**Chapter 3 Supplement: Project Management**

**Practice Problems**

**MULTIPLE CHOICE**

1. A PERT analysis of a project determined that the mean duration of the critical care was 70.5 weeks and the critical path had a standard deviation of 3 weeks. What is the probability the project will be completed within 75 weeks?

|  |  |
| --- | --- |
| a. | 90.00% |
| b. | 92.50% |
| c. | 93.32% |
| d. | 96.56% |

ANS: C PTS: 1 DIF: Easy

2. A PERT analysis of a project determined that the mean duration of the critical care was 70.5 weeks and the critical path had a standard deviation of 3 weeks. What is the probability that the project will take greater than 73.5 weeks?

|  |  |
| --- | --- |
| a. | 10.56% |
| b. | 15.87% |
| c. | 84.13% |
| d. | 89.44% |

ANS: B PTS: 1 DIF: Easy

3. A PERT analysis of a project determined that the mean duration of the critical care was 70.5 weeks and the critical path had a standard deviation of 3 weeks. What is the 95% confidence interval for the duration of the project?

|  |  |
| --- | --- |
| a. | 64.62 to 76.38 |
| b. | 65.50 to 75.50 |
| c. | 66.32 to 74.68 |
| d. | 67.12 to 73.88 |

ANS: A PTS: 1 DIF: Easy

4. A PERT analysis of a project determined that the mean duration of the critical care was 70.5 weeks and the critical path had a standard deviation of 3 weeks. What is the 99% confidence interval for the duration of the project?

|  |  |
| --- | --- |
| a. | 61.48 to 79.52 |
| b. | 62.14 to 78.86 |
| c. | 62.77 to 78.77 |
| d. | 63.50 to 77.50 |

ANS: C PTS: 1 DIF: Easy

5. A PERT analysis of a project determined that the mean duration of the critical care was 100 weeks and the critical path had a standard deviation of 6 weeks. What is the probability the project will be completed within 115 weeks?

|  |  |
| --- | --- |
| a. | 94.36% |
| b. | 96.00% |
| c. | 98.42% |
| d. | 99.38% |

ANS: D PTS: 1 DIF: Easy

6. A PERT analysis of a project determined that the mean duration of the critical care was 100 weeks and the critical path had a standard deviation of 6 weeks. What is the probability that the project will take greater than 107 weeks?

|  |  |
| --- | --- |
| a. | 10.56% |
| b. | 12.17% |
| c. | 89.44% |
| d. | 87.90% |

ANS: B PTS: 1 DIF: Easy

7. A PERT analysis of a project determined that the mean duration of the critical care was 65 weeks and the critical path had a standard deviation of 2.5 weeks. What is the 95% confidence interval for the duration of the project?

|  |  |
| --- | --- |
| a. | 58.50 to 71.50 |
| b. | 59.25 to 70.75 |
| c. | 60.10 to 69.90 |
| d. | 63.75 to 67.25 |

ANS: C PTS: 1 DIF: Easy

8. A PERT analysis of a project determined that the mean duration of the critical care was 65 weeks and the critical path had a standard deviation of 2.5 weeks. What is the 99% confidence interval for the duration of the project?

|  |  |
| --- | --- |
| a. | 61.23 to 68.77 |
| b. | 60.10 to 69.90 |
| c. | 59.25 to 70.75 |
| d. | 58.56 to 71.44 |

ANS: D PTS: 1 DIF: Easy

9. A PERT analysis of a project determined that the mean duration of the critical care was 65 weeks and the critical path had a standard deviation of 2.5 weeks. What is the probability the project will be completed within 70 weeks?

|  |  |
| --- | --- |
| a. | 96.50% |
| b. | 97.72% |
| c. | 98.23% |
| d. | 99.60% |

ANS: B PTS: 1 DIF: Easy

10. A PERT analysis of a project determined that the mean duration of the critical care was 65 weeks and the critical path had a standard deviation of 2.5 weeks. What is the probability the project will be completed in less than 60 weeks?

|  |  |
| --- | --- |
| a. | 1.45% |
| b. | 2.28% |
| c. | 97.75% |
| d. | 98.55% |

