d. If the indirect costs for each project duration are \$400 (18 weeks), \$350 (17 weeks), \$300 (16 weeks), \$250 (15 weeks), \$200 (14 weeks), and \$150 (13 weeks), what is the total project cost for each duration? Indicate the minimum total project cost duration.

CASE: CELL PHONE DESIGN PROJECT

You work for Motorola in its global cell phone group. You have been made project manager for the design of a new cell phone model. Your supervisors have already scoped the project so you have a list showing the work breakdown structure and this includes major project activities. You must plan the project schedule and calculate project duration and project costs. Your boss wants the schedule and costs on his desk tomorrow morning!

You have been given the information in Exhibit 10.14. It includes all the activities required in the project and the duration of each activity. Also, dependencies between the activities have been identified. Remember that the preceding activity must be fully completed before work on the following activity can be started.

Your project is divided into five major tasks. Task P involves developing specifications for the new cell phone. Here decisions related to such things as battery life, size of the phone, and features need to be determined. These details are based on how a customer uses the cell phone. These user specifications are redefined in terms that have meaning to the subcontractors that will actually make the new cell phone in Task S, supplier specifications. These involve engineering details for how the product will perform. The individual components that make up the product are the focus of Task D. Task I brings all the components together and a working prototype is built and tested. Finally in Task V, vendors are selected and contracts are negotiated.

1. Draw a project network that includes all the activities.
2. Calculate the start and finish times for each activity and determine the minimum number of weeks for completing the project. Find the critical set of activities for the project.
3. Identify slack in the activities not on the project critical path.
4. Your boss would like you to suggest changes that could be made to the project that would significantly shorten it. What would you suggest?

exhibit 10.14

Work Breakdown Structure and Activities for the Cell Phone Design Project

MAJOR PROJECT TASKS/ACTIVITIES	ACTIVITY IDENTIFICATION	DEPENDENCY	DURATION (WEEKS)
Product specifications (P)			
Overall product specifications	P1	—	4
Hardware specifications	P2	P1	5
Software specifications	P3	P1	5
Market research	P4	P2, P3	2
Supplier specifications (S)			
Hardware	S1	P2	5
Software	S2	P3	6
Market research	S3	P4	1
Product design (D)			
Circuits	D1	S1, D7	8
Battery	D2	S1	1
Display	D3	S1	2
Outer cover	D4	S3	4
User interface	D5	S2	4
Camera	D6	S1, S2, S3	1
Functionality	D7	D5, D6	4
Product integration (I)			
Hardware	I1	D1, D2, D3, D4, D6	3
Software	I2	D7	5
Prototype testing	I3	I1,I2	5
Subcontracting (V)			
Vendor selection	V1	D7	10
Contract negotiation	V2	I3, V1	2

Excel: Cell_Phone Design