Project Planning & Control

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Lecture – 18

Lesson - 06

Representing Results in a Bar Chart, AON Example – 2

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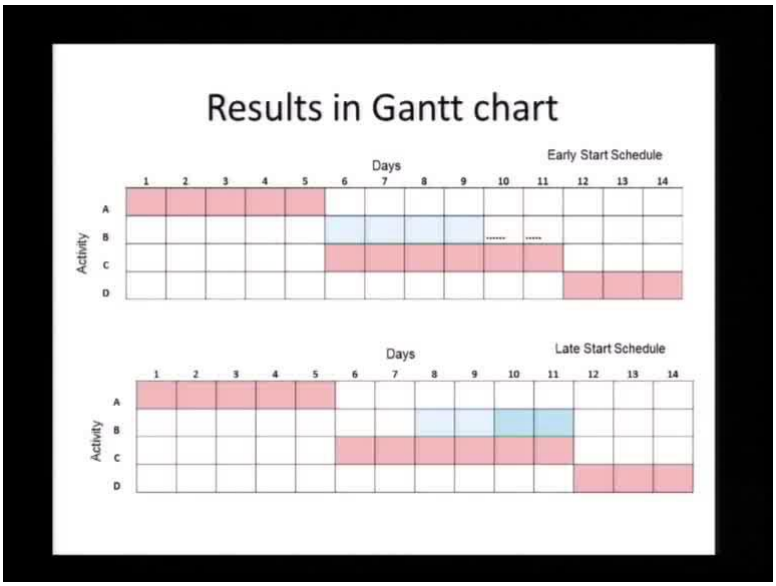

We come into a bar chart, so whatever; however we do the analysis, it is nice to see the results in a bar chart, because you will see that you can interpret more things when you see it in a bar chart. So, this is the same results in a bar chart, where you have an activity you can see A, B, C, D. Activity A takes five days; you can see it is the start of the first day to the end of the 5th day. Activity B, it is in a light blue here, it starts activity B and C… Now, you cannot see the relationship logic here, but because we have got the results out of the CPM we can put it into the bar chart and here is B stating at the beginning of the 6th day ending end of the 9th as it put there.

Activity C, finishing at the end of 11 and activity D starting at the beginning of 12 and going all the way to 14. Now, these we have seen that this, what we call there is activity B, so this is the early start schedule. Now, if I am going to the late start what happens.

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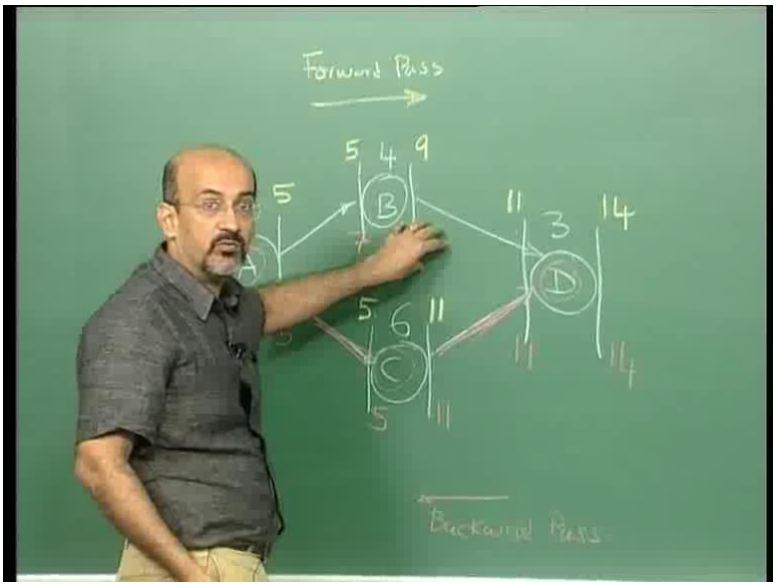

So, I can move B, the only thing I can do when I move to late start is to move B by the, to all the way to 11 and if I move B all the way to 11, is the project is still okay. So, I can visualize the late start schedule also on the bar chart and as we get into more complex networks and schedules, you will find that the ability to move in the bar chart, the ability to move an activity around between it is late start and it is early, or we know, gives a lot of flexibility in where resources are to be allocated. So, we will use this a lot more in the resource allocation feature. Any questions?.

