NPTEL

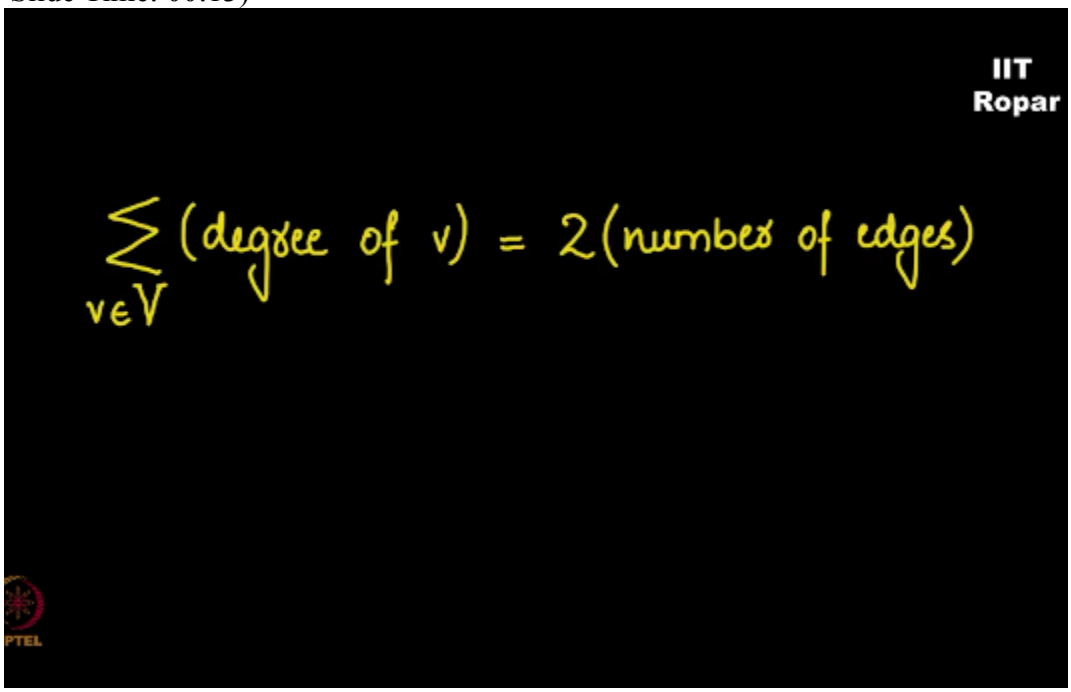
NPTEL ONLINE CERTIFICATION COURSE

Discrete Mathematics
Graph Theory - 1

Relation between number of edges and degrees – Proof

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

So summation of degree of all the vertices where V belongs to the vertex set is 2 times the number of edges,
(Refer Slide Time: 00:13)



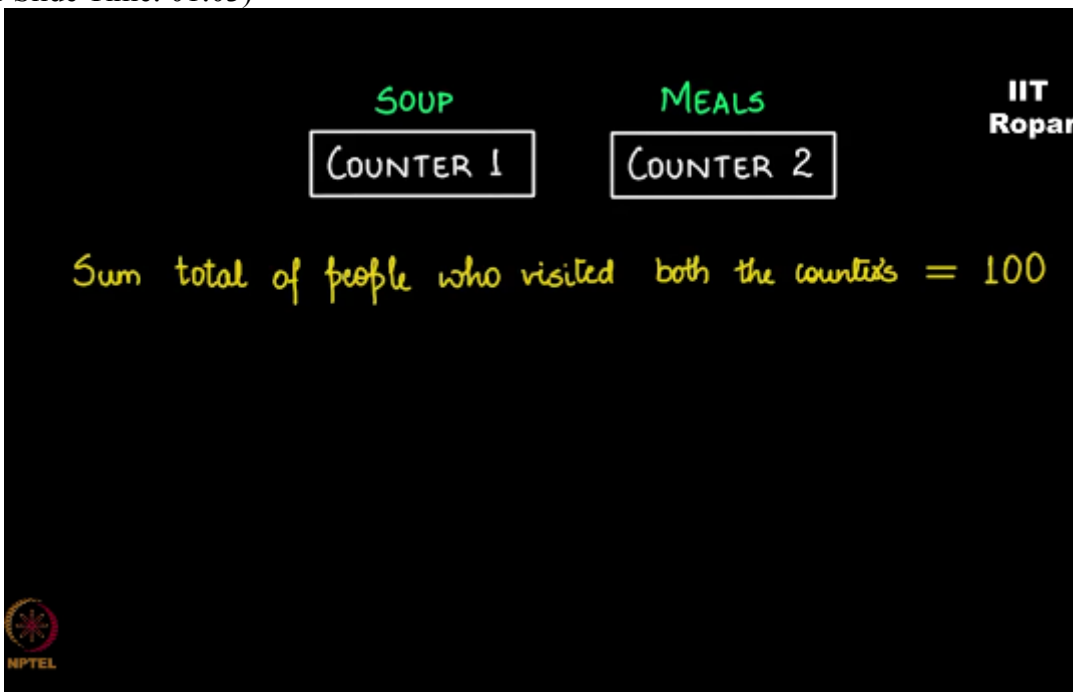
isn't this obvious as I have been telling and as you are seeing. If you take the sum of the degrees of individual notes you will be counting an edge twice, correct? Let me give you an example, assume there are two counters and every single person goes to both the counters
(Refer Slide Time: 00:38)

