**Chapter 3: Project Management**

**Practice Problems**

**MULTIPLE CHOICE**

Recently, Jorge Perez announced his retirement by the end of the month after being 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). The data are listed below.

|  |  |  |
| --- | --- | --- |
| Activity | Predecessor | Time |
| A | — | 4 |
| B | — | 2 |
| C | A | 3 |
| D | A | 3 |
| E | B | 7 |
| F | B | 11 |
| G | C, D, E, F | 2 |

1. What would be the earliest start time for activity F?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 2 |
| c. | 7 |
| d. | 18 |

ANS: B PTS: 1 DIF: Easy

2. What would be the latest finish time for activity C?

|  |  |
| --- | --- |
| a. | 4 |
| b. | 6 |
| c. | 12 |
| d. | 13 |

ANS: D PTS: 1 DIF: Easy

3. What would be the slack times for Activities A, D, and E, respectively?

|  |  |
| --- | --- |
| a. | 4, 0, 2 |
| b. | 3, 0, 0 |
| c. | 6, 4, 0 |
| d. | 6, 6, 4 |

ANS: D PTS: 1 DIF: Easy

4. What is the duration of the project on the critical path?

|  |  |
| --- | --- |
| a. | 9 |
| b. | 15 |
| c. | 25 |
| d. | 32 |

ANS: B PTS: 1 DIF: Medium

5. What is the critical path ?

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

ANS: B PTS: 1 DIF: Medium

Xebec Technologies Corporation contracted 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 data are listed below.

|  |  |  |
| --- | --- | --- |
| Activity | Predecessor | Time |
| A | — | 18 |
| B | A | 13 |
| C | A | 7 |
| D | B, C | 12 |
| E | B, C | 19 |
| F | D, E | 8 |
| G | D, E | 13 |
| H | F | 9 |
| I | G, H | 17 |
| J | I | 9 |

6. What would be the earliest start time for activity B?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 13 |
| c. | 18 |
| d. | 31 |

ANS: C PTS: 1 DIF: Easy

7. What is the critical path?

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

ANS: C PTS: 1 DIF: Easy

8. What is the duration of the project on the critical path?

|  |  |
| --- | --- |
| a. | 87 |
| b. | 93 |
| c. | 101 |
| d. | 125 |

ANS: B PTS: 1 DIF: Easy

9. What would be the slack times for Activities A, D, and E, respectively?

|  |  |
| --- | --- |
| a. | 0, 0, 0 |
| b. | 0, 0, 7 |
| c. | 0, 7, 0 |
| d. | 0, 7, 4 |

ANS: C PTS: 1 DIF: Medium

The new president of 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 the estimated durations (in weeks). The data are listed below.

|  |  |  |
| --- | --- | --- |
| Activity | Predecessor | Time |
| A | — | 6 |
| B | A | 3 |
| C | A | 9 |
| D | A | 10 |
| E | B | 4 |
| F | B | 2 |
| G | C | 12 |
| H | D | 3 |
| I | F, G | 14 |
| J | E, I, H | 4 |

10. What is the latest finish time for activity D?

|  |  |
| --- | --- |
| a. | 10 |
| b. | 24 |
| c. | 36 |
| d. | 38 |

ANS: D PTS: 1 DIF: Easy

11. What is the earliest finish time for activity G?

|  |  |
| --- | --- |
| a. | 12 |
| b. | 25 |
| c. | 27 |
| d. | 41 |

ANS: C PTS: 1 DIF: Easy

12. What is the slack time for Activity B?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 3 |
| c. | 6 |
| d. | 16 |

ANS: D PTS: 1 DIF: Medium

13. What is the duration of the project on the critical path?

|  |  |
| --- | --- |
| a. | 27 |
| b. | 45 |
| c. | 57 |
| d. | 65 |

ANS: B PTS: 1 DIF: Medium

14. What is the critical path?

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

ANS: C 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 3 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 next election’s campaign would look like. They mapped out the required activities, the precedence relationships, and estimated the duration for each activity (in weeks). The data are listed below.

|  |  |  |
| --- | --- | --- |
| Activity | Predecessor | Time |
| A | — | 2 |
| B | — | 6 |
| C | A, B | 3 |
| D | C | 8 |
| E | C | 11 |
| F | E | 3 |
| G | C | 7 |
| H | D, F, G | 16 |
| I | G, F | 23 |
| J | H | 6 |
| K | I, J | 9 |

15. What is the earliest start time for Activity D?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 6 |
| c. | 9 |
| d. | 20 |

ANS: C PTS: 1 DIF: Easy

16. What is the latest finish time for Activity D?

|  |  |
| --- | --- |
| a. | 9 |
| b. | 16 |
| c. | 17 |
| d. | 24 |

ANS: D PTS: 1 DIF: Easy

17. What is the slack time for Activity H?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 1 |
| c. | 4 |
| d. | 7 |