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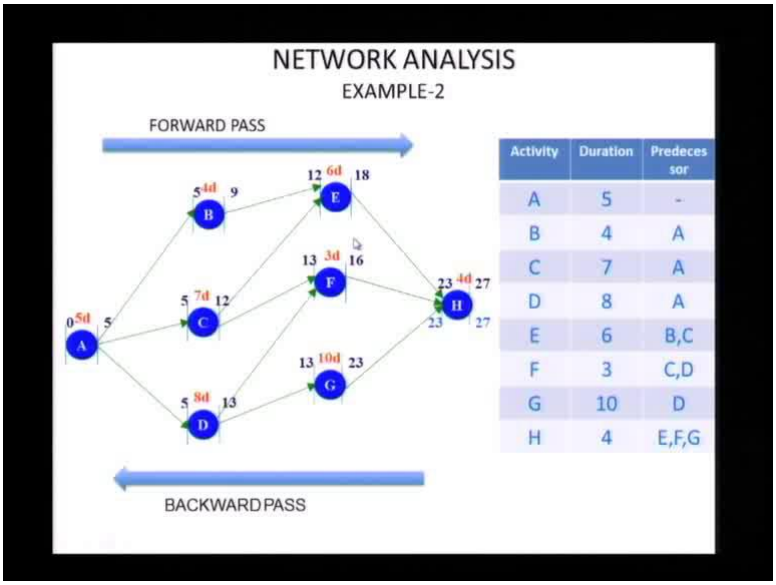

So, let me give you an another problem to do, this is a slightly larger network. Activities A to H, you have the duration you have the predecessor, can you do the analysis for this

environment. So, let us go with the networks, so I have activity A, B, C, D, E, F, G, H, so my relationships are B follows A. So, these relationships are seen by wherever I have this, so I have B, C, and D with A as predecessor. Now, I have E here; it has both B and C as predecessors and F have C and D as a predecessor.

Now, I come to G, it only has D as a predecessor, I come to H, it has E, F, and G as the predecessor. So, this completes the network, so what the predecessor relationship to the activities has been represented here. Now, we put in the durations as we did it manually, I am using the same notation here, I have all the durations now along with all the activities, and now I start the forward pass. So, with 0, 5 and now all of these can start at 5, and this will go to 9, 12, 13.

So, now where should E, 12; because it is predecessors are B and C, C only finishes by 12, so it has gone to 12 and then, F has 12 and 13 as predecessors, so it is 13. G has, it has only 13 as a predecessor. Now, E will finish at 18, 16 and 23, so now, H has three predecessors, and we have to; obviously, start with the last one, the one and finishes at 27. Any questions? So, now, if you wanted to come up with a way of, so what we did here is a forward pass and what we calculated was the early times.

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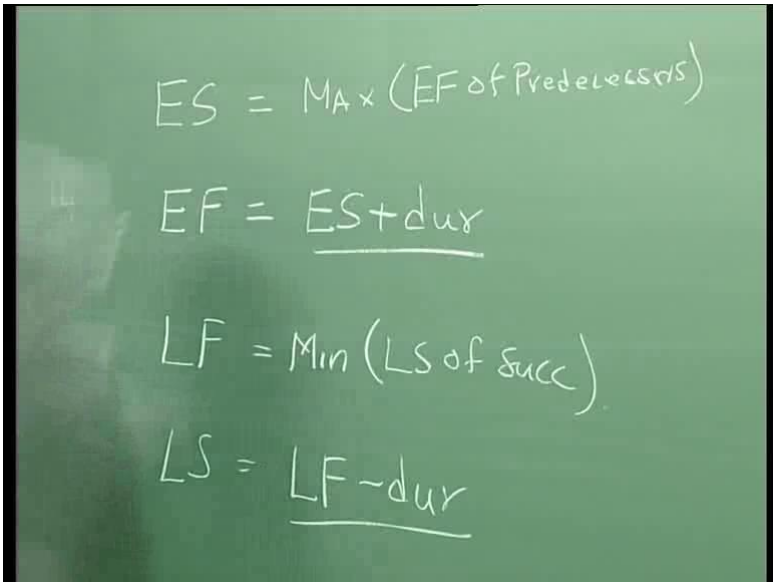

We calculated the early start and the early finish. How would I, what would the formula if I wanted to come up with some kind of formula, what would my formula for an early start and early finish, either predecessor or successors.

