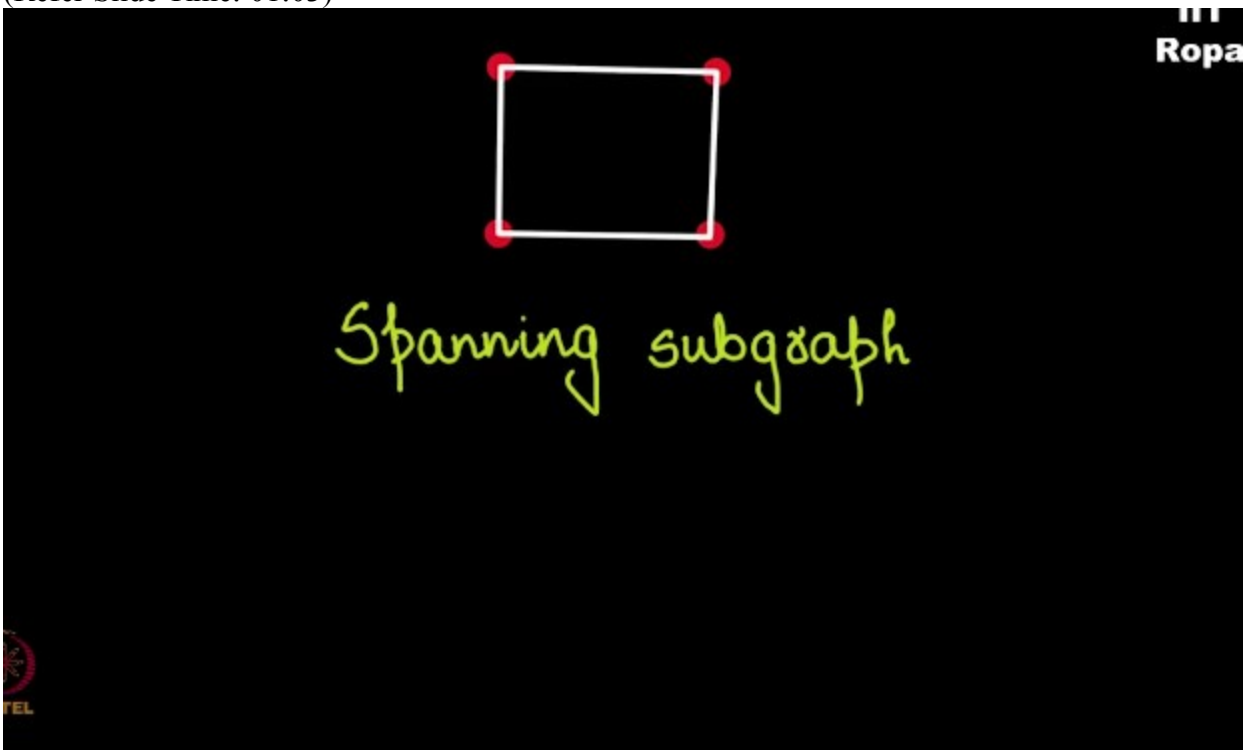

but the moment I introduce this edge it becomes induced to,
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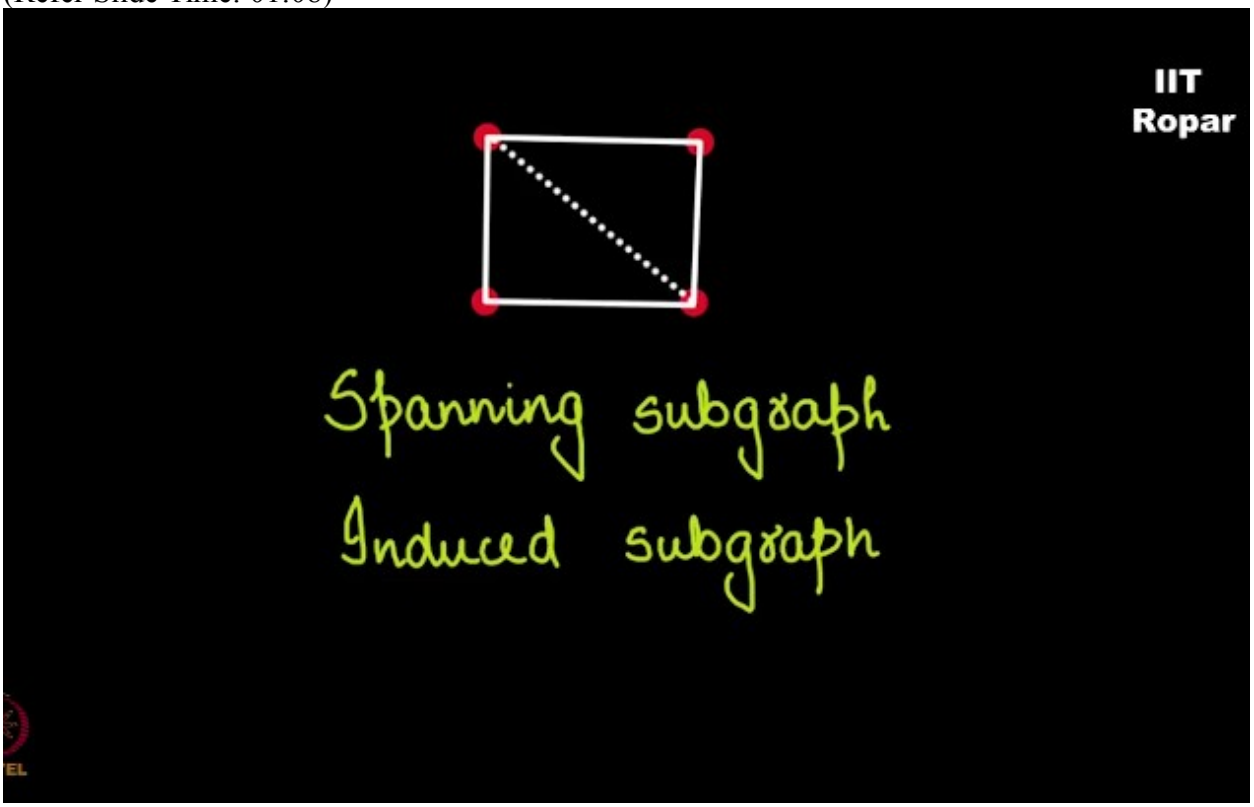

