The Galaxy project consists of 8 interdependent tasks, labeled A through H. You’ve consulted experts, and have determined an optimistic, likely and pessimistic completion time (in days) for each of the tasks. The dependencies, and the times, are listed below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Task** | **Precursor(s)** | **Optimistic** | **Likely** | **Pessimistic** |
| A | (start) | 2 | 6 | 9 |
| B | A | 18 | 19 | 20 |
| C | A | 10 | 12 | 14 |
| D | A | 12 | 18 | 24 |
| E | (start) | 13 | 14 | 16 |
| F | B, C, D | 8 | 12 | 16 |
| G | D, E | 6 | 8 | 10 |
| H | F, G | 17 | 20 | 21 |
| (end) | H |   |   |   |

1. Draw a path diagram for the project.
2. Calculate the expected length of each task.  Fill in the following worksheet.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Task** | **Optimistic (O)** | **Likely (L)** | **Pessimistic (P)** | **Expected Task** $$E=\frac{O+4L+P}{6}$$ |
| A | 2 | 6 | 9 |   |
| B | 18 | 19 | 20 |   |
| C | 10 | 12 | 14 |   |
| D | 12 | 18 | 24 |   |
| E | 13 | 14 | 16 |   |
| F | 8 | 12 | 16 |   |
| G | 6 | 8 | 10 |   |
| H | 17 | 20 | 21 |   |

3.  Use the following worksheet to determine the lengths of all possible paths. Determine the critical path. What is its length?

|  |  |
| --- | --- |
| **Path****(Listing of tasks on the path)** | **Expected Path Length**$$E\_{p=}\sum\_{}^{}E$$ |
|   |   |
|   |   |
|   |   |
|   |   |
|   |   |
|   |   |
|   |   |
|   |   |

The Mojo Project consists of 14 interrelated tasks, A through N.  Their estimated normal completion times, normal costs, crash times and crash costs are given below. (Times in weeks; costs in thousands of dollars.)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Task | Predecessors | Normal Time | Normal Cost | Crash Time | Crash Cost |
| A | (start) | 3 | 4 | 2 | 5 |
| B | (start) | 5 | 6 | 4 | 7 |
| C | A | 2 | 3 | 2 | 4 |
| D | A | 4 | 8 | 3 | 10 |
| E | A | 3 | 5 | 2 | 7 |
| F | B | 9 | 14 | 7 | 16 |
| G | B | 4 | 5 | 3 | 7 |
| H | C, D | 4 | 7 | 2 | 9 |
| I | D | 6 | 2 | 5 | 3 |
| J | F | 12 | 10 | 11 | 15 |
| K | H | 4 | 6 | 3 | 7 |
| L | E, I, J | 10 | 18 | 8 | 20 |
| M | K, L | 8 | 10 | 6 | 14 |
| N | G | 7 | 5 | 6 | 8 |

Use an online application (e.g., Sporkforge, 2014) to find the critical path, using the estimated normal times. Copy the output of the app into your upload as an image.

4.  Which tasks are on the critical path?

5.  What is the expected completion time of the project?

Instead of being finished in 4 weeks, task D takes 8 weeks.

6.  Which (if any) tasks should be crashed, to make up the lost time? Why?

7.  What is the additional cost of crashing the project?