**BA 352: Project Management, Take Home Exam 1**

**(10 points)**

Due: TBA

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Act | I.P. | a | m | b | µ | σ | α | β |
| A | --- | 25 | 30 | 50 |  |  |  |  |
| B | --- | 8 | 10 | 16 |  |  |  |  |
| C | --- | 5 | 7 | 18 |  |  |  |  |
| D | B | 9 | 12 | 15 |  |  |  |  |
| E | B | 4 | 5 | 8 |  |  |  |  |
| F | C | 5 | 6 | 17 |  |  |  |  |
| G | F | 1.5 | 2 | 5 |  |  |  |  |
| H | F | 8 | 12 | 24 |  |  |  |  |
| I | D | 4 | 5 | 9 |  |  |  |  |
| J | E,G | 5 | 6 | 8 |  |  |  |  |
| K | H,I,J | 7 | 10 | 14 |  |  |  |  |
| L | H | 10 | 12 | 16 |  |  |  |  |
| M | K | 2 | 3 | 6 |  |  |  |  |

1. Draw the PERT/CPM network.
2. Solve the network using CPM and the most likely times (column m).
	1. What are the critical path, completion time and slack times?
	2. Draw a **Gantt chart** of the project. We didn’t do this in class, so look it up online. Then either draw it by hand or find a free program to do so online or figure out how to draw it in MS Excel.
3. Using the optimistic times (a), what is the fastest conceivable time that this project will take? Using the pessimistic times (b), what is the longest conceivable times that it will take?
4. Solve the network using the average times (column µ).
	1. What is the new completion time? How much longer is this critical path compared to **2)**?
	2. Is the critical path the same as **2)** or different?
5. Using PERT, estimate:
	1. The standard deviation of the project completion time.
	2. The probability the project is done “early:” in 38 days or less.
	3. The probability the project is takes 50 days or more.
	4. When will the project will be done with 99% certainty?
6. Now assume that the entire project completion time follows a Big Beta distribution with m = your answer from **2)** and a and b your answers from **3)**. Repeat parts **a. – d.** of **5)**.
7. Using Simulation (with thousands of simulations), what is the average completion time for the project? Also, re-estimate parts **a. – d.** of **5)**.
8. Graph the distribution of project completion times for **7)** using a PivotTable. Compare these to the distributions of **5)** and **6)** using the =norm.dist() and beta.dist() functions in Excel (and choosing “false” instead of “true”). Put all three of these on one clearly labeled graph. This part is hard, ask me for help if you need it!
9. Prepare a table that:
	1. Summarizes all the completion time estimates from **2), 3), 4),** and **7)**.
	2. And summarizes all the probability estimates from parts **a. – d.** of **5), 6),** and **7)**.
10. Executive Summary: (One page, typed.) Assume that you have an idiot boss (picture me?) that insists that this project should take exactly 40 days, no ifs ands or buts about it. Carefully explain why the only thing that’s certain about a real project is uncertainty. Paint a clear picture for your boss about what the actual completion time/distribution will look like and make him/her understand the project well enough that he could explain it to the client who is paying for it. Put together the results from **1) – 9)** to make your case.

**Extra Credit)** To be discussed in class.