Social Networks
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Cascading Behavior in Networks
Lecture – 91
Modeling Diffusion (Continued)

So, I hope you have correctly solved it. So, the answer is very simple. Sitting in library the payoff is 2 and you have 12 friends. So, it gives you a total payoff of 24. Going outside and having fun the payoff you get is 3, but you have 9 friends. So, you get a total payoff of 27.

So obviously, the second is better, and, in this case, you go outside and have fun. So, here we talked about one person how do you weigh your options. Let us define it a little bit more rigorously. So, I will use some mathematical notations.

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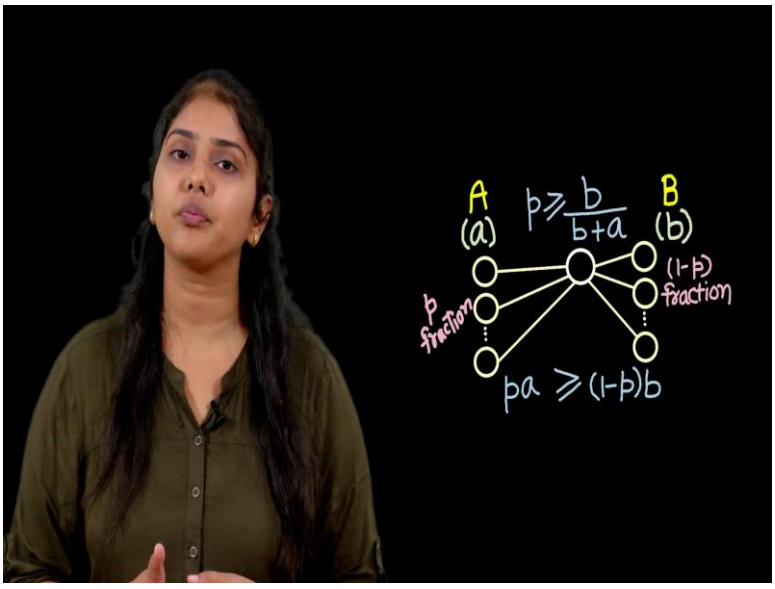

So, assume that you have 2 choices, 2 actions A and B: capital A and capital B. The payoff associated with doing capital A is small a and payoff associated with doing capital B is small b. And then you have friends, so let us say B fraction of your friends have adopted capital A remaining 1 - p fraction of your friends has adopted the action

capital B. So, what is the payoff you get if you adopt capital A is p * a and what is the payoff you get if you adopt capital B is (1 – p) * b.

So, simple mathematics tells me that if you want to adopt A what should happen. If you have to adopt A, if the product A has to be adopted if the action A has to be taken p * a >= (1 – p) * b, which says that p >= b/(b + a).

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So, here you go to a value of p. So, the value of p is this much fraction of your friends have adopted A, you also adopt A. So, you kind of have a threshold here. Let us say the value of p here is 40%, 40/100; it means that if you have 100 friends if 40 of your friends adopt A, you will also adopt A you will see a very nice concept here.

So, let us say this 40% is associated with going outside. If 40% of your friends come and they tell you that they are going outside, you also go outside. And for going to library it is 60%, if 60% of your friends go to library, you also go to library. So, what is happening here?

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Assume that you have 10 friends, out of these 10 friends 4 should go outside for you to get outside. So, let us say let us look at it sequentially. One of your friend comes and tells you that he is going outside and previously you have decided that you will study in library and then one of your friend comes and tells you that he is going to go and have fun outside. You will not be bothered much.

Then second of your friend comes and then tells who is going to go outside, you will be like fine. Third of your friend comes and tells you he is going outside, you little bit feel that, so many people are going outside I should also go, but still somehow you refrain yourself because, you want to complete that assignment. But, then when now this fourth friend comes and tells you that he is going outside your mood gets completely changed you get ready and hang around with them. So, this phenomenon is known as social reinforcement. When more and more people come and tell us about something, we will tend to believe that information.

Let us extend this scenario from our self to the complete network. So, in the complete network it is not just one person who is deciding what to do everybody. So, it is not just we who are looking at each other and following them. It is like everybody is looking at each other and weighing their options and getting impacted by what others are doing and they are doing something. So, how does this complete thing operate?

