NPTEL

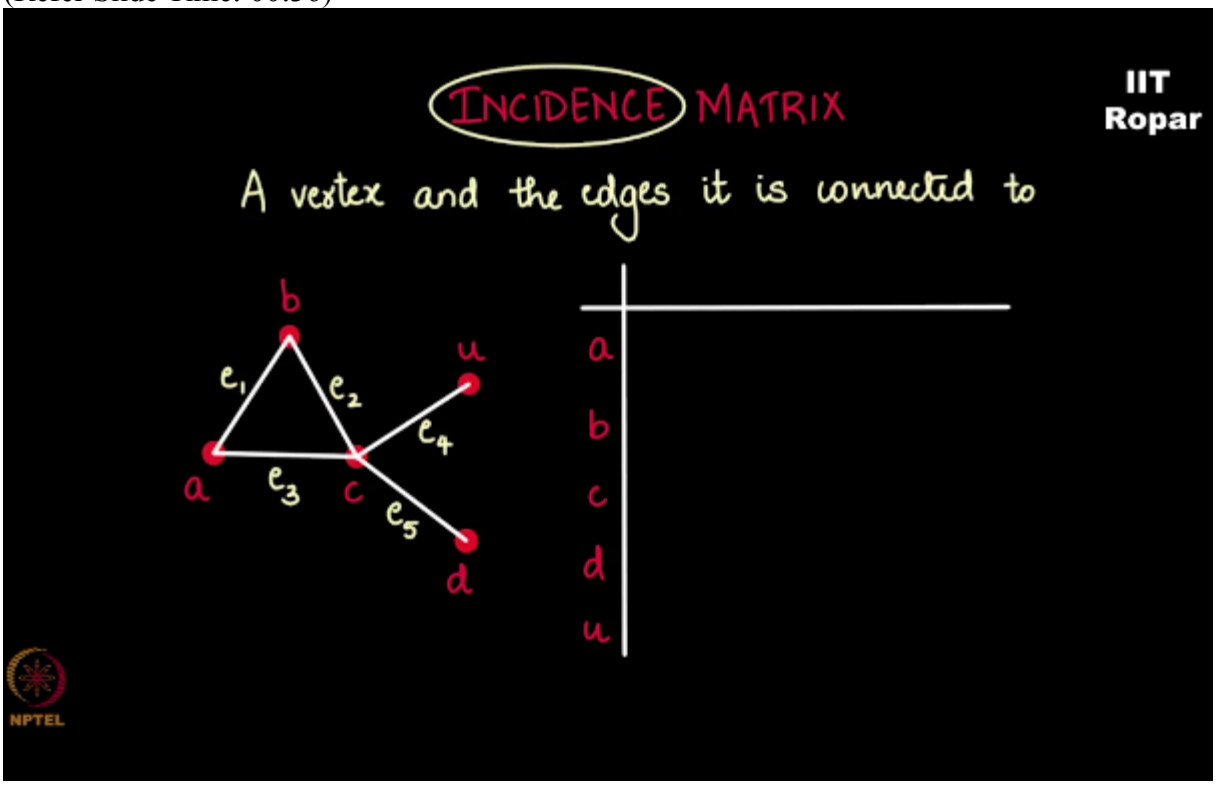
NPTEL ONLINE CERTIFICATION COURSE

Discrete Mathematics
Graph Theory - 2

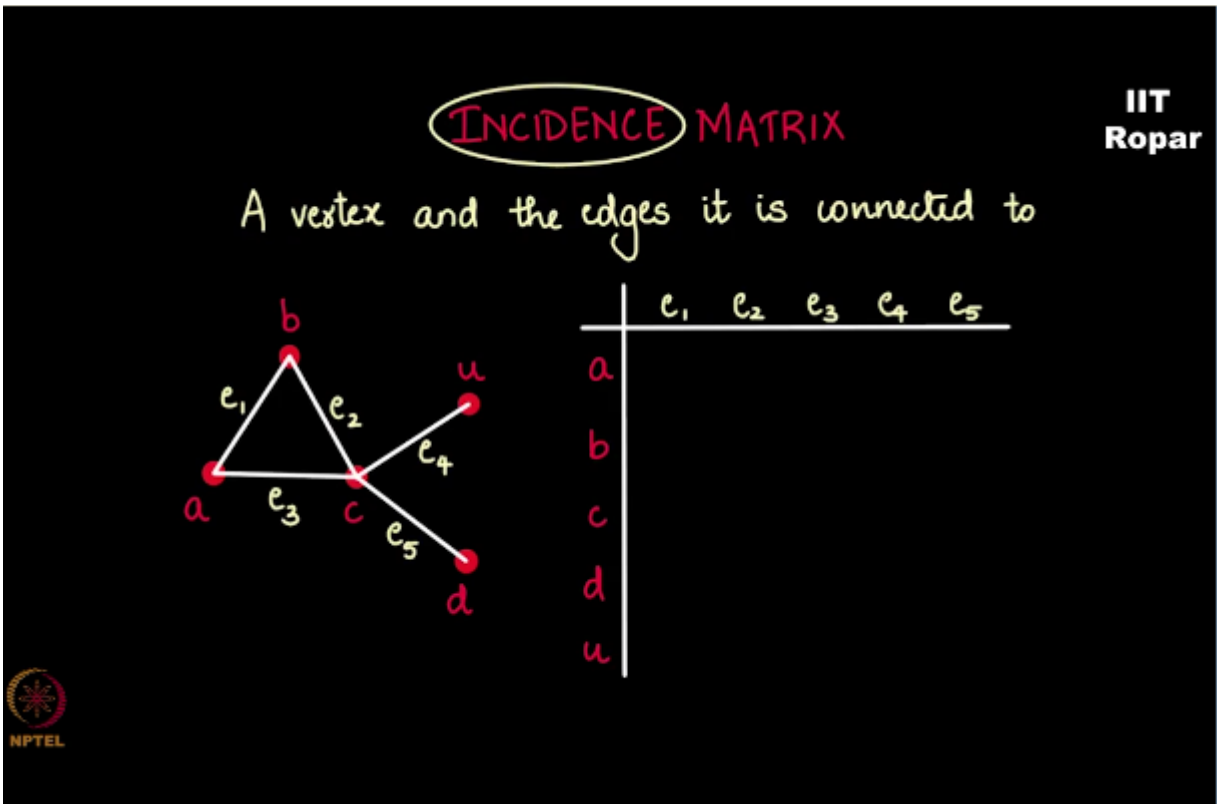
Incidence matrix representation

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

We have seen what is an adjacency matrix, now we'll be seeing something called as the incidence matrix, the word incidence has several meanings but what we mean here is a vertex will be addressing the vertex and the edges which it is connected to, what do I mean by that? Now look at this table, here I'm going to write all the nodes, vertices,
(Refer Slide Time: 00:36)