let the first counter be soup counter where soup is being served
(Refer Slide Time: 00:44)

and the second counter is the main meals
(Refer Slide Time: 00:48)

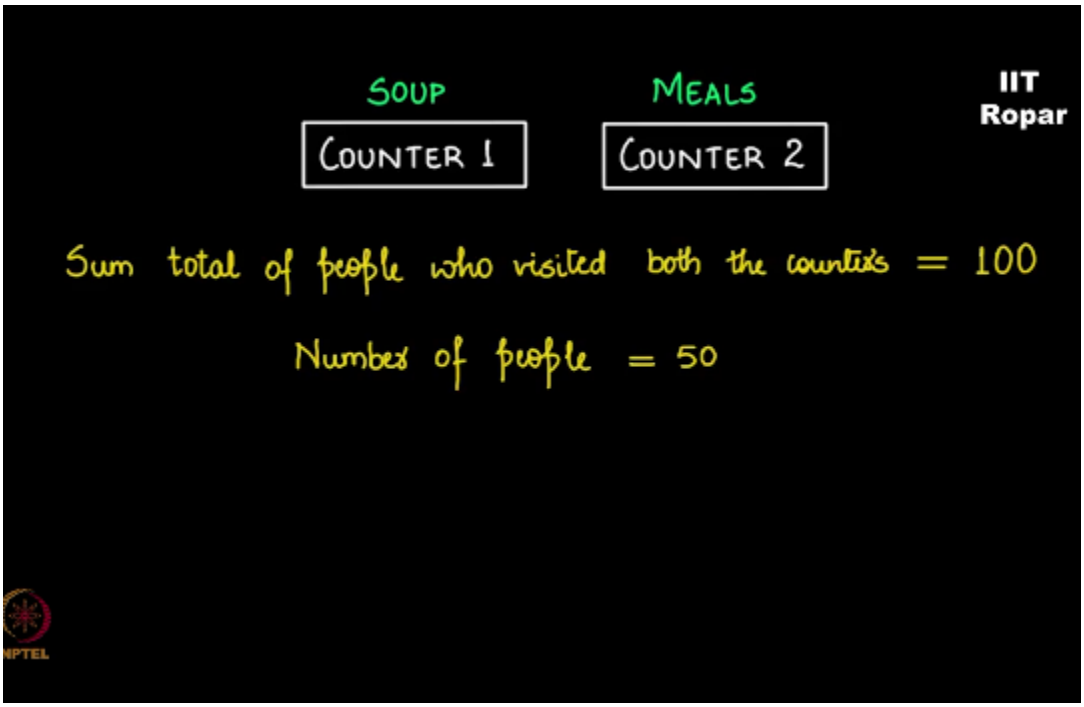
so that every single person goes to both the counters, and they are keeping a head count of people in both the counters, and if someone tells you the sum total of people who visited both the counters put together is 100

(Refer Slide Time: 01:03)