Student: ((Refer Time: 05:37))

$$ES = MAX\ (EF\ of\ Predecessors)$$

$$EF = ES + dur$$

$$LF = Min\ (LS\ of\ Succ)$$

$$LS = LF - dur$$

So, basically it is a max of an early finish, it is not a formula, but it is a notation. What about the early finish? Early start plus duration, so this is the logic you are applying to calculate this, and the only place the logic gets tricky is, when you how to find out what is my maximum of predecessors and when you get a complicated network, away actually calculated all my predecessor parameters. Now, we go on to the backward pass, so we will find that this has to complete on 27, we are fixing that working backward, goes to 23. So, what is the latest finish?

So, all of these can finish as late as 23 without compromising the project duration. So, all of this can finish as late as 23 and now, I again calculate back to the late start. So, when I am calculating backward pass we first calculate the late finish, then go to the late start. So, I have 17, 20, 13; now I come to the late finish 17 C, C has two, it has 17 and 20 as successors 17. D has 20 and 13, 13. Now, further back whether we know to the late starts 13, 10, 5 and A has now 13, 10, five as successors 5.

So, now, I am going to ask you; obviously, for the late finish equal to the minimum of a late start. So, this ((Refer Time: 08:21)). Any questions on this?

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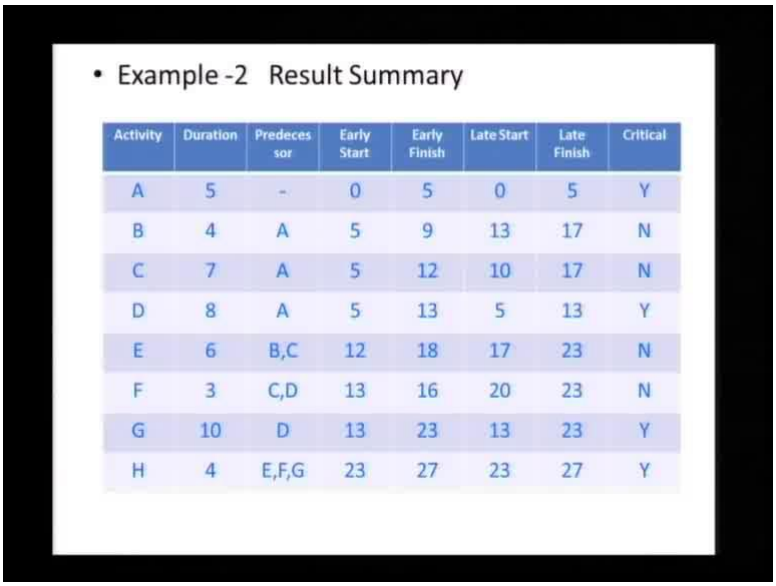

So, here you have all of the parameters. Actually, I should take you back here ((Refer Time: 08:36)) and ask you, so we know project duration is 27, you can make out what is critical here without any calculation, which is critical. What are the critical activities? A, D, G, H and you can see in A, D, this chain of activities all of the early parameters and the late parameters are the same; that means, any delay to any of these activities will delay the project whereas on the other chain, any of the any, I mean there can be delays by varying degrees and this is really the subject of a lot of discussions, which we will take up when we discuss the slacks and floats.

