**Activity 7.6 – Module Problems**

|  |
| --- |
| ProblemsComplete the following problems and submit the results in either a Microsoft Word document or a Microsoft Excel spreadsheet. If you choose to use an Excel spreadsheet, place each problem on a separate sheet and label the tab with problem number. Save your document with a descriptive file name, including the assignment and your name. |

**Chapter 11:**

7-1 Jean Walker is making plans for spring break at the beaches in Florida. In applying techniques she learned in her quantitative methods class, she has identified the activities that are necessary to prepare for her trip. The following table lists the activities and the immediate predecessors. Draw the network for this project.

|  |  |
| --- | --- |
| Activity | Immediate Predecessors |
| A |  |
| B | A |
| C | A |
| D | B |
| E | C,D |
| F | A |
| G | E,F |

The following are the activity times for Jean Walkers activities. Find the earliest, latest, and slack times for each activity. Then find the critical path.

|  |  |
| --- | --- |
| Activity | Time (in days) |
| A | 3 |
| B | 7 |
| C | 6 |
| D | 2 |
| E | 5 |
| F | 8 |
| G | 4 |

7-2 Tom Schriber, a director of personnel of Management Resources, Inc., is in the process of designing a program that its customers can use in the job-finding process. Some of the activities include preparing resumés, writing letters, making appointments to see prospective employers, researching companies and industries, and so on. Some of the information on the activities is shown in the following table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Days | | |  |
| Activity | a | m | b | Immediate Predecessors |
| A | 8 | 10 | 12 |  |
| B | 8 | 10 | 14 |  |
| C | 3 | 3 | 4 |  |
| D | 9 | 20 | 34 | A |
| E | 6 | 8 | 11 | C |
| F | 9 | 10 | 14 | B,D,E |
| G | 7 | 10 | 14 | B,D,E |
| H | 14 | 15 | 18 | F |
| I | 10 | 11 | 13 | F |
| J | 6 | 8 | 11 | G,H |
| K | 4 | 7 | 8 | I,J |
| L | 2 | 4 | 8 | G,H |

1. Construct a network for this problem.
2. Determine the expected time and variance for each activity.
3. Determine ES, EF, LS, LF, and slack for each activity.
4. Determine the critical path and project completion time.
5. Determine the probability that the project will be finished in 70 days or less.
6. Determine the probability that the project will be finished in 80 days or less.
7. Determine the probability that the project will be finished in 90 days or less.

7-3 The air pollution project discussed in the chapter has progressed over the past several weeks, and it is now the end of week 8. Lester Harky would like to know the value of the work completed, the amount of any cost overruns or underruns for the project, and the extent to which the project is ahead of or behind schedule by developing a table like Table 11.8. The revised cost figures are shown in the following table:

|  |  |  |
| --- | --- | --- |
| Activity | Percent of Completion | Actual Cost ($) |
| A | 100 | 20,000 |
| B | 100 | 36,000 |
| C | 100 | 26,000 |
| D | 100 | 44,000 |
| E | 50 | 25,000 |
| F | 60 | 15,000 |
| G | 10 | 5,000 |
| H | 10 | 1,000 |

7-4 The Scott Corey accounting firm is installing a new computer system. Several things must be done to make sure the system works properly before all the accounts are put into the new system. The following table provides information about this project. How long will it take to install the system? What is the critical path?

|  |  |  |
| --- | --- | --- |
| Activity | Immediate Predecessor(s) | Time (weeks) |
| A |  | 3 |
| B |  | 4 |
| C | A | 6 |
| D | B | 3 |
| E | A | 5 |
| F | C | 2 |
| G | D,E | 5 |
| H | F,G | 5 |

The managing partner of the Scott Corey accounting firm has decided that the system must be up and running in 16 weeks. Consequently, information about crashing the project was put together and is shown in the following table:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Activity | Immediate Predecessor(s) | Normal Time (weeks) | Crash Time (weeks) | Normal Cost ($) | Crash Cost ($) |
| A |  | 3 | 2 | 8,000 | 9,300 |
| B |  | 4 | 3 | 9,000 | 10,000 |
| C | A | 6 | 4 | 12,000 | 15,000 |
| D | B | 3 | 1 | 15,000 | 15,500 |
| E | A | 5 | 3 | 5,000 | 8,700 |
| F | C | 2 | 1 | 7,500 | 9,000 |
| G | D,E | 5 | 3 | 9,000 | 11,400 |
| H | F,G | 5 | 3 | 5,000 | 8,000 |

1. If the project is to be finished in 16 weeks, which activity or activities should be crashed to do this at the least additional cost? What is the total cost of this?
2. List all the paths in this network. After the crashing in part (a) has been done, what is the time required for each path? If the project completion time must be reduced another week so that the total time is 15 weeks, which activity or activities should be crashed?

Solve this by inspection. Note that it is sometimes better to crash an activity that is not the least cost for crashing if it is on several paths rather than to crash several activities on separate paths when there is more than one critical path.

You may submit just the answers or you may submit the answers and the QM worksheets you used to arrive at the answer. Choosing the latter will afford instructors the opportunity to review your work and determine if you understand the concept but have made some minor computational error, therefore allowing them to assign some credit based on your understanding. Submitting just the answers does not provide for any partial credit.