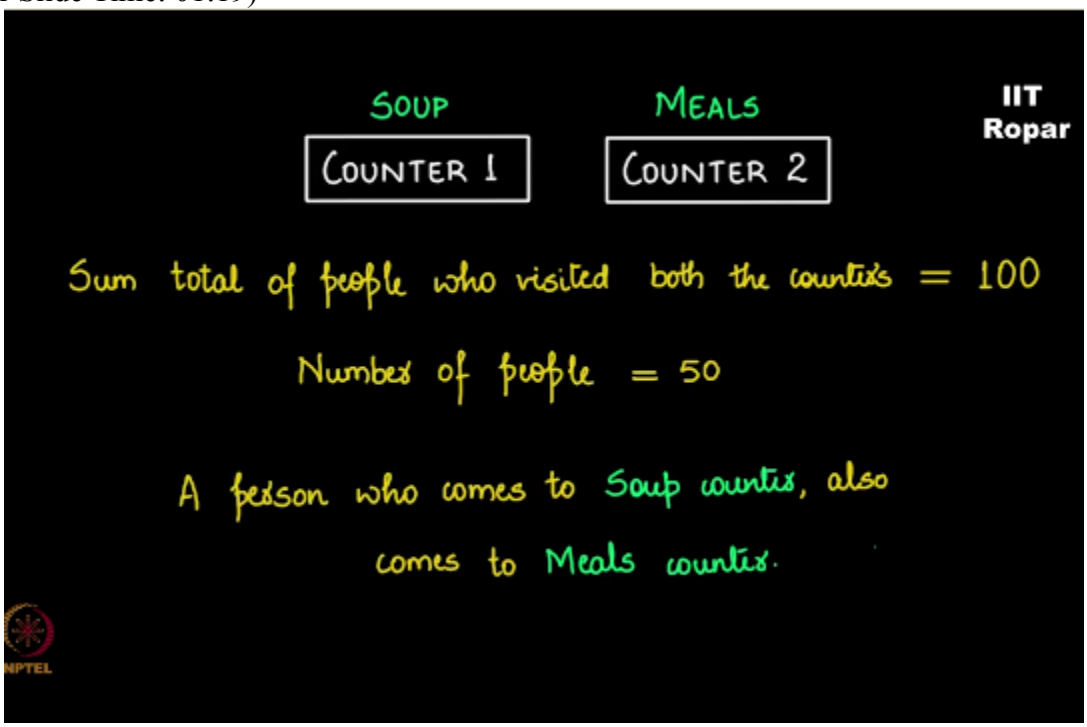
you know very well that the number of people is actually 50,

(Refer Slide Time: 01:07)



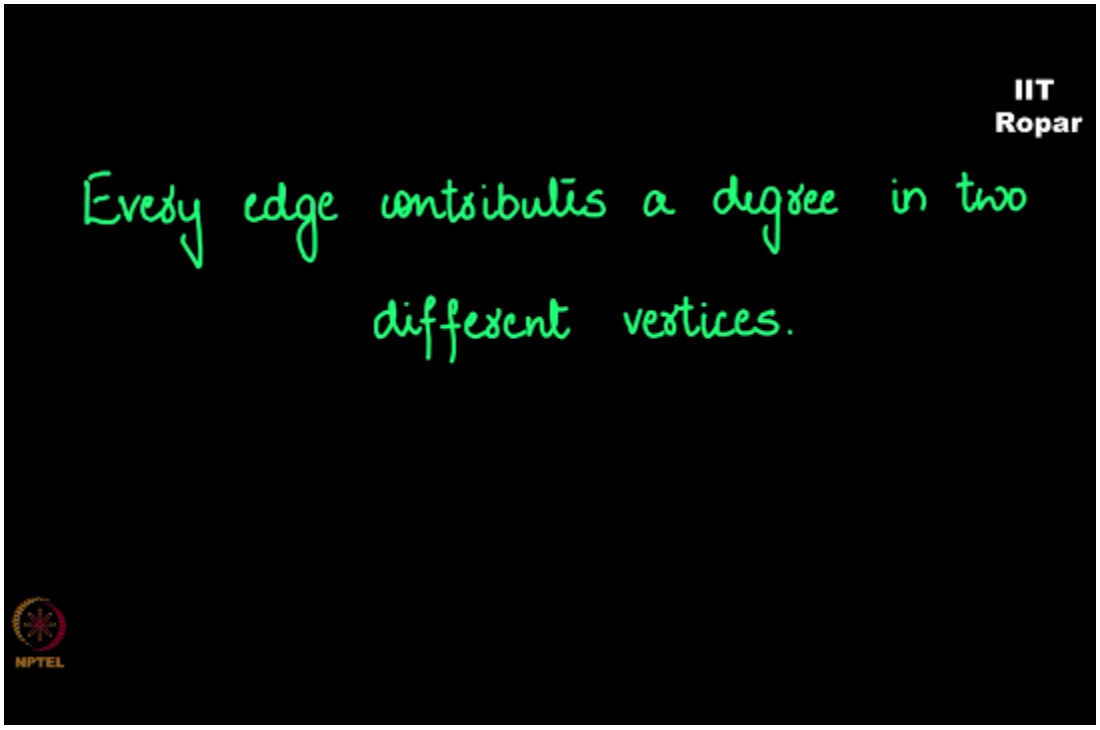
why? You know for sure that you are counting by, over counting by 2 folds here, because a person who comes to soup shop also comes to the meals place, right.