without this edge it is not induced but with this edge it is both spanning as well as induced.

Now do you see this graph and this graph? They are the same,
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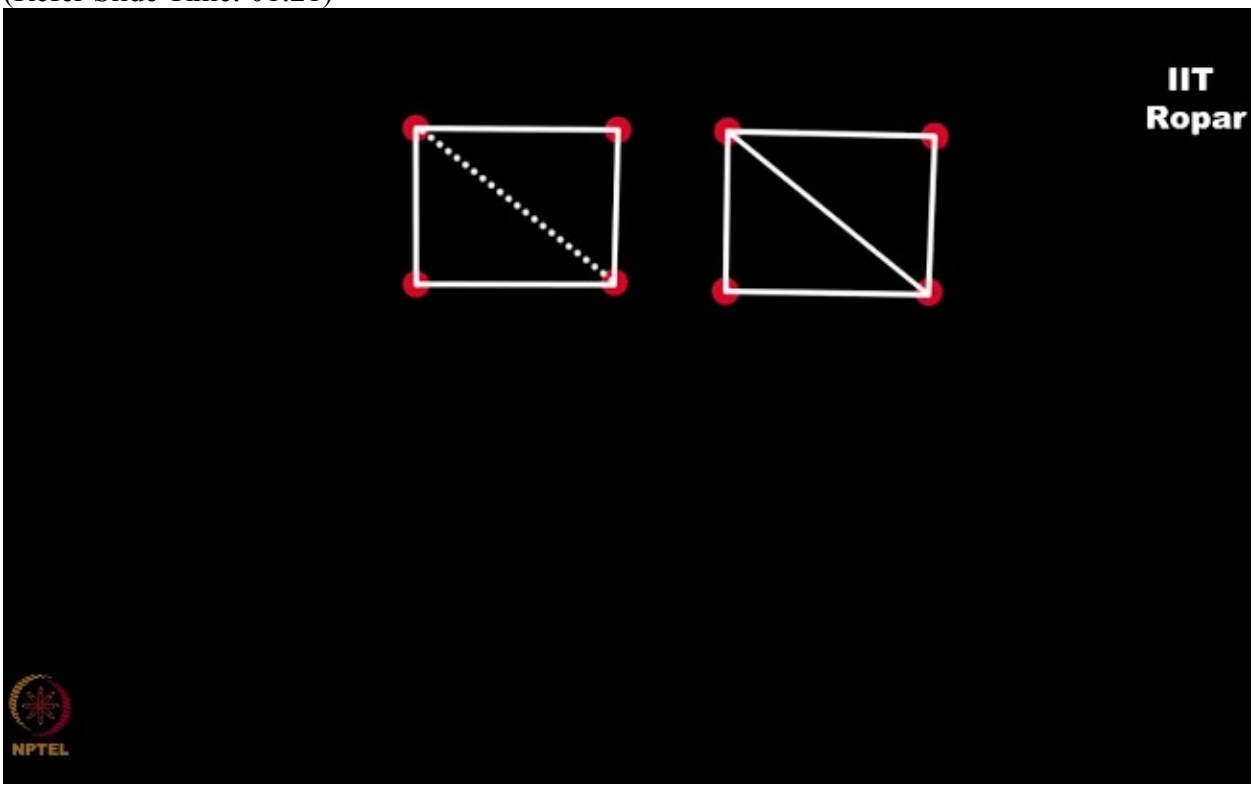

