## Project Management

1. A simple project listing of five activities and their respective time estimates are presented below:

|  |  |  |
| --- | --- | --- |
| **Activity** | **Immediate Predecessor** | **Time in Days** |
| A | None | 1 |
| B | A | 2 |
| C | A | 1 |
| D | B and C | 3 |
| E | D | 2 |

1. Using the CPM procedure, which activities make up the critical path?
2. What will be impact if every activity time were random such that the minimum time were 0.5 days smaller and maximum time were 1 day longer, and the likely time remained the same? (For example, activity A would have minimum, likely and maximum (pessimistic) times of 0.5, 1 and 2 days.) Use the PERT procedure without and with simulation.
3. A simple project listing of five activities, their predecessors and their respective time estimates are presented below:

|  |  |  |
| --- | --- | --- |
| **Activity** | **Immediate Predecessor** | **Time in Days** |
| A | None | 3 |
| B | A | 2 |
| C | A | 1 |
| D | B and C | 3 |
| E | D | 4 |

1. Using the CPM procedure, what is the Latest Finish Time for the last activity in this project (i.e., the total time to complete the project)?
2. What will be impact if every activity time were random such that the minimum time were 0.5 days smaller and maximum time were 1 day longer, and the likely time remained the same? (For example, activity A would have minimum, likely and maximum (pessimistic) times of 2.5, 3 and 4 days.) Use the PERT procedure without and with simulation

**3.** A simple project listing of five activities, their predecessors and their respective time estimates are presented below:

|  |  |  |
| --- | --- | --- |
| **Activity** | **Immediate Predecessor** | **Time in Days** |
| A | None | 2 |
| B | A | 2 |
| C | A | 1 |
| D | B and C | 3 |
| E | D | 1 |

Using the CPM procedure, which activities have slack in this project? 

1. A company must perform a maintenance project consisting of seven activities. The activities, their predecessors and their respective time estimates are presented below:

|  |  |  |  |
| --- | --- | --- | --- |
| **Activity** | **Designation** | **Immediate Predecessor** | **Time in Days** |
| Break down both machines | A | None | 3 |
| Clean Machine 1 | B | A | 3 |
| Clean Machine 2 | C | A | 3 |
| Reset Machine 1 | D | B | 4 |
| Reset Machine 2 | E | C | 2 |
| Re-calibrate both machines | F | D and E | 1 |
| Final Test | G | F | 2 |

Using the CPM procedure, which activities make up the critical path? 

1. Below are the data for a Time-Cost CPM Scheduling model analysis. The time is in days and the costs include both direct and indirect costs.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Activity** | **Immediate Predecessor** | **Normal Time** | **Crash Time** | **Normal Cost** | **Crash Cost** |
| A | None | 3 | 2 | $200 | $400 |
| B | A | 4 | 3 | $300 | $600 |
| C | A | 1 | 1 | $200 | $200 |
| D | B and C | 3 | 2 | $500 | $550 |
| E | D | 2 | 1 | $500 | $900 |

What are the total time of this project and total normal cost? 

1. Below are the data for a Time-Cost CPM Scheduling model analysis. The time is in days and the costs include both direct and indirect costs.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Activity** | **Immediate Predecessor** | **Normal Time** | **Crash Time** | **Normal Cost** | **Crash Cost** |
| A | None | 3 | 2 | $200 | $400 |
| B | A | 4 | 3 | $300 | $600 |
| C | A | 1 | 1 | $200 | $200 |
| D | B and C | 3 | 2 | $500 | $550 |
| E | D | 2 | 1 | $500 | $900 |

If you crash this project to reduce the total time by one day what is the total time of the project and total cost? 

1. Below are the data for a Time-Cost CPM Scheduling analysis. The time is in days and the costs include both direct and indirect costs.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Activity** | **Immediate Predecessor** | **Normal Time** | **Crash Time** | **Normal Cost** | **Crash Cost** |
| A | None | 3 | 2 | $200 | $400 |
| B | A | 4 | 3 | $300 | $600 |
| C | A | 1 | 1 | $200 | $200 |
| D | B and C | 3 | 2 | $500 | $550 |
| E | D | 2 | 1 | $500 | $900 |

If you crash this project to reduce the total time by four days, what is the total time of the project and total cost? 

1. A simple project listing of five activities and their respective time estimates are presented below:

|  |  |  |
| --- | --- | --- |
| **Activity** | **Immediate Predecessor** | **Time in Days** |
| A | None | 1 |
| B | A | 2 |
| C | A | 1 |
| D | B and C | 3 |
| E | D | 2 |

Using the CPM procedure, which activities make up the critical path?

1. The following table represents a plan for Ultra Mega Power plant and time

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Activity Name** | **Predecessor** | **a (days)** | **m (days)** | **b (days)** |
| A | - | 2 | 3 | 4 |
| B | A | 1 | 2 | 3 |
| C | A | 4 | 5 | 3 |
| D | A | 3 | 4 | 11 |
| E | B | 1 | 3 | 5 |
| F | C | 1 | 2 | 3 |
| G | D | 1 | 8 | 9 |
| H | E,F | 2 | 4 | 6 |
| I | H | 2 | 4 | 12 |
| J | D | 3 | 4 | 5 |
| K | H,D | 5 | 7 | 8 |

* 1. Draw the network diagram representing above project
  2. Which path is the critical path?
  3. What is the expected completion time of the project?
  4. What is the probability that the project will take more than 20 days to complete?
  5. We can accomplish any one of the following at an additional cost of 1500.
     1. Reduce activity E by two days
     2. Reduce activity J by two days
     3. Reduce activity G by two days

If we can save 1000 by reducing the total completion time by one day. Which of the above mentioned step is will you recommend and why?

1. Following table shows the details of various activities and their details present in a project

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Activity** | **Predecessor** | **Normal Time** | **Normal Cost** | **Crash Time (weeks)** | **Crash Cost** |
| A | - | 6 | 6000 | 4 | 12000 |
| B | A | 10 | 10000 | 9 | 11000 |
| C | A | 8 | 8000 | 7 | 10000 |
| D | B | 12 | 12000 | 10 | 14000 |
| E | B | 10 | 10000 | 7 | 12000 |
| F | C | 14 | 14000 | 12 | 19000 |
| G | D | 7 | 7000 | 5 | 10000 |
| H | E,F | 9 | 9000 | 6 | 15000 |
| I | G,H | 6 | 6000 | 5 | 8000 |

* 1. Determine the critical path and earliest completion time of the project
  2. Calculate the cost of crashing the project completion time by four weeks

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