ANS: B PTS: 1 DIF: Easy

The new president off Miskatonic University has decided on building a pool. She sat down with the contractor and together they determined what activities would have to occur, their precedence relationships, and estimated durations (in weeks). However, after a review it appeared that construction would interfere with the start of the Fall semester. Miskatonic asked the contractor to present time and cost estimates for crashing the project. The data is listed below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Activity | Predecessor | Normal Time | Crash  Time | Normal  Cost/week | Crash  Cost/week |
| A | - | 6 | 4 | $200 | $450 |
| B | A | 3 | 1 | $350 | $600 |
| C | A | 9 | 6 | $450 | $800 |
| D | A | 10 | 8 | $800 | $1,100 |
| E | B | 4 | 2 | $750 | $1,250 |
| F | B | 2 | 1 | $900 | $2,000 |
| G | C | 12 | 9 | $875 | $1,750 |
| H | D | 3 | 2 | $500 | $900 |
| I | F, G | 14 | 10 | $375 | $600 |
| J | E, I, H | 4 | 3 | $600 | $1,000 |

11. What activity has the greatest weekly cost for crashing?

|  |  |
| --- | --- |
| a. | D |
| b. | E |
| c. | F |
| d. | I |

ANS: C PTS: 1 DIF: Easy

12. What is the critical path of the crashed project?

|  |  |
| --- | --- |
| a. | A, C, G, I, J |
| b. | A, B, E, G, I, J |
| c. | B, D, G, I J |
| d. | B, C, E, F, G, J |

ANS: A PTS: 1 DIF: Medium

13. What is the duration of the crashed critical path?

|  |  |
| --- | --- |
| a. | 27 |
| b. | 31 |
| c. | 32 |
| d. | 44 |

ANS: C PTS: 1 DIF: Medium

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

|  |  |
| --- | --- |
| a. | $1,650 |
| b. | $6,700 |
| c. | $8,700 |
| d. | $10,450 |

ANS: A PTS: 1 DIF: Medium

15. What activity—on or off the crashed critical path—would have the least total cost in crashing?

|  |  |
| --- | --- |
| a. | A |
| b. | B |
| c. | D |
| d. | G |

ANS: B PTS: 1 DIF: Easy

16. What activity—on or off the crashed critical path—would have the greatest total cost for crashing?

|  |  |
| --- | --- |
| a. | A |
| b. | B |
| c. | D |
| d. | G |

ANS: D PTS: 1 DIF: Easy

17. What activity has the least weekly cost for crashing?

|  |  |
| --- | --- |
| a. | A |
| b. | B |
| c. | C |
| d. | I |

ANS: A PTS: 1 DIF: Easy

Xebec Technologies Corporation wants to significantly improve an airborne radar system with the United States Air Force. After working with their engineers and the manufacturing team, Xebec identified the key activities that would be required to perform the upgrade and determined the precedence relationships and the estimates of the activities' durations (in weeks). The CIA has expressed an interest in using the airborne radar system on a fleet of drones they operate as quickly as possible. The CIA asked Xebec to prepare a crashing analysis. The data is listed below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Activity | Predecessor | Normal Time | Crash  Time | Normal  Cost/week | Crash  Cost/week |
| A | - | 18 | 16 | $2,100 | $3,600 |
| B | A | 13 | 11 | $1,200 | $2,000 |
| C | A | 7 | 5 | $3,000 | $5,000 |
| D | B, C | 12 | 9 | $1,750 | $2,500 |
| E | B, C | 19 | 15 | $2,100 | $3,300 |
| F | D, E | 8 | 7 | $3,600 | $4,900 |
| G | D, E | 13 | 10 | $2,800 | $5,000 |
| H | F | 9 | 6 | $1,250 | $2,350 |
| I | G, H | 17 | 13 | $1,500 | $2,000 |
| J | I | 9 | 8 | $4,500 | $6,000 |

18. What activity has the greatest weekly cost of crashing?

|  |  |
| --- | --- |
| a. | C |
| b. | E |
| c. | F |
| d. | J |

ANS: D PTS: 1 DIF: Easy

19. What activity has the least weekly cost for crashing?

|  |  |
| --- | --- |
| a. | B |
| b. | D |
| c. | B and I |
| d. | D and H |

ANS: C PTS: 1 DIF: Easy

20. What is the critical path of the crashed project?

|  |  |
| --- | --- |
| a. | A, B, F, I, J |
| b. | A, B, E, F, H, I, J |
| c. | B, E, H, J |
| d. | B, C, E, F, I. J |

ANS: B PTS: 1 DIF: Medium

21. What is the duration of the crashed critical path?

|  |  |
| --- | --- |
| a. | 68 |
| b. | 76 |
| c. | 98 |
| d. | 100 |

ANS: B PTS: 1 DIF: Medium

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

|  |  |
| --- | --- |
| a. | $10,850 |
| b. | $20,850 |
| c. | $24,150 |
| d. | $36,650 |

