CASE

George, after a successful engineering career, has decided to pursue his lifelong dream of opening a woodworking business. George has been woodworking for a number of years and is a master craftsman. His primary products include wood carvings, furniture, jewelry boxes, wooden bowls, and other beautiful wooden objects. George has been selling his products at woodworking shows, arts and craft fairs, and at local businesses. Business has been picking up significantly and George feels that now is the time to launch a website for his business.

George wants a website that will showcase his products, allow secure online ordering, and has social media capability. In addition, George would like to provide videos on how to wood carve. The videos will be free for a two week period and then there will be a nominal monthly subscription fee. This monthly fee will allow one to watch unlimited videos and download wood carving patterns. George wants to add enough videos to get the subscription service started and then he will add additional new videos each month.

He contacts Annie, a family friend, who owns a software and website development business. They meet for lunch and George gives her all the specific requirements for the website. George would like to have a website launched in less than three weeks. He will be a vendor at a large woodworking show in six weeks and wants a website in place so potential visitors can peruse his products prior to the show.

Annie is happy to help George with the website and carefully takes notes of all his website requirements. She tells George that she needs to estimate how long the website project will take given that she and her employees are in the midst of several projects. However, she promises that she will try her best to have the website completed within three weeks. George tells Annie that he is willing to pay extra in order to have the website completed within a three week period.

Annie goes back to her office and puts together the project activities, the time to complete each activity, and whether an activity time can be reduced (crashed) by hiring additional workers. She does not want to begin shooting videos for the subscription service (Activity J) until the videos for the wooden products are complete (Activity B). Annie can hire out additional workers at a cost of $40.00 per hour ($320 for an eight hour workday). Table 1 provides the activity, description, time to complete an activity, predecessors, and the maximum amount that an activity can be crashed (completion time reduced).

Annie needs your help. Her project management expert is on vacation this week. Annie would like the following items and questions addressed in a report.

1) Develop a project network diagram that shows all the activities and precedence relationships.
2) Determine the project length (without crashing).
3) Determine the critical path activities.
4) What is the shortest time that the project can be finished if crashing is allowed? What would be the crashing cost?
5) Determine the crashing cost if the project must be finished in 15 days, 18 days, and 21 days?
A complete Excel solution can be obtained by emailing the author. The following are the items and answers to questions listed above:

1) The project network diagram:

![Project Network Diagram](image)

2) The project will take 25 days without crashing any activities.

3) The critical path items are activities: B, J, K, and M since their slack is zero.

4) The shortest time that the project can be completed if crashing is allowed is 15.5 days. The crashing cost is $3,200 to finish the project in 15.5 days.

5) The project cannot be completed in less than 15.5 days. The cost for getting the project completed in 18 days is $2,240 and the cost is $1,280 to have the project finished within 21 days.

GRADING RUBRIC

The following is a sample grading rubric for this case study. Although 60 points have been allocated to the case, the point value and rubric can easily be altered.

1) The project network diagram:
   - 0.00 to less than 2.50 points: Not attempted or not a decent attempt. Many errors.
   - 2.50 to less than 7.00 points: A decent attempt; however, there are errors. More than minor mistakes. Grammar and spelling are used in answering the questions.
   - 7.00 to less than 12.00 points: A decent attempt; however, there are errors. For example, mistakes are made in calculating the slack for several activities.
   - 12.00 to 15.00 points: The model is clearly shown. The activities that should be crashed, when the project will be completed, and the crashing cost is clearly shown.

2) The EST, EFT, LST, LFT, and slacks (15 points)
   - 0.00 to less than 2.50 points: Not attempted or not a decent attempt. Many errors.
   - 2.50 to less than 7.00 points: A decent attempt; however, there are errors. More than minor mistakes.
   - 7.00 to less than 12.00 points: A decent attempt; however, there are errors. More than minor mistakes. Grammar and spelling issues are used in answering the questions.
   - 12.00 to 15.00 points: The model is clearly shown and the question is correctly answered. More than minor mistakes. Grammar and spelling issues are used in answering the questions.

3) The EST, EFT, LST, LFT, and slacks (15 points)
   - 0.00 to less than 2.50 points: Not attempted or not a decent attempt. Many errors.
   - 2.50 to less than 7.00 points: A decent attempt; however, there are errors. More than minor mistakes. Grammar and spelling issues are used in answering the questions.
   - 7.00 to less than 12.00 points: A decent attempt; however, there are errors. More than minor mistakes. Grammar and spelling issues are used in answering the questions.
   - 12.00 to 15.00 points: The model is clearly shown and the question is correctly answered.

4) The EST, EFT, LST, LFT, and slacks (15 points)
   - 0.00 to less than 2.50 points: Not attempted or not a decent attempt. Many errors.
   - 2.50 to less than 7.00 points: A decent attempt; however, there are errors. More than minor mistakes. Grammar and spelling issues are used in answering the questions.
   - 7.00 to less than 12.00 points: A decent attempt; however, there are errors. More than minor mistakes. Grammar and spelling issues are used in answering the questions.
   - 12.00 to 15.00 points: The model is clearly shown and the question is correctly answered.