(Refer Slide Time: 01:19)

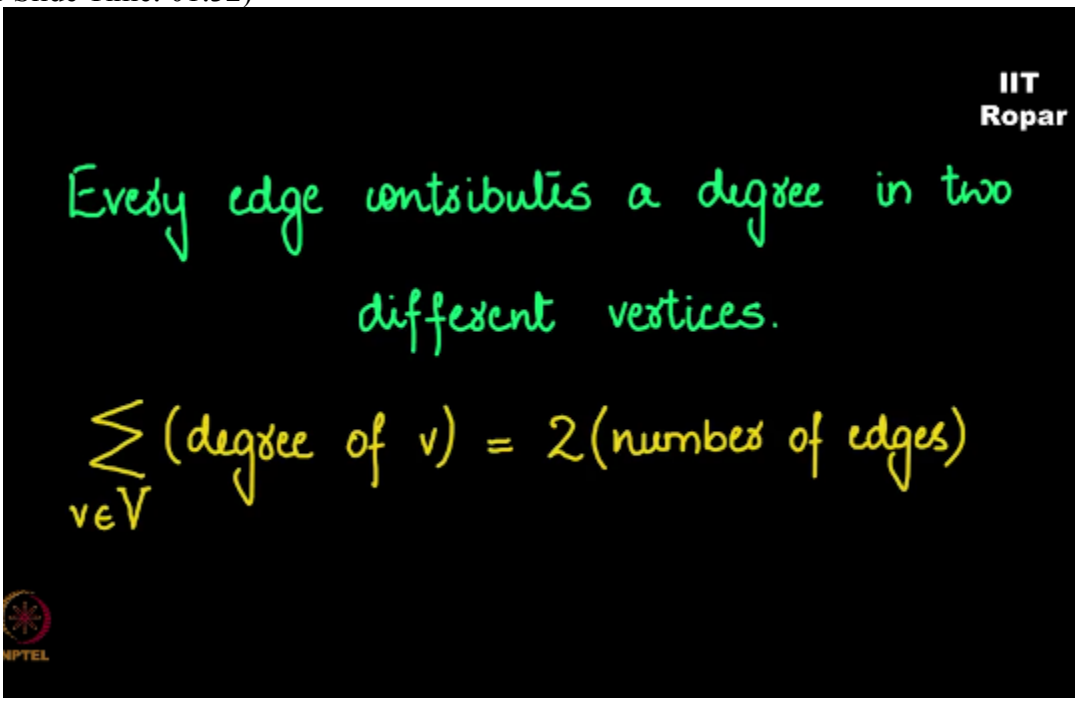


Similarly, every edge contributes to a degree in two different vertices, right,

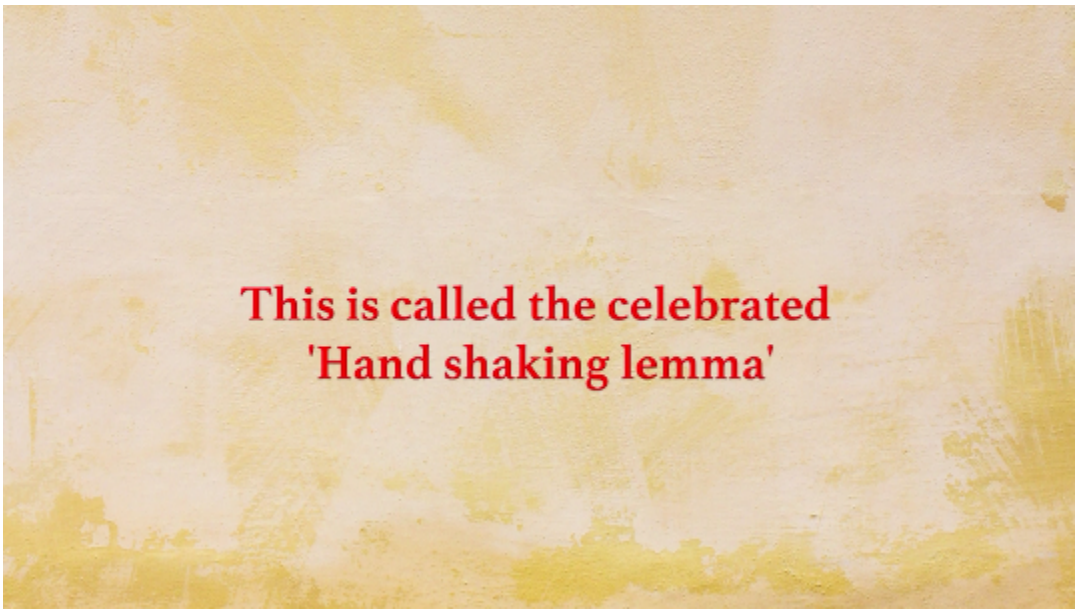
(Refer Slide Time: 01:26)



which means the sum total degree should actually be counting the total number of edges twice
(Refer Slide Time: 01:32)



and hence sum of degrees of all possible vertices V is 2 times the number of edges.
(Refer Slide Time: 01:43)



IIT MADRAS PRODUCTION

Founded by
Department of Higher Education
Ministry of Human Resources Development
Government of India

www.nptel.iitm.ac.in