ANS: A PTS: 1 DIF: Hard

23. What activity on the critical path would have the least total cost with crashing?

|  |  |
| --- | --- |
| a. | A |
| b. | H |
| c. | G |
| d. | I |

ANS: B PTS: 1 DIF: Easy

24. What activity on the critical path would have the greatest total cost for crashing?

|  |  |
| --- | --- |
| a. | A |
| b. | B |
| c. | G |
| d. | E |

ANS: D PTS: 1 DIF: Easy

Recently, Jorge Perez announced his retirement by the end of the month after serving as the Perez Construction CEO for 38 years. His daughter, Elena, immediately planned on throwing a large retirement party. Having worked in her father's construction company she was familiar with project management and used it to help plan the party. She determined the activities, the precedence relationships among those activities, and the time estimates (in days). After talking to the family, she realized that she needed to examine the possibility of crashing some of the activities to speed up the date to the retirement party. The data is listed below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Activity | Predecessor | Normal Time | Crash  Time | Normal  Cost/Week | Crash  Cost/Week |
| A | - | 6 | 2 | $2,500 | $3,500 |
| B | - | 3 | 1 | $1,500 | $4,500 |
| C | A | 4 | 2 | $3,000 | $5,000 |
| D | A | 4 | 3 | $1,750 | $2,750 |
| E | B | 9 | 6 | $2,200 | $3,500 |
| F | B | 12 | 10 | $1,000 | $2,200 |
| G | C, D, E, F | 4 | 3 | $4,000 | $8,000 |

25. What activity on the crashed critical path would have the greatest total cost for crashing?

|  |  |
| --- | --- |
| a. | B |
| b. | C |
| c. | F |
| d. | G |

ANS: D PTS: 1 DIF: Easy

26. What activity would have the least total cost in crashing?

|  |  |
| --- | --- |
| a. | A |
| b. | B |
| c. | D |
| d. | F |

ANS: B PTS: 1 DIF: Easy

27. What is the critical path of the crashed project?

|  |  |
| --- | --- |
| a. | A, C, D, G |
| b. | A, C, D, E, F, G |
| c. | B, F, G |
| d. | B, C, F, G |

ANS: C PTS: 1 DIF: Medium

28. What is the duration of the crashed critical path?

|  |  |
| --- | --- |
| a. | 11 |
| b. | 14 |
| c. | 16 |
| d. | 19 |

ANS: B PTS: 1 DIF: Medium

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

|  |  |
| --- | --- |
| a. | $11,200 |
| b. | $14,700 |
| c. | $18,000 |
| d. | $28,000 |

ANS: C PTS: 1 DIF: Medium

Brandon Hilbert is a dual major—business and film studies. He has a senior assignment in his film course to make a short documentary film that he has to fund himself. Using his business skills, he is applying his project management skills to planning his documentary. He identified nine major activities, their precedence relationships, and their time estimates (in days). After conducting a project management analysis, Brian’s advisor suggested that he submit the film to an independent film festival. However, that would mean that the project would have to be completed before the « normal » time estimates. Brian went back and considered the cost of « crashing » the activities. The results are given below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Activity | Predecessor | Normal Time | Crash  Time | Normal  Cost | Crash  Cost |
| A | - | 19 | 16 | $125 | $250 |
| B | - | 27 | 22 | $400 | $500 |
| C | A, B | 16 | 13 | $310 | $525 |
| D | A, B | 9 | 6 | $600 | $900 |
| E | A, B | 29 | 25 | $225 | $375 |
| F | C, D | 15 | 12 | $750 | $950 |
| G | E | 32 | 27 | $500 | $750 |
| H | F | 18 | 12 | $625 | $800 |
| I | F, G | 20 | 15 | $200 | $400 |

