**Chapter 9 Review Questions and Exercises**

**9-R1 What are five common reasons for crashing a project?**

Five common reasons for crashing a project include:

* Reducing time to market in order to gain a competitive advantage
* Unforeseen delays that cause substantial delays midway through the project
* Incentive contracts that reward reduced project time
* Imposed deadlines
* Very high overhead costs

**9-R2 What are the advantages and disadvantages of reducing project scope to accelerate a project? What can be done to reduce the disadvantages?**

Advantages to reducing project scope to accelerate a project are that time and cost may be reduced. Disadvantages include the fact that functionality is lost and the value of the project reduced. These disadvantages can be minimized by an intense re-examination of requirements with stakeholders to determine which features are essential. This “may actually improve the value of the project by getting it done more quickly and for a lower cost” (p. 288).

**9-R3** **Why is scheduling overtime a popular choice for getting projects back on schedule? What are the potential problems for relying on this option?**

Scheduling overtime is a popular choice for accelerating project completion because it avoids the additional costs of coordination and communication encountered when new people are added to a project. Additionally, there may be fewer distractions when working outside of normal business hours and, if the people working overtime are salaried workers, there may not be any real additional cost for the extra work.   
  
Potential problems with relying on overtime include the increased costs when using hourly workers. Overtime for salaried workers may result in reduced productivity, lower employee satisfaction, burnout or turnover.

**9-R4 Identify four indirect costs you might find on a moderately complex project. Why are these costs classified as indirect?**

Indirect costs that might be found on a moderately complex project include supervision, administration, consultants, and interest. These costs are classified as indirect because they cannot be associated with any particular work package or activity.

**9-R5** **How can a cost-duration graph be used by the project manager? Explain.**

Cost-duration graphs allow the project manager to identify “the costs of reducing project time so that comparisons can be made with the benefits of getting the project completed sooner” (p. 288). These graphs require gathering direct and indirect costs for specific project duration which can help highlight and searching critical activities to find the lowest direct-cost activities that will shorten project duration.

**9-R6 Reducing the project duration increases the risk of being late. Explain.**

Reducing the project duration increases the risk of being late because reducing the slack of noncritical activities increasing the likelihood of creating new critical paths. More critical paths increases the risk of the project being late.

**9-R7 It is possible to shorten the critical path and save money. Explain how.**

Shortening the critical path can save money in instances where indirect costs are a significant percentage of total project costs. A shorter project means these costs are incurred for less time.

**9-E1**

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In order to reduce the project duration by 2 weeks **I would shorten Activity H because it is on the critical path.**

**9-E3**

**Initial Project Duration: 15 time units**

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**Total Direct Cost: $730**

**Project Duration: 14 time units**

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**Total Direct Cost: $740**

**Project Duration: 13 time units**

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**Total Direct Cost: $760**

**Project Duration: 12 time units**

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**Total Direct Cost: $950**

**Project Duration: 11 time units**

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**Total Direct Cost: $1150**

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| **Project Duration** | **15** | **14** | **13** | **12** | **11** |
| Direct Costs | 730 | 740 | 760 | 950 | 1150 |
| Indirect Costs | 90 | 70 | 50 | 40 | 30 |
| Total Project Cost | $820 | $810 | $810 | $990 | $1180 |

**The optimum cost-time schedule for the project is either 13 or 14 time units. In either case the cost is $810.**

**9-E4**

**Initial Project Duration: 16 weeks**

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**Total Direct Cost: $680**

**Project Duration: 15 weeks**

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**Total Direct Cost: $720**

**Project Duration: 14 weeks**

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**Total Direct Cost: $790**

**Project Duration: 13 weeks**

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**Total Direct Cost: $860**

**Project Duration: 12 weeks**

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**Total Direct Cost: $930**

**Project Duration: 11 weeks**

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**Total Direct Cost: $1010**

**Project Duration: 10 weeks**

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**Total Direct Cost: $1290**

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| **Project Duration** | **16** | **15** | **14** | **13** | **12** | **11** | **10** |
| Direct Costs | 680 | 720 | 790 | 860 | 930 | 1010 | 1290 |
| Indirect Costs | 1200 | 1130 | 1000 | 900 | 860 | 820 | 790 |
| Total Project Cost | $1880 | $1850 | $1790 | $1760 | $1790 | $1830 | $2080 |

**9-E5**

**Initial Project Duration: 27 weeks**

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**Total Direct Cost: $300**

**Project Duration: 26 weeks**

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**Total Direct Cost: $330**

**Project Duration: 25 weeks**

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**Total Direct Cost: $380**

**Project Duration: 24 weeks**

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**Total Direct Cost: $470**

**Project Duration: 23 weeks**

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**Total Direct Cost: $650**

**Project Duration: 22 weeks**

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**Total Direct Cost: $830**

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| **Project Duration** | **27** | **26** | **25** | **24** | **23** | **22** |  |
| Direct Costs | 300 | 330 | 380 | 470 | 650 | 830 |  |
| Indirect Costs | 300 | 240 | 180 | 120 | 60 | 50 |  |
| Total Project Cost | 600 | 570 | 560 | 590 | 710 | 880 |  |
| Incentive | 0 | -10 | -20 | -30 | -40 | -50 |  |
| Total Cost with Incentive | $600 | $560 | $520 | $560 | $670 | $830 |  |

**The optimum cost-time schedule is 25 weeks with or without the incentive. I would therefore accept the incentive to complete the project in 25 weeks.**

**9-E6**

***\*\* Using $120 crash cost for C and $100 crash cost for G***

**Completion Time: 21**

**Total Cost: $550**

**Completion Time: 20**

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**Activity Crashed: G, H**

**Adjusted Total Cost: $610**

**Reason: Least expensive**

**Completion Time: 19**

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**Activity Crashed: B, C**

**Adjusted Total Cost: $690**

**Reason: C instead of E to avoid creating new critical paths; B instead of F because it occurs earlier.**

**Completion Time: 18**

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**Activity Crashed: B, E**

**Adjusted Total Cost: $770**

**Reason: B instead of F because it occurs earlier.**

**Completion Time: 17**

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**Activity Crashed: B, D, E**

**Adjusted Total Cost: $890**

**Reason: B instead of F because it occurs earlier.**