ANS: B PTS: 1 DIF: Easy

18. What is the critical path?

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

ANS: C PTS: 1 DIF: Easy

19. What is the duration of the project on the critical path?

|  |  |
| --- | --- |
| a. | 44 |
| b. | 55 |
| c. | 78 |
| d. | 94 |

ANS: B PTS: 1 DIF: Medium

Ms. Sherry Fellows is a sixth-grade social studies teacher. She believes it would be extremely valuable for her class to go to the state legislature and see it in action. She went to the principal with this suggestion, and the principal handed her the required set of activities that would have to be done before the school could even approve such a proposal. She went home and identified the required activities, their precedence relationships, and made a rough estimate of how long it would take her to carry out each activity (in days). The data are listed below.

|  |  |  |
| --- | --- | --- |
| Activity | Predecessor | Most Likely |
| A | — | 14 |
| B | A | 8 |
| C | A | 5 |
| D | A | 13 |
| E | A | 20 |
| F | C, D | 16 |
| G | B, F | 9 |
| H | E, G | 9 |

20. What is the earliest finish time for Activity C?

|  |  |
| --- | --- |
| a. | 14 |
| b. | 19 |
| c. | 22 |
| d. | 27 |

ANS: B PTS: 1 DIF: Easy

21. What is the latest finish time for Activity G?

|  |  |
| --- | --- |
| a. | 43 |
| b. | 52 |
| c. | 61 |
| d. | 70 |

ANS: B PTS: 1 DIF: Easy

22. What activity has the largest slack time?

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

ANS: A PTS: 1 DIF: Easy

23. What is the critical path?

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

ANS: B PTS: 1 DIF: Easy

24. What is the duration of the critical path?

|  |  |
| --- | --- |
| a. | 52 |
| b. | 61 |
| c. | 68 |
| d. | 74 |

ANS: B PTS: 1 DIF: Medium

Dean Arnold Draper of the Pelton University School of Business believes that the school’s curriculum needs to have a major revision. He also recognizes that it is very difficult to convince his faculty of such a major change. He plans on having a retreat to present this proposal to the faculty, along with some suggestions as to the direction of the change for the curriculum. He can’t simply call for a meeting (or retreat) without having done significant homework. He’s mapped out the tasks that he will have to perform in order to have the materials to convince his faculty. In addition, he has determined the relationship among those activities and estimated their duration (in days). The data are given below.

|  |  |  |
| --- | --- | --- |
| Activity | Predecessor | Time |
| A | — | 8 |
| B | A | 6 |
| C | A | 11 |
| D | B, C | 9 |
| E | B, C | 3 |
| F | D, E | 7 |
| G | D, E | 4 |
| H | D, E | 5 |
| I | D, E | 10 |
| J | D, E | 8 |

25. What would be the earliest finish time for Activity H?

|  |  |
| --- | --- |
| a. | 28 |
| b. | 33 |
| c. | 38 |
| d. | 40 |

ANS: B PTS: 1 DIF: Easy

26. What would be the latest finish time for Activity B?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 8 |
| c. | 15 |
| d. | 19 |

ANS: D PTS: 1 DIF: Easy

27. What is the slack time for Activity E?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 3 |
| c. | 5 |
| d. | 6 |

ANS: D PTS: 1 DIF: Medium

28. What is the critical path?

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

ANS: B PTS: 1 DIF: Easy

29. What is the duration of the critical path?

|  |  |
| --- | --- |
| a. | 36 |
| b. | 38 |
| c. | 56 |
| d. | 71 |

ANS: B PTS: 1 DIF: Medium

Xebec Technologies Corporation submitted their proposal to the United States Air Force. The air force requires that all proposals be submitted in a PERT format. Xebec went back and reworked the numbers. The revised PERT data are listed below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activity | Predecessor | Optimistic | Most Likely | Pessimistic |
| A | — | 16 | 18 | 21 |
| B | A | 11 | 13 | 17 |
| C | A | 5 | 7 | 11 |
| D | B, C | 9 | 12 | 13 |
| E | B, C | 15 | 19 | 25 |
| F | D, E | 7 | 8 | 10 |
| G | D, E | 10 | 13 | 15 |
| H | F | 6 | 9 | 13 |
| I | G, H | 13 | 17 | 23 |
| J | I | 8 | 9 | 10 |

30. What is the critical path?

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

ANS: D PTS: 1 DIF: Medium

31. What is the duration for the critical path?

|  |  |
| --- | --- |
| a. | 85.50 |
| b. | 94.50 |
| c. | 109.17 |
| d. | 112.33 |

ANS: B PTS: 1 DIF: Medium

32. What is the slack time for Activity G?

|  |  |
| --- | --- |
| a. | 0.00 |
| b. | 4.50 |
| c. | 6.00 |
| d. | 7.67 |

ANS: B PTS: 1 DIF: Medium

33. What is the standard deviation of Activity C?

|  |  |
| --- | --- |
| a. | 0.17 |
| b. | 0.33 |
| c. | 0.67 |
| d. | 1.00 |

ANS: D PTS: 1 DIF: Hard

34. What is the standard deviation of the critical path?

|  |  |
| --- | --- |
| a. | 0.133 |
| b. | 0.863 |
| c. | 1.897 |
| d. | 2.995 |