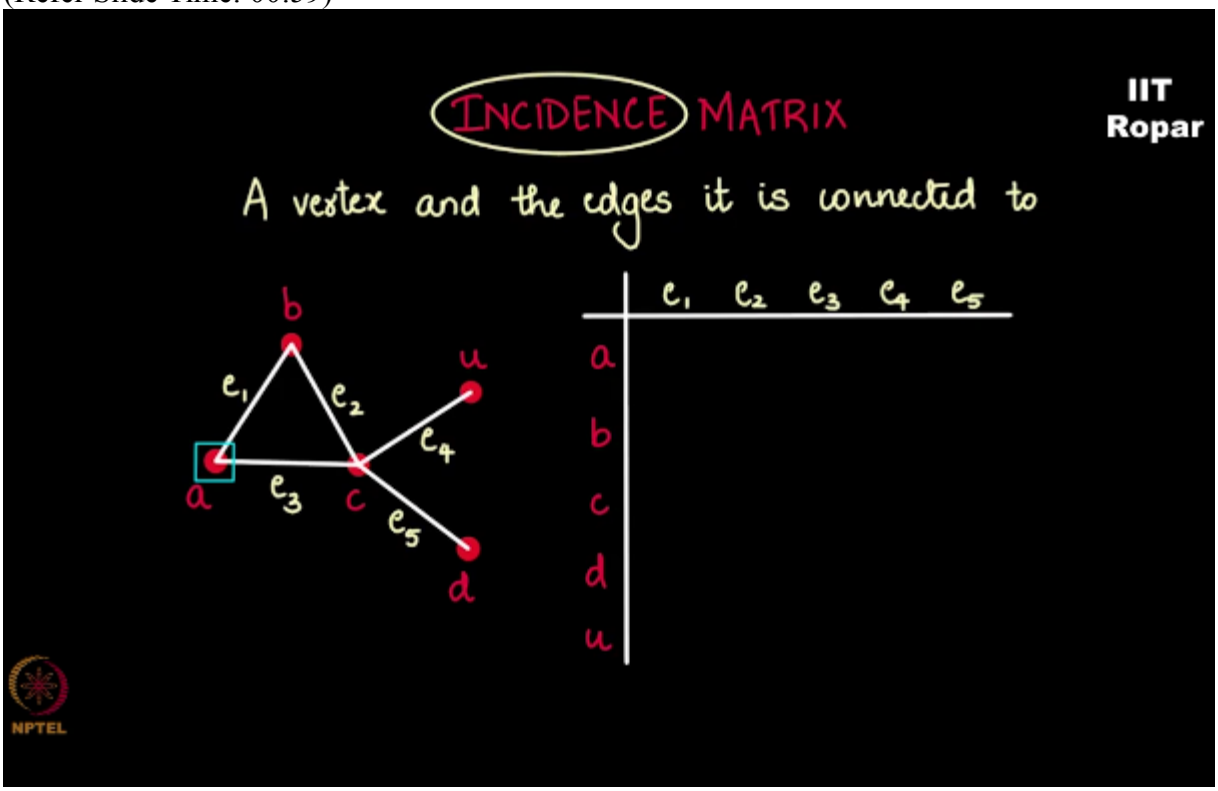


and here in this row I'll write all the edges,
(Refer Slide Time: 00:41)

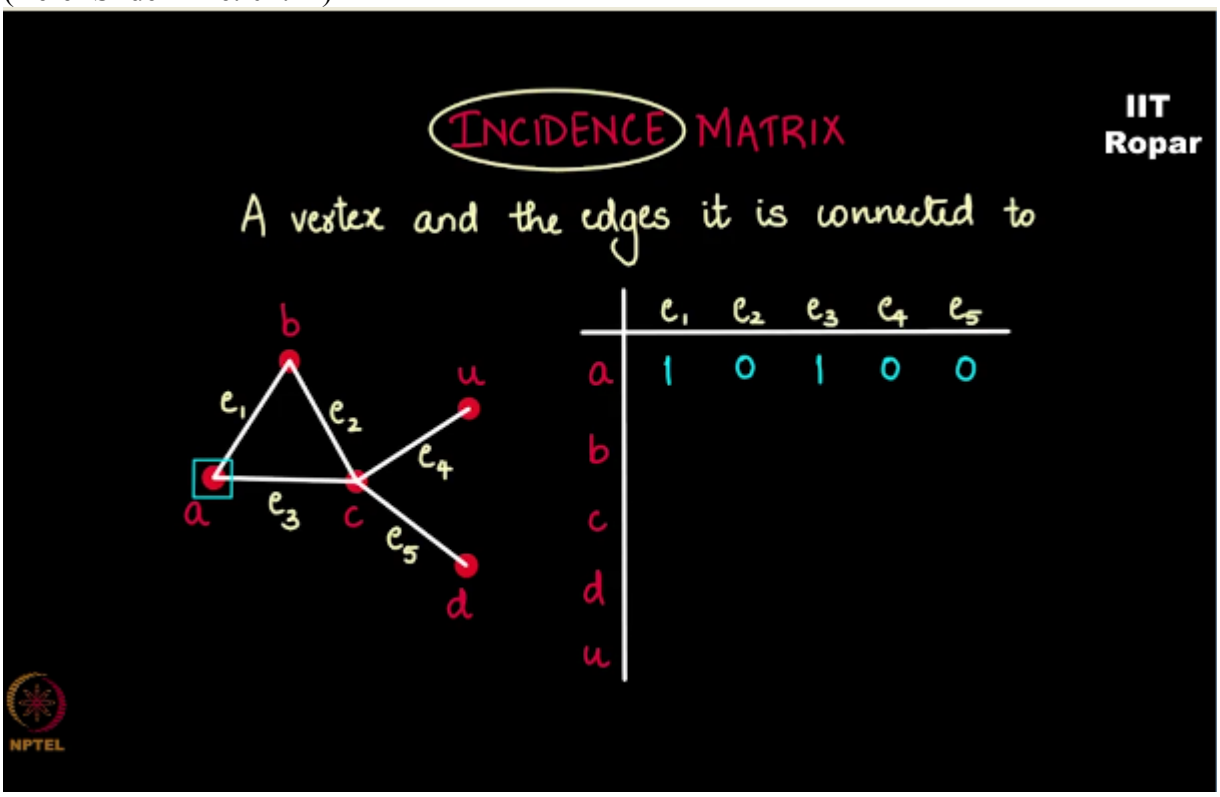


so look at the graph, A vertex A is connected to or it is incident to E1 and E3, but it's not incident to E2, so do you see what I mean by incidence