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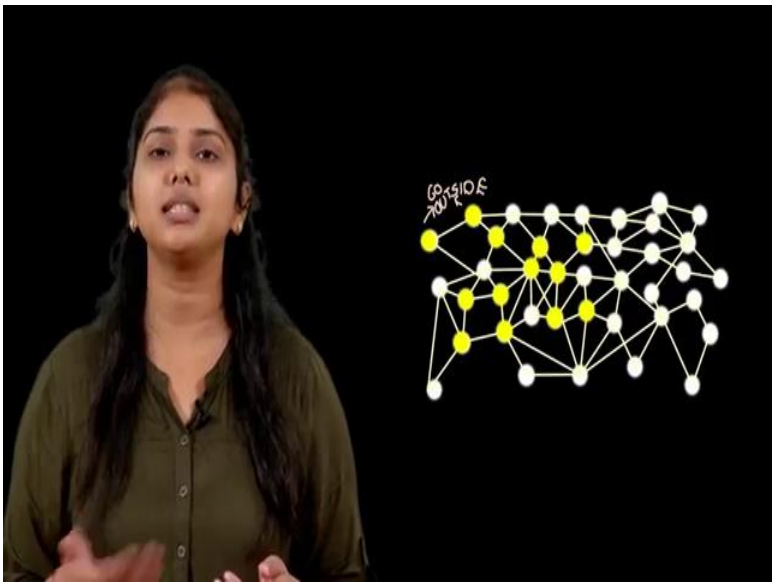

So, for understanding it nicely let us again take the same example, there is this class of 40 people let us say and they all have the they all are friends, their friendships between them and they all have this pending assignment on Wednesday. And the entire class has decided each and every student in the class has decided that they are going to sit in the library and complete this assignment. But what happens next is there are these 2 outrageous people in this class who says that we will do the assignment later, we are going to go outside since it is a Sunday and have fun.

So, the 2 nodes in this network they flip, and they change their mind from doing the assignment to going outside and having fun. And now what happens? Now everybody is kind of start changing their opinion. So, where everybody wanted to sit and work on this assignment, they look at these 2 people and see that they are going outside, the things in the class start changing.

So, every person one by one looks at these 2 people; one person might look and then decide fine, these two people are going outside I will also go outside and have fun with them. And then other person and then other person, so the entire class which has actually decided to sit for the assignment and do it, people start changing their mind and many of them start going outside. So, this is how it happens.

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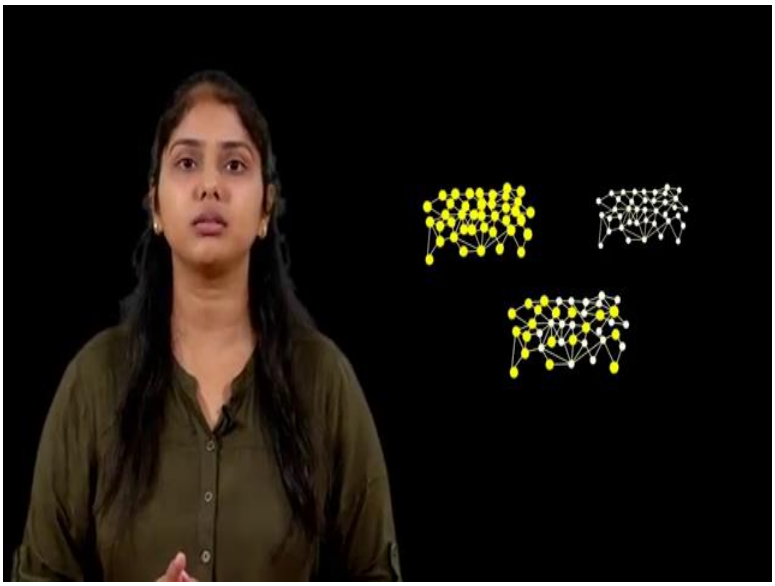

So, what do you think will happen at the end? What will, how will this network stabilize? Will everybody at the end go outside and have fun and nobody will be doing the assignment or people will keep flipping, flipping and ultimately the people who have thought of going outside and have fun they also change their mind? All of them sit together and do assignment or a third option what can be the third option? So, the third option is there emerges 2 parties in this class.

So, one party goes to the library and do their assignment and second party go outside and have fun, so it is also possible.