subgraph is the same as the graph excess, well so you must be able to reduce, answer by now if you have to give me a subgraph which is both induced and spanning
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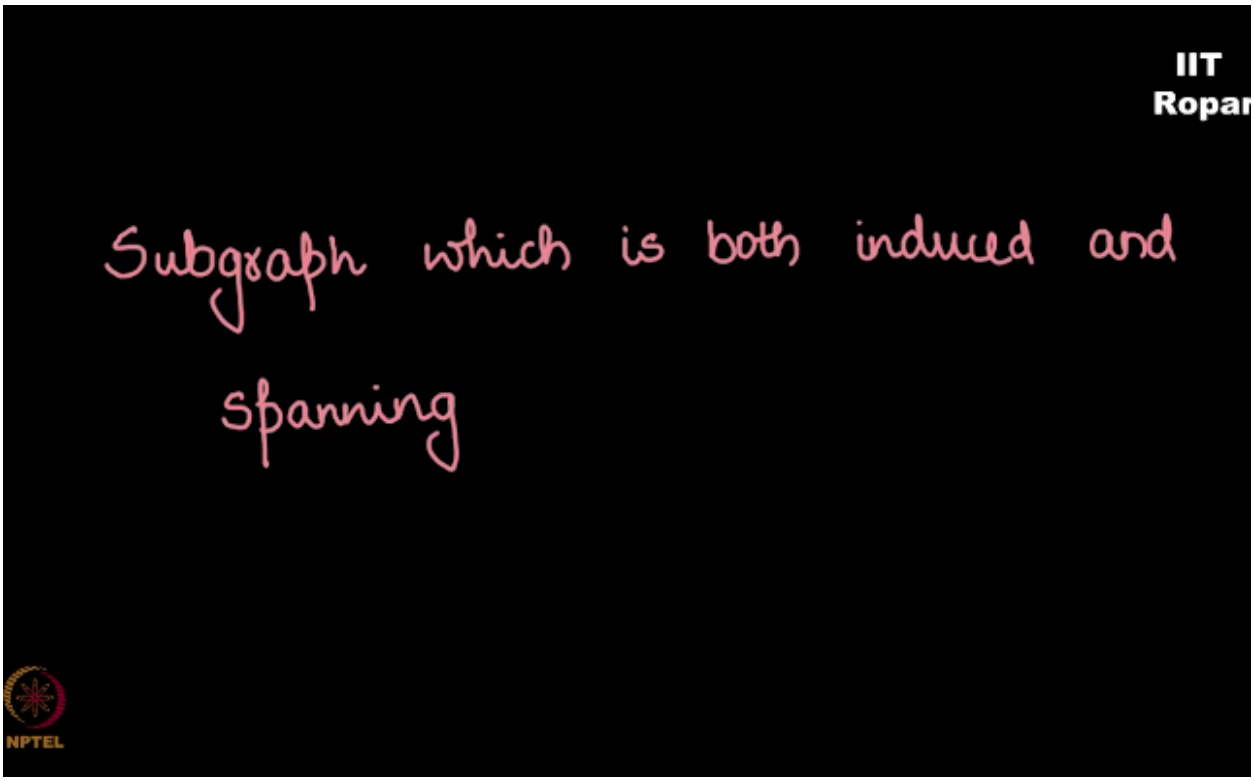

