**Project Milestone 3 - Summer 2020**

**Network Diagrams**

**2205 MSA 6600 6E1 502W LEC 43109**

**EHR implementation of a web portal with a database at**

**Catskill Family Practice**

**Project Manager (BSTC)**

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**Summer 2020**

**Bowling Green State University, Ohio**

**Network Diagram**

Understanding criticality about completing the project on time I would like you to give and brief information about network diagram and how it helps in tracking the project. Before estimating the given time without any plan of the activities we have estimated the project to be completed in 1 year but during the planning process the management process has become more complex and there were multiple activities and dependencies are interlinked to the delay. By using a network diagram, we can able to see all the activities with information about each activity like what are the dependencies for the activity before getting started. This detailed view will help in identifying the opportunities which can overlap while starting an activity for accomplishing the project.

**D**

**A**  **B C**  **G H I**

**E F**

Above shown picture indicates the network diagram of the EHR implementation project. Activity A has no dependency but it is dependent for Activity B and the activity B is dependent for C, D, E and F. Activity G and F has a dependency in C and E but Activity F has a dependency of B as well. Activity H has 3 dependencies i.e. D, G and F but the activity I has only 1 dependency i.e. I

Step by step process

* The Network diagram shows it has 9 activities named from A to I
* The starting activity is A and the ending activity is I
* After A has been completed, activities B can commence.
* Activity B is the predecessor of 4 activities, C, D, E, F. It plays an important role and it should be tracked timely so that there is no delay in the project.
* Activity G can be started once both C and E are completed.
* Activity F can be started once all three B, C and E are completed.
* Now Activity H can start only after all three-D, G, F are completed.
* Activity H need to be completed before Activity I can start.

**Slack time**

Slack time helps in allocating the resources based on employee performance and experience on the work. From below table, only 3 activities have slack time, i.e. C, D and G. These activities have additional time to complete the work and the project will not be delayed if the activity is completed within the slack time. If the slack time is high, then there is a possibility to reduce the required resource for completing the particular activity.

|  |  |  |
| --- | --- | --- |
| **Activity** | **Duration days** | **Slack time** |
| A | 4 | 0 |
| B | 4 | 0 |
| C | 3 | 3 |
| D | 3 | 6 |
| E | 6 | 0 |
| F | 3 | 0 |
| G | 1 | 2 |
| H | 6 | 0 |
| I | 5 | 0 |

**Critical Path**

The critical path is determined to identify the activity which needs to completed within the given timeline in the plan. Using Critical path, we can have a clear idea when the activity needs to be started and how long each activity will require to be completed. Critical path identifies how much time a project requires to be accomplished.

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| --- | --- | --- |
| **8** | **D** | **11** |
| **14** | **3** | **17** |

|  |  |  |
| --- | --- | --- |
| **0** | **A** | **4** |
| **0** | **4** | **4** |

|  |  |  |
| --- | --- | --- |
| **23** | **I** | **28** |
| **23** | **5** | **28** |

|  |  |  |
| --- | --- | --- |
| **4** | **B** | **8** |
| **4** | **4** | **8** |

|  |  |  |
| --- | --- | --- |
| **8** | **C** | **11** |
| **11** | **3** | **14** |

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| --- | --- | --- |
| **14** | **G** | **15** |
| **16** | **1** | **17** |

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| --- | --- | --- |
| **17** | **H** | **23** |
| **17** | **6** | **23** |

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| --- | --- | --- |
| **14** | **F** | **17** |
| **14** | **3** | **17** |

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| --- | --- | --- |
| **8** | **E** | **14** |
| **8** | **6** | **14** |