30. What is the critical path of the crashed project?

|  |  |
| --- | --- |
| a. | A, C, D, H, I |
| b. | A, D, E, G, H, I |
| c. | B, C, E, G, H, I |
| d. | B, E, G, I |

ANS: D PTS: 1 DIF: Medium

31. What is the duration of the crashed critical path?

|  |  |
| --- | --- |
| a. | 66 |
| b. | 77 |
| c. | 89 |
| d. | 148 |

ANS: C PTS: 1 DIF: Medium

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

|  |  |
| --- | --- |
| a. | $8,700 |
| b. | $9,300 |
| c. | $11,200 |
| d. | $18,600 |

ANS: B PTS: 1 DIF: Hard

33. What activity on the critical path would have the greatest total cost for crashing?

|  |  |
| --- | --- |
| a. | A |
| b. | B |
| c. | G |
| d. | I |

ANS: C PTS: 1 DIF: Easy

34. What activity on the critical path would have the least total cost in crashing?

|  |  |
| --- | --- |
| a. | A |
| b. | B |
| c. | G |
| d. | I |

ANS: B PTS: 1 DIF: Easy

After the death of his party's candidate, Charles Osgood was asked to run in the deceased candidate’s place. With only three weeks left before the election, it was extremely difficult for Mr. Osgood to obtain the necessary public awareness to win. However, he came remarkably close. He and the party decided that he would be an ideal candidate for the next congressional election. They sat down and they began to think about what the preliminary activities for the next election's campaign would look like. They mapped out the required activities, the precedence relationships, and estimations of the durations for each activity (in weeks). At that point, the national committee of the party suggested that the campaign think about compressing the time of the campaign and that the national committee would pay for the « extra » costs. Osgood and his aides went back and determined a new schedule. The data is listed below.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Activity | Predecessor | Normal Time | Crash  Time | Normal  Cost | Crash  Cost |
| A | - | 2 | 1 | $1,000 | $2,000 |
| B | - | 6 | 4 | $1,200 | $2,500 |
| C | A, B | 3 | 1 | $1,800 | $3,000 |
| D | C | 8 | 5 | $900 | $1,700 |
| E | C | 11 | 9 | $700 | $1,100 |
| F | E | 3 | 1 | $1,400 | $2,600 |
| G | C | 7 | 5 | $700 | $1,600 |
| H | D, F, G | 16 | 13 | $1,500 | $3,000 |
| I | G, F | 23 | 21 | $750 | $1,200 |
| J | H | 6 | 4 | $1,750 | $2,650 |
| K | I, J | 9 | 8 | $1,300 | $2,800 |

35. What activity on the critical path would have the greatest total cost for crashing?

|  |  |
| --- | --- |
| a. | B |
| b. | C |
| c. | I |
| d. | K |

ANS: C PTS: 1 DIF: Easy

36. What activity on the critical path would have the least total cost in crashing?

|  |  |
| --- | --- |
| a. | B |
| b. | C |
| c. | E |
| d. | F |

ANS: D PTS: 1 DIF: Easy

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

|  |  |
| --- | --- |
| a. | $11,150 |
| b. | $18,250 |
| c. | $19,650 |
| d. | $27,650 |

ANS: A PTS: 1 DIF: Hard

38. What is the critical path of the crashed project?

|  |  |
| --- | --- |
| a. | A, B, C, E, F, I, K |
| b. | A, C, F, I, K |
| c. | B, C, D, G, H, K |
| d. | B, C, E, F, I, K |