you must jump and tell me that it is only very obvious that it must be the graph itself.

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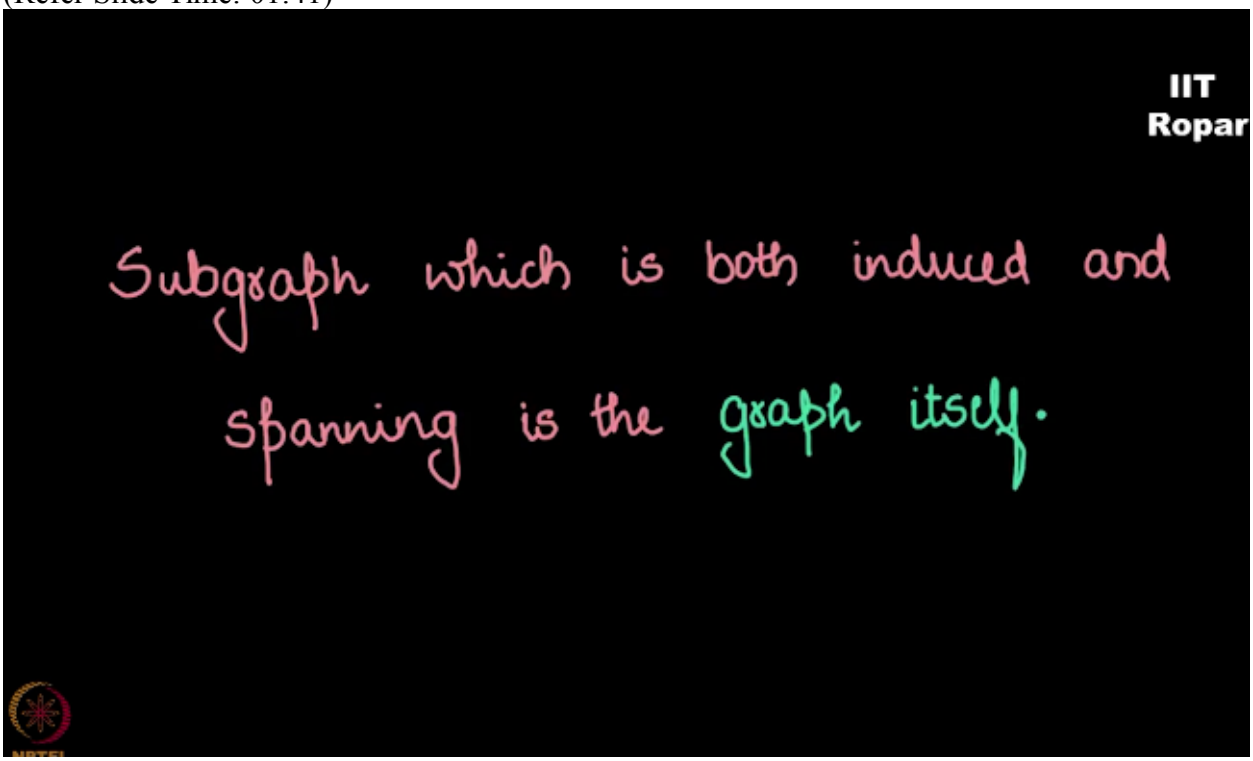

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