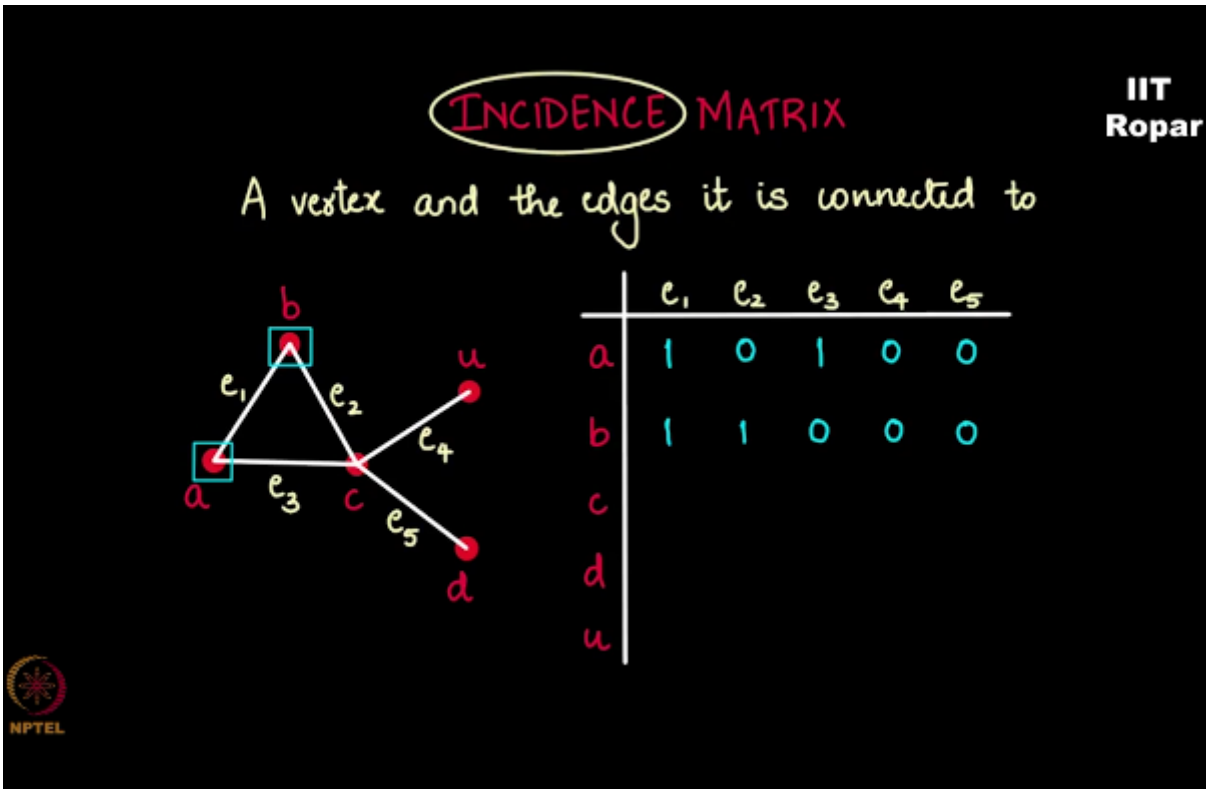
(Refer Slide Time: 00:59)



it E1 and E3 have an endpoint as A, right, so A in the table A E1, here it will be 1, A is incident to E1, as well as E3, so both of these places will get 1, whereas the rest will be 0.
(Refer Slide Time: 01:22)