**Critical path -> A, B, E, F, H, I**

Above shown tables give the information about the critical path in our project. A with duration 4 days. The earliest that the first activity in a network diagram can start is always set at Day 0. Let us now consider B. The earliest A can finish is day 4. B can start only after A has been completed, hence the earliest B can start will also be day 4. B takes 4 days to complete, hence the earliest B can finish will be 4 + 4 = 8 days. Let us now consider D. The earliest B can finish is day 8. D can start only after B has been completed, hence the earliest D can start will also be day 8. D takes 3 days to complete, hence the earliest D can be finished will be 8 + 3 = 11 days. Likewise, in the case of C. C takes 3 days to complete, hence the earliest C can be finished will be 8 + 3 = 11 days. Likewise, in the case of E. E takes 6 days to complete, hence the earliest E can be finished will be 8 + 6 = 14 days. Let us now consider F. The earliest finish for C is day 11 while the earliest finish for E is day 14. Now F can startonly after both C and E are completed, hence the larger of the two finish times (day 14) with being the earliest start for F. F takes 3 days to complete, hence the earliest F can be finished will be 14 + 3 = 17 days. Let us now consider G. The earliest finish for C is day 11 while the earliest finish for E is day 14 and the earliest finish for B is 8. Now G can start only after all three B, C and E are completed, hence the larger of the three finish times (day 14) with being the earliest start for G. G takes 1 day to complete, hence the earliest G can be finished will be 14 + 1 = 15 days. Now for the activity H. The earliest finish for G is day 15 while the earliest finish for F is day 17 and earliest finish for D is day 11. Now H can start only after all three D, F and G are completed, hence the larger of the three finish times (day 17) with be the earliest start for H. H takes 6 days to complete, hence the earliest C can be finished will be 17 + 6 = 23 days. Now for the last activity I. The earliest finish for H is day 23. Now I can start only after H is completed, hence (day 23) will be the earliest start for I. As I takes 5 days to complete, the earliest I can be finished will be 23 + 5 = 28 days. The next step is to do a backward or reverse pass – meaning, we now proceed from right to left starting with the activity I and ending with activity A. We know that the earliest the project can be finished in 28 days, so we set the latest finish time for the last activity I as also 28 days. LF is set as 28 for I, and I takes 5 days to complete. Hence, the latest that I can start will be 28 – 5 = 23 day. Let us now consider H. The latest start for I is day 23. I can start only after H is finished; hence the latest H can finish would be day 23. Hence, the latest that H can start will be 23 – 6 = 17 day. Let us now consider D, G and F. The latest start for H is day 17. H can start only after all three D, G and F are finished; hence the latest D, G and F can finish would be day 17. LF is set as 17 for D, and D takes 3 days to complete. Hence, the latest that D can start will be 17 – 3 = 14 day. LF is set as 17 for G, and G takes 1 day to complete. Hence, the latest that G can start will be 17 – 1 = 16 day. LF is set as 17 for F, and F takes 3 days to complete. Hence, the latest that F can start will be 17 – 3 = 14 day. Let us now consider C and E. The latest start for G is day 16 and for F is 14. G and F can start only after both C and E are finished; hence the latest C and E can finish would be day 14 (lesser than two values). LF is set as 14 for C, and C takes 3 days to complete. Hence, the latest that C can start will be 14 – 3 = 11 day. LF is set as 14 for E, and E takes 6 day to complete. Hence, the latest that E can start will be 14 – 6 = 8 day. Let us now consider B. The latest start for D is 14, C is 11, E is 8 and G is 16. C, D, E, G can only start after B is finished, hence the latest B can finish would be day 8. LF is set as 8 for B, and B takes 4 days to complete. Hence, the latest that B can start will be 8 – 4 = 8 day. Now consider A. The latest start for B is day 4. Now B can start only after A is has been completed, Hence the latest A can finish would be day 4. LF is set as 4 for A, and A takes 4 days to complete. Hence, the latest that A can start will be 4 – 4 = 0 day. All activities with a slack time of 0 are considered to be on the “critical” path if the estimated time of completion for any of these activities are delayed, it has the potential to delay the completion time of the project.The Critical path identified in the project is A, B, E, F, H, I. Time taken for the longest path to complete the project is 4 + 4 + 6 + 3 + 6 + 5 = 28 days.

**Team member**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Activity** | **Name** | **Performance Evaluation** | **Duration days** | **Slack time** |
| A | Neha | Excellent | 4 | 0 |
| B | Jake | Excellent | 4 | 0 |
| C | Crystal | Fair | 3 | 3 |
| D | Joe | Fair | 3 | 6 |
| E | Todd | Good | 6 | 0 |
| F | Dawn | Excellent | 3 | 0 |
| G | Andy | Fair | 1 | 2 |
| H | Mary | Good | 6 | 0 |
| I | Nick | Good | 5 | 0 |

Given team members are allocated to each activity as shown above. Starting with activity A, the project always should have a good start with the positivity created among the team so allocating Neha who has an excellent performance. Coming to activity B, it is the predecessor of 4 activities and should be completed on time and there should not be any chances taken so allocating Jake who has an excellent performance. Then coming to activity C which has a slack time involved so allocating Crystal with Fair performance and the same for G and D as well allocating Joe and Andy respectively. Activity E, H, I has a better timeline than the Activity F. So allocating all good performers Todd, Mary and Nick to E, H and I respectively. Activity F has very less duration and for this, I have allocated Dawn who is an excellent performance resource.

