



Université d'Ottawa · University of Ottawa  
 School of Electrical Engineering and Computer Science

ELG 5100, Fall 2013

Assignment 1 Solution

**Q1.** Since the estimates are not drastically different (say, by a factor of 2), and we are estimating the most important component of the software, the Project Manager's choice becomes less of a technical one, and more a question of being on the safe side. To reduce risks, you should go with the worst case scenario of 5000 LOC. An experienced PM would not squander efforts in technical analysis in this case.

**Q2.**

For Basic Semiattached software project,

$$Effort(E) = 3.0 \times (Size)^{1.12} \dots\dots\dots Eq. 1$$

$$Time\ to\ Develop\ (TDEV) = 2.5 \times (E)^{0.35} \dots\dots\dots Eq. 2$$

Where, E is measured in staff-months, TDEV is in months and size is in KLOC.

According to the question,  $E = 200\ staff\ days$

We assume that there are 20 working days (5 working days per week) in a month.

$$Therefore, E = 200 / 20 = 10\ staff\ months$$

From Eq. 1 we get,

$$(Size)^{1.12} = E/3.0$$

$$or, Size = (E/3.0)^{(1/1.12)}$$

$$or, Size = (10/3.0)^{(1/1.12)} \quad [Substituting\ the\ value\ of\ E]$$

$$or, Size = 2.93\ (approx.)$$

Therefore, the size of the software is approximately **2.93 KLOC**.

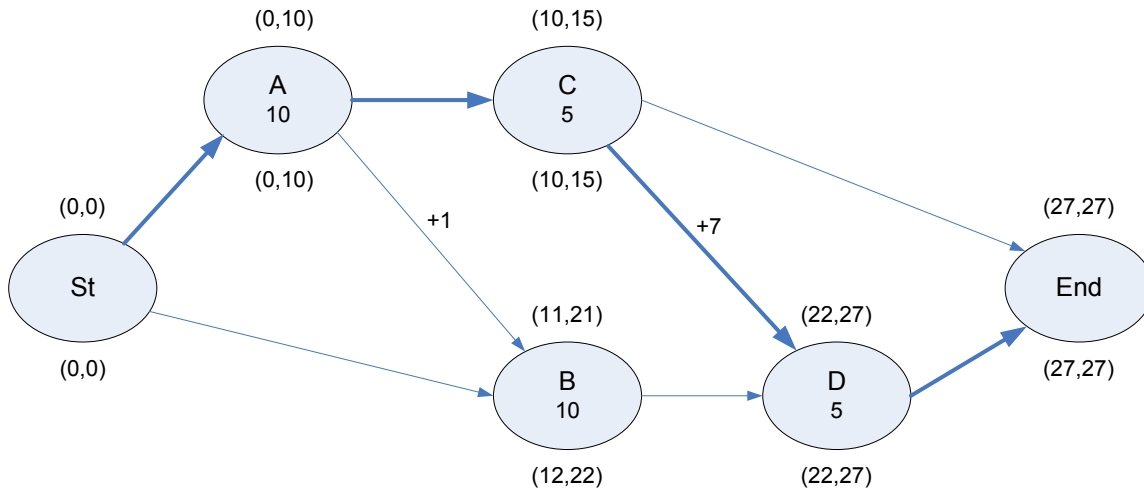
By substituting the value of E in Eq. 2 we get,

$$TDEV = 2.5 \times 10^{0.35}$$

$$or, TDEV = 5.6\ (approx.)$$

Therefore, given adequate resources, it will take approximately **5.6 months** to complete the development of this software.

**Q3**  
a)



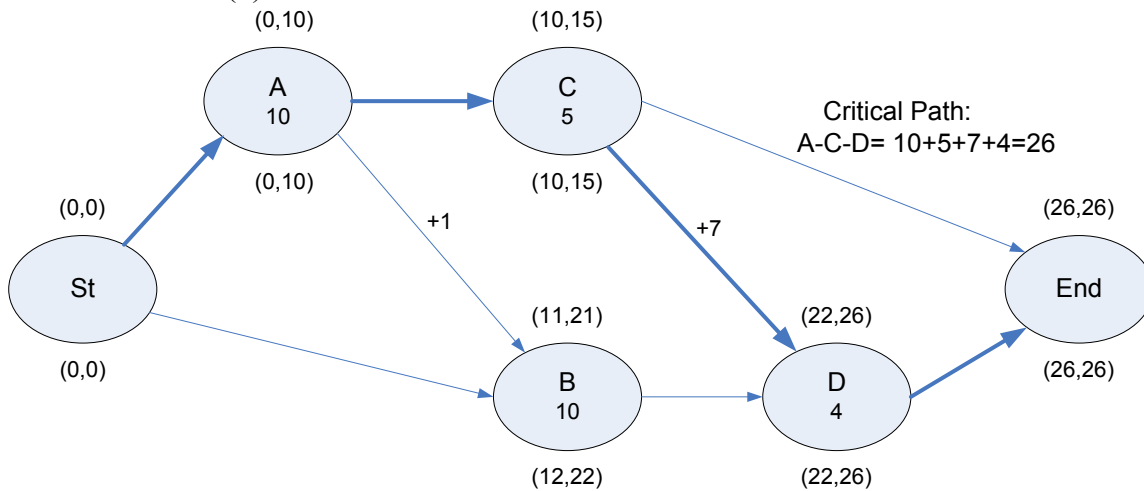
The critical path is A-C-D.