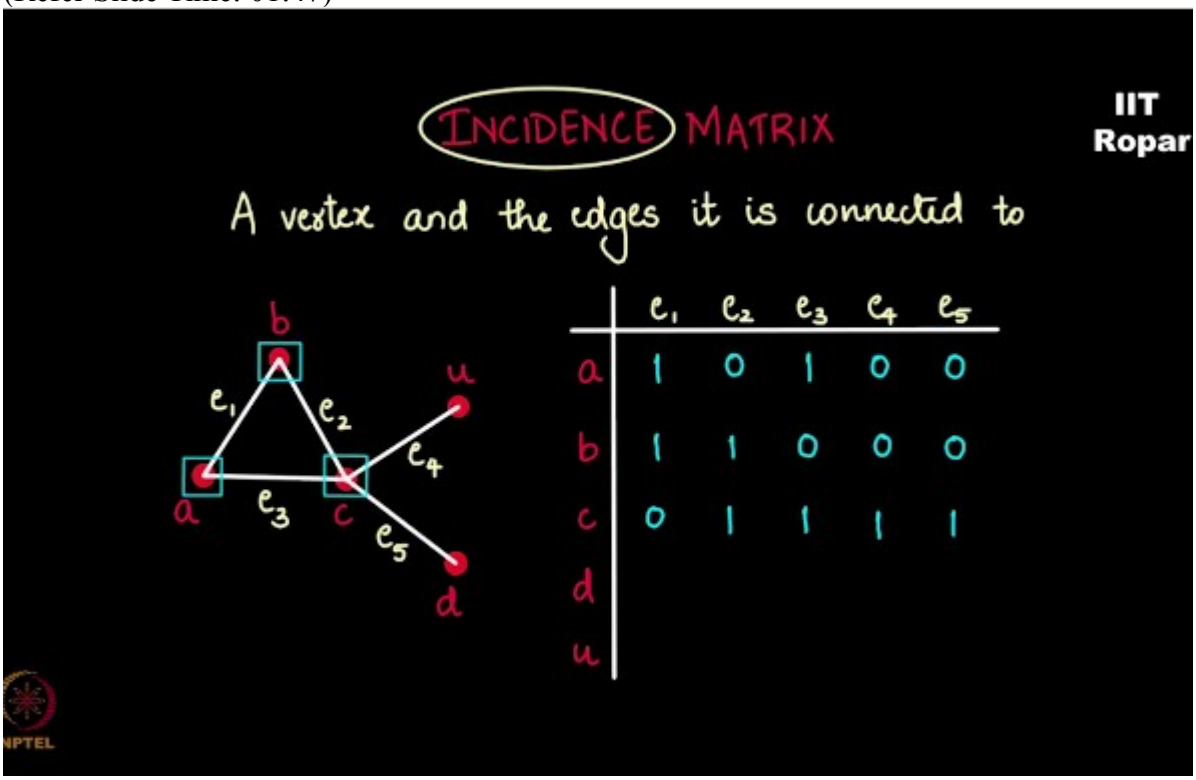


Now let us come to B, the vertex B is incident to E1 and E2, so E1 and E2 get a 1 and the rest zeros,
(Refer Slide Time: 01:33)