ANS: D PTS: 1 DIF: Medium

39. What is the duration of the crashed critical path?

|  |  |
| --- | --- |
| a. | 38 |
| b. | 44 |
| c. | 66 |
| d. | 72 |

ANS: B PTS: 1 DIF: Medium

Brandon Hilbert’s short documentary was very favorably received at the film festival. A producer decided to fund Brian to expand the short documentary into a longer format. Below you will find data on the status of the film at the end of September.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Jun | July | Aug | Sept | Oct | Plan | %  Complete | Value |
| Contact Interviewees | $4,000 | $2,000 |  |  |  | $6,000 | 100% | $6,000 |
| Draft Script | $1,500 |  |  |  |  | $1,500 | 100% | $1,500 |
| Select Film Crew |  | $3,000 | $5,000 | $5,000 |  | $13,000 | 90% | $11,700 |
| Revise Script |  |  | $1,000 |  |  | $1,000 | 100% | $1,000 |
| Equipment Rental | $500 | $2,500 | $4,750 | $4,750 |  | $12,500 | 80% | $10,000 |
| Film Interviews |  | $2,000 | $2,000 | $2,000 |  | $6,000 | 80% | $4,800 |
| Additional Filming |  |  |  |  | $3,000 | $3,000 | 0% | $ - |
| Initial Editing |  |  |  | $1,500 |  | $1,500 | 80% | $1,200 |
| Final Editing |  |  |  |  | $3,500 | $3,500 | 0% | $ - |
| Monthly Planned | $6,000 | $9,500 | $12,750 | $13,250 | $6,500 | $48,000 |  | $36,200 |
| Monthly  Planned Cumulative | $6,000 | $15,500 | $28,250 | $41,500 | $48,000 |  |  |  |
| Monthly Actual | $7,500 | $10,200 | $13,750 | $14,000 | $ - |  |  |  |
| Monthly  Actual Cumulative | $7,500 | $17,700 | $31,450 | $45,450 |  |  |  |  |

40. What is the Planned Value of this project?

|  |  |
| --- | --- |
| a. | $36,200 |
| b. | $41,500 |
| c. | $48,000 |
| d. | $56,300 |

ANS: B PTS: 1 DIF: Easy

41. What is the Earned Value of this project?

|  |  |
| --- | --- |
| a. | $36,200 |
| b. | $41,500 |
| c. | $48,000 |
| d. | $56,300 |

ANS: A PTS: 1 DIF: Easy

42. What is the Scheduled Performance Index?

|  |  |
| --- | --- |
| a. | .68 |
| b. | .71 |
| c. | .76 |
| d. | .87 |

ANS: D PTS: 1 DIF: Medium

43. What is the Estimated Time to Completion for this project?

|  |  |
| --- | --- |
| a. | 5.11 months |
| b. | 5.22 months |
| c. | 5.73 months |
| d. | 6.12 months |

ANS: C PTS: 1 DIF: Medium

44. What is the Cumulative Actual Work Performed for this project?

|  |  |
| --- | --- |
| a. | $36,200 |
| b. | $41,500 |
| c. | $45,450 |
| d. | $56,300 |

ANS: C PTS: 1 DIF: Medium

45. What is the Cost Performance Index for this project?

|  |  |
| --- | --- |
| a. | .68 |
| b. | .71 |
| c. | .73 |
| d. | .80 |

ANS: D PTS: 1 DIF: Medium

46. What is the Estimated Cumulative Cost of Completion for this project?

|  |  |
| --- | --- |
| a. | $48,000 |
| b. | $56,234 |
| c. | $60,760 |
| d. | $67,234 |

ANS: C PTS: 1 DIF: Medium

47. Brandon Hilbert is looking forward to promoting his new documentary. Using project management tools, he estimates that the promotional campaign should have a mean completion time of 17 weeks with a standard deviation of 3.3 weeks. What would be the 95% confidence interval for the completion of this promotional campaign?

|  |  |
| --- | --- |
| a. | 10.53 to 23.47 weeks |
| b. | 11.53 to 24.47 weeks |
| c. | 12.04 to 21.96 weeks |
| d. | 13.33 to 20.67 weeks |

ANS: A PTS: 1 DIF: Easy

48. Brandon Hilbert is looking forward to promoting his new documentary. Using project management tools, he estimates that the promotional campaign should have a mean completion time of 17 weeks with a standard deviation of 3.3 weeks. What would be the 99% confidence interval for the completion of this promotional campaign?

|  |  |
| --- | --- |
| a. | 7.75 to 26.25 |
| b. | 8.50 to 25.50 |
| c. | 9.33 to 24.67 |
| d. | 10.00 to 24.00 |

ANS: B PTS: 1 DIF: Medium

49. If Brandon Hilbert were to submit his film for the awards circuit, he needs to complete his promotional campaign within 22 weeks. What is the probability that he would succeed?

|  |  |
| --- | --- |
| a. | 98.75% |
| b. | 97.52% |
| c. | 95.00% |
| d. | 93.57% |

ANS: D PTS: 1 DIF: Medium

50. If Brandon Hilbert were to submit his film for the awards circuit, he needs to complete his promotional campaign before 15 weeks. What is the probability that he would succeed?

|  |  |
| --- | --- |
| a. | 2.50% |
| b. | 12.67% |
| c. | 27.09% |
| d. | 31.78% |

ANS: C PTS: 1 DIF: Medium