b) Initially the critical path is A-C-D.

**Step 1:** As the cheapest activity to crash on the critical path is D, we will crash it at step 1.

Activity	Maximum Crashing (months)	Cost per Month Crashed (\$)
A	0	N/A
B	3	1000
C	2	800
D	(1-1)=0	500

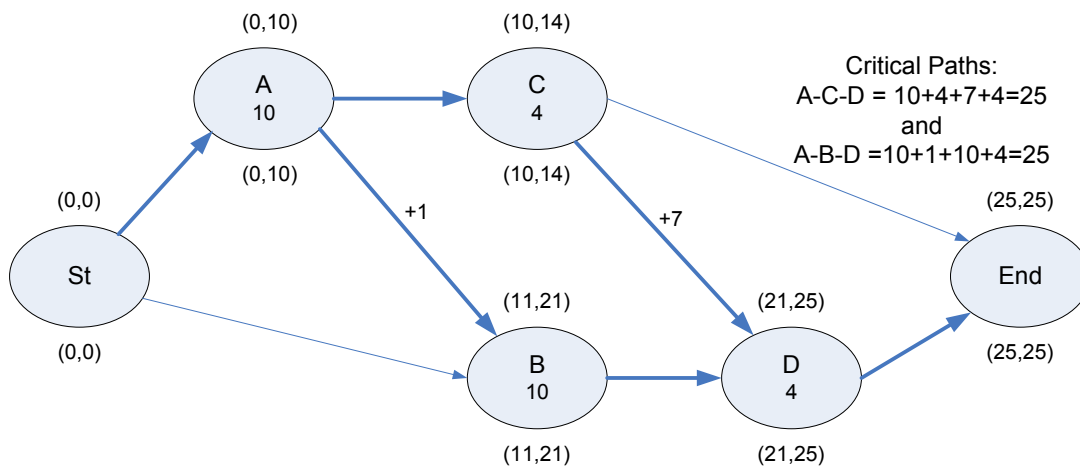
Total Extra Cost (\$) = 500



**Step 2:** As D has already reached its maximum crashing limit, the cheapest activity to crash on the critical path is now C. We will crash C at step 2.

Activity	Maximum Crashing (months)	Cost per Month Crashed (\$)
A	0	N/A
B	3	1000
C	(2-1)=1	800
D	0	500

Total Extra Cost (\$) = 500+800



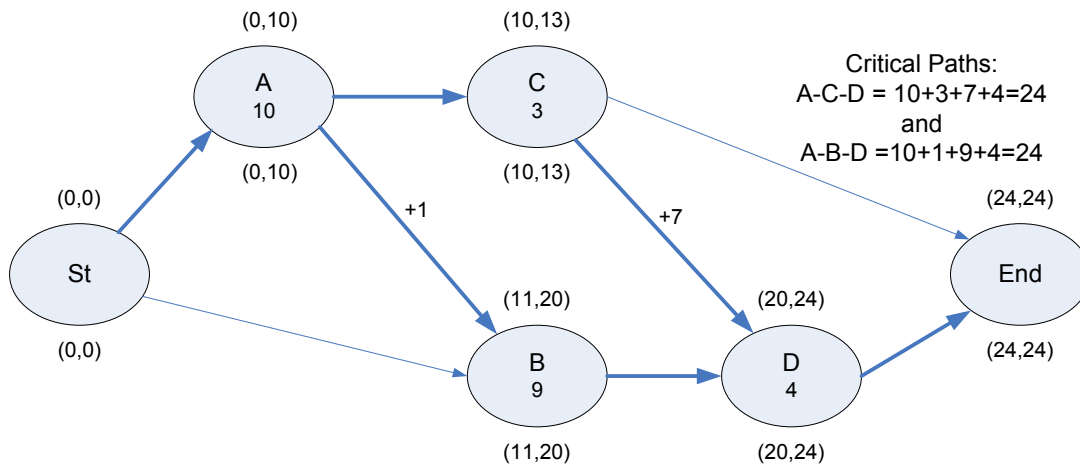
### Step 3:

Now as we have two critical paths, we will have to find the cheapest activity on each of the critical paths and crash those simultaneously.