ANS: D PTS: 1 DIF: Hard

Because of there are several construction projects going on at the same time at Miskatonic University, the contractor suggested that before anything is put on paper they employ a three-time estimate approach (PERT) to determining the duration of the project. Revised data are given below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activity | Predecessor | Optimistic | Most Likely | Pessimistic |
| A | — | 4 | 6 | 9 |
| B | A | 1 | 3 | 7 |
| C | A | 6 | 9 | 14 |
| D | A | 8 | 10 | 16 |
| E | B | 2 | 4 | 7 |
| F | B | 1 | 2 | 5 |
| G | C | 9 | 12 | 18 |
| H | D | 2 | 3 | 6 |
| I | F, G | 10 | 14 | 20 |
| J | E, I, H | 3 | 4 | 7 |

35. What is the critical path?

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

ANS: A PTS: 1 DIF: Medium

36. What is the duration for the critical path?

|  |  |
| --- | --- |
| a. | 65.00 |
| b. | 55.17 |
| c. | 46.67 |
| d. | 43.33 |

ANS: C PTS: 1 DIF: Medium

37. What is the slack time for Activity H?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 16.17 |
| c. | 22.17 |
| d. | 28.67 |

ANS: C PTS: 1 DIF: Medium

38. What is the standard deviation of Activity E?

|  |  |
| --- | --- |
| a. | 0.833 |
| b. | 1 |
| c. | 1.333 |
| d. | 1.5 |

ANS: A PTS: 1 DIF: Hard

39. What is the standard deviation of the critical path?

|  |  |
| --- | --- |
| a. | 1.227 |
| b. | 2.356 |
| c. | 2.786 |
| d. | 2.995 |

ANS: D PTS: 1 DIF: Hard

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). The results are given below.

|  |  |  |
| --- | --- | --- |
| Activity | Predecessor | Time |
| A: Contact Interviewees | — | 19 |
| B: Draft Script | — | 27 |
| C: Select Film Crew | A, B | 16 |
| D: Revise Script | A, B | 9 |
| E: Secure Equipment and Financing | A, B | 29 |
| F: Film Interviews | C, D | 15 |
| G: Additional Filming | E | 32 |
| H: Initial Editing | F | 18 |
| I: Final Editing | F, G | 20 |

40. What is the critical path?

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

ANS: C PTS: 1 DIF: Medium

41. What is the duration for the critical path?

|  |  |
| --- | --- |
| a. | 88 |
| b. | 90 |
| c. | 108 |
| d. | 187 |

ANS: C PTS: 1 DIF: Medium

42. What is the slack time for activity “Revise Script”?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 19 |
| c. | 30 |
| d. | 37 |

ANS: B PTS: 1 DIF: Medium

43. What is the slack time of activity “Initial Editing”?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 12 |
| c. | 32 |
| d. | 37 |

ANS: B PTS: 1 DIF: Medium

44. What was the earliest finish time for the activity “Secure Equipment and Financing”?

|  |  |
| --- | --- |
| a. | 27 |
| b. | 56 |
| c. | 58 |
| d. | 88 |

ANS: B PTS: 1 DIF: Medium

Ms. Sherry Fellows was working on her proposal for a field trip taking her students to the state legislature. Her husband asked her what she was doing, and she explained. He suggested that given her busy schedule, the use of one time estimate for each activity had problems. He suggested that she utilize three time estimates for each activity and then the computer for the critical path. The revised data that she came up with are listed below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Activity | Predecessor | Optimistic | Most Likely | Pessimistic |
| A | — | 10 | 14 | 18 |
| B | A | 5 | 8 | 10 |
| C | A | 3 | 5 | 11 |
| D | A | 11 | 13 | 19 |
| E | A | 17 | 20 | 29 |
| F | C, D | 12 | 16 | 23 |
| G | B, F | 6 | 9 | 16 |
| H | E, G | 5 | 9 | 15 |

45. What is the critical path?

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

ANS: B PTS: 1 DIF: Medium

46. What is the duration for the critical path?

|  |  |
| --- | --- |
| a. | 53.83 |
| b. | 61,17 |
| c. | 63.17 |
| d. | 77.67 |

ANS: C PTS: 1 DIF: Medium

47. What is the slack time for Activity C?

|  |  |
| --- | --- |
| a. | 0 |
| b. | 8 |
| c. | 18.33 |
| d. | 23.33 |

ANS: B PTS: 1 DIF: Medium

48. What is the standard deviation of Activity E?

|  |  |
| --- | --- |
| a. | 0.00 |
| b. | 1.33 |
| c. | 2.00 |
| d. | 2.17 |

ANS: C PTS: 1 DIF: Medium

49. What is the standard deviation of the critical path?

|  |  |
| --- | --- |
| a. | 2.17 |
| b. | 3.53 |
| c. | 4.27 |
| d. | 4.87 |

ANS: B PTS: 1 DIF: Hard

50. What is the standard deviation of Activity A?

|  |  |
| --- | --- |
| a. | 0.67 |
| b. | 1.33 |
| c. | 1.50 |
| d. | 1.83 |

ANS: B PTS: 1 DIF: Hard