**Reduction of project time**

By looking at the various network diagrams above we have a basic stat which activity is consuming more time and which activity needs to be more focused. Let us deploy new team members who are exceptional at work and they are talented if they are allocated to any activity the duration of the activity reduces to half. Based on the conclusions above activity E and H are consuming the high number of days than any other in the project activities. Assuming activity E and H are replaced with these exceptionally talented team members and check the performance of the project using the network diagram.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Activity** | **Name** | **Performance Evaluation** | **Duration days** | **Slack time** |
| A | Neha | Excellent | 4 | 0 |
| B | Jake | Excellent | 4 | 0 |
| C | Crystal | Fair | 3 | 0 |
| D | Joe | Fair | 3 | 3 |
| E | Tweedledee | Exceptional | 3 | 0 |
| F | Dawn | Excellent | 3 | 0 |
| G | Andy | Fair | 1 | 2 |
| H | Tweedledum | Exceptional | 3 | 0 |
| I | Nick | Good | 5 | 0 |

|  |  |  |
| --- | --- | --- |
| **8** | **D** | **11** |
| **11** | **3** | **14** |

|  |  |  |
| --- | --- | --- |
| **0** | **A** | **4** |
| **0** | **4** | **4** |

|  |  |  |
| --- | --- | --- |
| **17** | **I** | **22** |
| **17** | **5** | **22** |

|  |  |  |
| --- | --- | --- |
| **4** | **B** | **8** |
| **4** | **4** | **8** |

|  |  |  |
| --- | --- | --- |
| **8** | **C** | **11** |
| **8** | **3** | **11** |

|  |  |  |
| --- | --- | --- |
| **11** | **G** | **12** |
| **13** | **1** | **14** |

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| --- | --- | --- |
| **14** | **H** | **17** |
| **14** | **3** | **17** |

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| --- | --- | --- |
| **11** | **F** | **14** |
| **11** | **3** | **14** |

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| **8** | **E** | **11** |
| **8** | **3** | **11** |

**Critical Path -> A, B, C, E, F, H, I**

From the obtained output of the network diagram, we can see our critical path has increased than what it is expected to be. The new critical path would be A, B, C, E, F, H, I. The project would be completed in 22 days and it is 5 days before the previously expected timeline. The major concern looking at the critical path would be Activity C where we have deployed a fair performance resource which Crystal need to complete the work on time otherwise the project would be delayed. Considering this risk let us consider the alternative option for allocating the new team members in different activities. Assuming they are allocated to activity H and I which are the next 2 highest number of days consuming in the project and they might not affect the estimated slack time in the project.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Activity** | **Name** | **Performance Evaluation** | **Duration days** | **Slack time** |
| A | Neha | Excellent | 4 | 0 |
| B | Jake | Excellent | 4 | 0 |
| C | Crystal | Fair | 3 | 3 |
| D | Joe | Fair | 3 | 6 |
| E | Todd | Good | 6 | 0 |
| F | Dawn | Excellent | 3 | 0 |
| G | Andy | Fair | 1 | 2 |
| H | Tweedledee | Exceptional | 3 | 0 |
| I | Tweedledum | Exceptional | 2.5 | 0 |

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| --- | --- | --- |
| **8** | **D** | **11** |
| **14** | **3** | **17** |

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| --- | --- | --- |
| **0** | **A** | **4** |
| **0** | **4** | **4** |

|  |  |  |
| --- | --- | --- |
| **20** | **I** | **22.5** |
| **20** | **2.5** | **22.5** |

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| --- | --- | --- |
| **4** | **B** | **8** |
| **4** | **4** | **8** |

|  |  |  |
| --- | --- | --- |
| **8** | **C** | **11** |
| **11** | **3** | **14** |

|  |  |  |
| --- | --- | --- |
| **14** | **G** | **15** |
| **16** | **1** | **17** |

|  |  |  |
| --- | --- | --- |
| **17** | **H** | **20** |
| **17** | **3** | **20** |

|  |  |  |
| --- | --- | --- |
| **14** | **F** | **17** |
| **14** | **3** | **17** |

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| **8** | **E** | **14** |
| **8** | **6** | **14** |

**Critical Path -> A, B, C, E, F, H, I**

From the above network diagram, we can see that the completion of the project is reduced from 28 to 22.5 days which has reduced 4.5 days on the total. We can also see the same critical path as observed with the previous team which is A, B, C, E, F, H, I. Utilizing the new exceptionally talented resources in Activity H and I will help in reducing the completion time of the project and it is not affecting the activities where fair performance is allocated. Upon different trails of the position, the maximum reduction of time in the project is 4.5 days in total and resources need to be deployed in Activity H and I.