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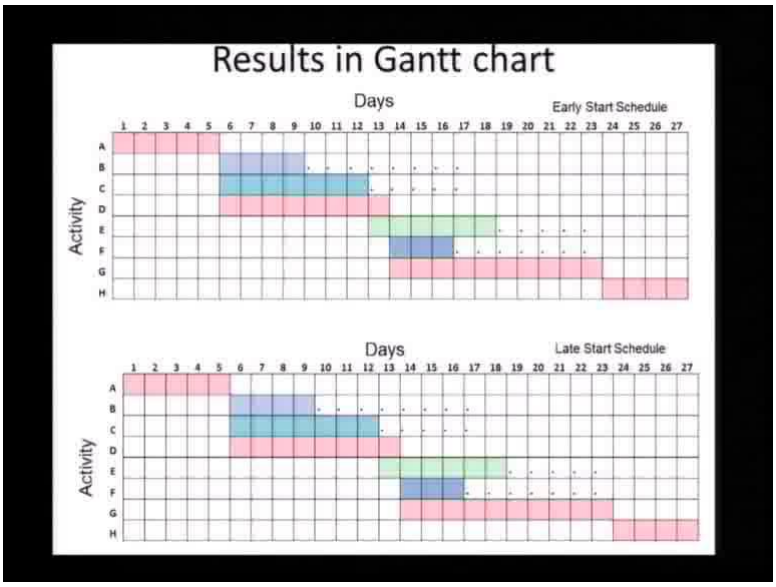

Now, the same project can now be represented in a bar chart; same results can be represented in a bar chart and the activities in pink are the critical activities. The others you can see the amount of delay they can have, but can I for example start moving one of these activities all the way to end, what will be the impact?.

Student: It will be the succeeding activity.

Yes, the succeeding activity will have to get delayed, only then. So, if I delay for example B, and I go back to the network; obviously, ((Refer Time: 09:59)) it will impact E. So, if I delay B here, E will also move down, I cannot delay B without after, I mean beyond a certain stage. So, how much can I delay? So, here is an interesting question, how much can I delay B without delaying E. So, if I am going with my early finishes 9, an early start is 12, so if I can go three days from the early parameters of B without delay E.

If I go by the fourth day, E will start getting the impact, unless I of course, move E all the way to start at 17. So, there is a lot of play here which project managers used to be able to schedule resources to be able to… They have to share resources between activities, this is the kind of play they use, and this is the all about slack or float, and this is something one has to understand very well to be able to utilize resources effectively on a project. So, now, here is the early start schedule of this project and here it is a late start schedule, I do not think that is common.

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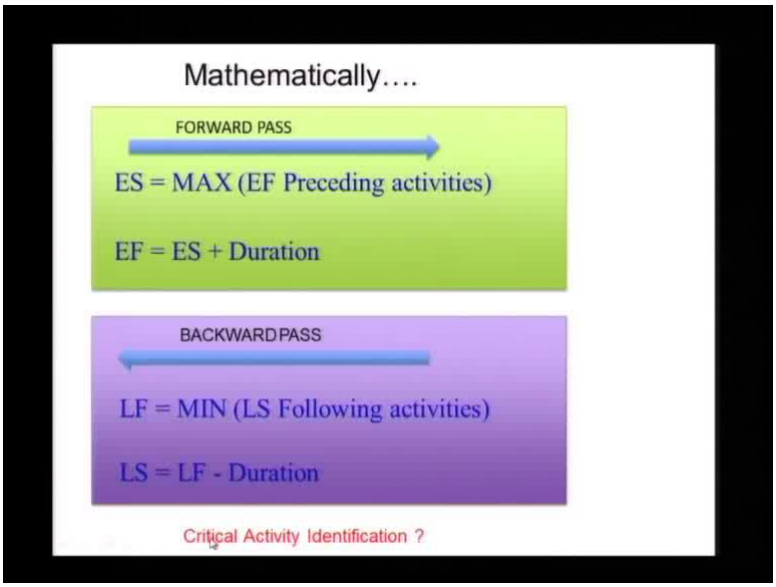

So, we discuss this. Also, we had the forward pass; we discussed these two formulae. We also discussed the backward pass and we right now identified critical activities, because the network was simple and we were able to see easily which activities are critical. But, in the next lecture what we will talk about is, we will complete some of these issues in more detail, will talk a little bit about sequencing, but will take up the important issue of floats and discuss that in detail. Any questions?

Okay, Thanks.