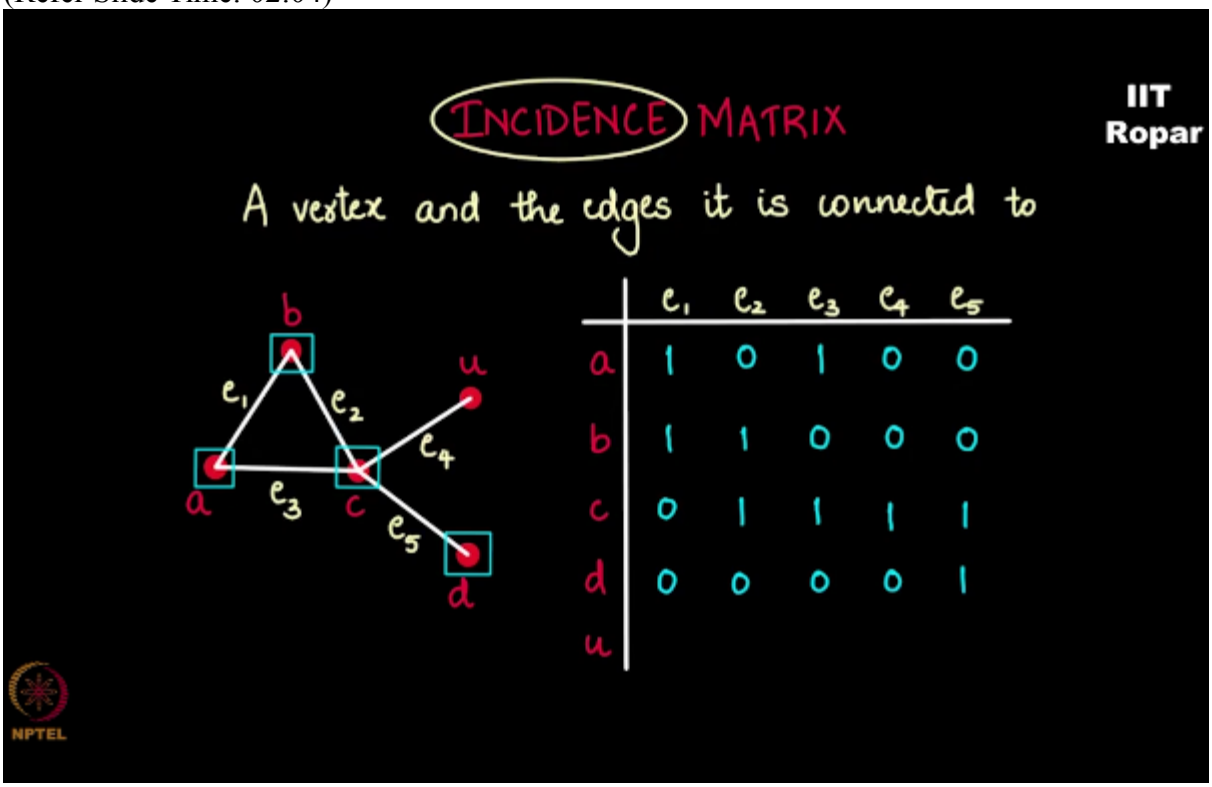


now the vertex C is incident to E2 and E4, and E3 and E5, so all these are 1 except E1 which gets a 0,

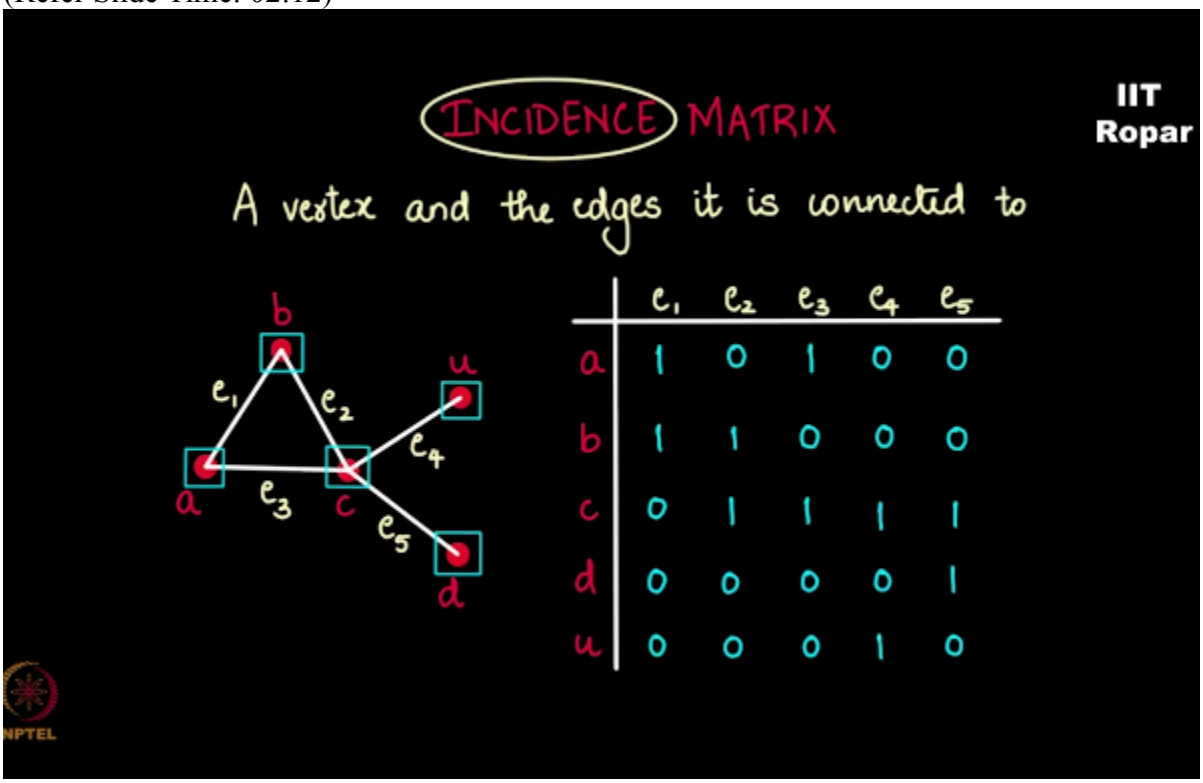
(Refer Slide Time: 01:47)



C is not incident to E1, the vertex D, let us take the vertex D, this is incident only to E5 rest are 0s, E5 and D this is 1,
(Refer Slide Time: 02:04)



and the vertex U is incident only to E4 and the rest are 0s,
(Refer Slide Time: 02:12)



so this is called as an incidence matrix, again here it was written as a table but in the future we'll be writing it as a matrix.