**MSC 337 Operations Management**

***Lesson Three – A****. Henry Morgan is interested in analyzing one particular job that his company has bid on. It is essentially an assembly job with some machine work as well. His foreman has told Mr. Morgan that the whole job can best be analyzed by breaking it down into a total of 11 activities, not counting the Start and Stop nodes. The foreman has also developed estimates of the time to accomplish each and has identified the precedence relationships (if any) among the activities. This information is summarized in the table below.*

|  |  |  |
| --- | --- | --- |
| ***Activity*** | ***Time (in days)*** | ***Immediate predecessors*** |
| ***Start*** | ***0*** | ***-*** |
| ***A*** | ***12*** | ***Start*** |
| ***B*** | ***9*** | ***Start*** |
| ***C*** | ***10*** | ***A*** |
| ***D*** | ***10*** | ***B*** |
| ***E*** | ***24*** | ***B*** |
| ***F*** | ***10*** | ***A*** |
| ***G*** | ***35*** | ***C*** |
| ***H*** | ***40*** | ***D*** |
| ***I*** | ***15*** | ***A*** |
| ***J*** | ***4*** | ***E, G, H*** |
| ***K*** | ***6*** | ***F, I, J*** |
| ***Finish*** | ***0*** | ***K*** |

1. *Draw the project network using the AON approach. (Make sure to include the names of the nodes and their activity times).*
2. *Identify the critical path(s****).***

1. *What is the time until completion?*
2. *Which activities have slack time—how much is in each? (Show your work)*

***Lesson Three – B***

*The diagram below represents a PERT chart with seven nodes. The normal time (in days) to complete each task is given by the numbers above each node. Suppose that the* ***cost to do each task in the normal amount of time is as follows: $1900 for tasks A, B, and*** *D and $1700 for tasks C, E, F and G.*

|  |  |  |
| --- | --- | --- |
| Task | Maximum Reduction | Cost per day to reduce time |
| A | 1 | 1900 |
| B | 3 | 1400 |
| C | 1 | 1700 |
| D | 2 | 2200 |
| E | 1 | 1700 |
| F | 2 | 1800 |
| G | 1 | 2500 |

The table shows both the maximum number of days that it is possible to reduce the

normal time to complete each task and the additional cost per day over and above the normal costs to reduce the time for each task.

1. What is the cost to do the project at the normal speed?

1. Find the lowest project cost if the completion time must be reduced by 1 day?
2. Find the lowest project cost if the completion time must be reduced by 3 days.

***Lesson Four –A.*** *This table shows the number of traffic violations issued in the city of Clifton, Virginia over the last seven years:*

|  |  |
| --- | --- |
| Year | Nr |
| 2007 | 1567 |
| 2008 | 1691 |
| 2009 | 1579 |
| 2010 | 1490 |
| 2011 | 1373 |
| 2012 | 1241 |
| 2013 | ? |

*On the basis of this data,* ***project******how many traffic violations will be issued in 2013*** *using”:*

1. *A three-year moving average*
2. *A five-year moving average*
3. *A four-year moving average where the most recent year is weighted twice as heavily as each of the preceding years*

***Lesson Four – B****. Suppose that you have a time series showing iPhone4 sales for the last 15 months. Your boss would like for you to use this data to forecast the demand for next month based upon this data using moving averages and weighted moving averages****.***

*a.) How would you suggest to him what the value for “n” should be in a simple moving average?*

*b.) How would you suggest to him what weights should be used in a weighted moving average?*

*c.) Identify and briefly describe some of the “non-numerical” factors that cause fluctuations in demand for the iPhone 4.*