On A-C-D the cheapest activity to crash is C and on A-B-D the cheapest activity to crash is B as D has already reached its maximum crashing limit.

Activity	Maximum Crashing (months)	Cost per Month Crashed (\$)
A	0	N/A
B	(3-1)=2	1000
C	(1-1)=0	800
D	0	500

Total Extra Cost (\$) = 500+800 +800+1000



#### Step 4:

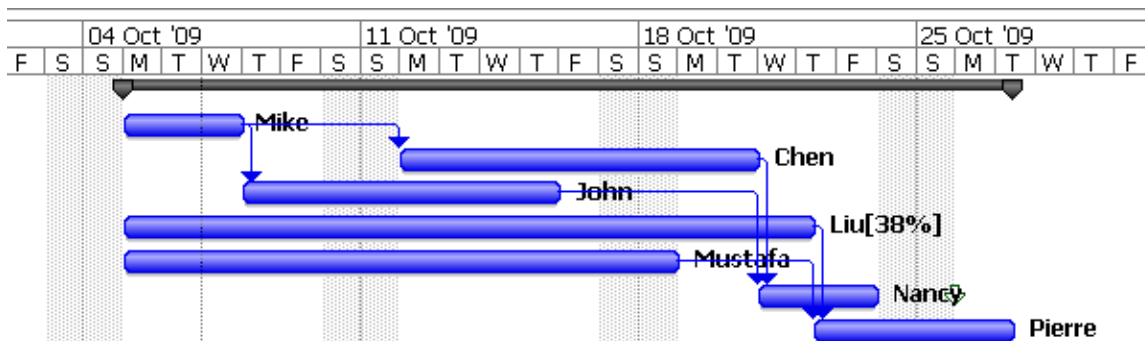
Again we have two critical paths. On A-C-D we can not crash any activity as both C and D have reached their maximum crashing limits. On A-B-D, we can crash B, but that will not reduce the length of the project since A-C-D will still be the critical path and the project will still be 24 months long.

Therefore, the shortest finishing time is **24 months** and total extra cost is **\$3100**.

#### Q4

a) Assuming 40 hour weeks, we get:

ID	ID	WBS	Task Name	Duration	Start	Finish	Predecessors
1	1	1	1 Phase1	6.16 days	05/10/09	27/10/09	
2	2	1.1	Finalize design of the A	3 days	Mon 05/10/09	Thu 08/10/09	
3	3	1.2	Implement AI compone	7 days	Mon 12/10/09	Tue 20/10/09	2
4	4	1.3	Implement AI compone	6 days	Thu 08/10/09	Fri 16/10/09	2
5	5	1.4	Implement frontend UI	13.16 days	Mon 05/10/09	Thu 22/10/09	
6	6	1.5	Implement backend UI	10 days	Mon 05/10/09	Mon 19/10/09	
7	7	1.6	Test AI	3 days	Wed 21/10/09	Fri 23/10/09	3,4
8	8	1.7	Test UI	3 days	Thu 22/10/09	Tue 27/10/09	5,6



From the above Gantt chart, we see that the earliest finishing time will be in 17 working days (just over 16).

**b)** From the Gantt chart we can see that all the tasks from the table can be delivered except 'Test UI' if iteration lengths are 3-calender weeks each.

**Q5.** Death March refers to a project that is destined to fail due to unrealistic expectations in time, scope or cost. The rule-of-thumb for determining that a project is a death march is to calculate the required time, budget, and effort (let's call it the calculated reality), and then observe the project parameters and whether any one of them overrides the calculated reality by 50% or more. For example:

- the schedule imposed by marketing is 50% shorter than the required time;
- the amount of work (features) promised by the CEO is 50% greater than doable;
- the size of the staff provided by the company is only half as large as necessary;
- the budget available is 50% less than needed

If any of the above applies, the project is considered a death march project as it is destined to fail.

**Q6-** The idea is to aim at the goal. While in reality the goal does become a moving target, it is important to always point towards it. If we have a good start, as opposed to an ad-hoc start, we will have to make fewer adjustments in terms of time, scope, budget and resources. Even if the requirements change drastically, the work on requirements gathering, WBS, estimation, planning will help us make risks evident early. By requirement change management, duties are clear to customers and project team, which prevents conflicts and disputations in the future.