

Exercise 2

Cost Management

- Solutions -

Task 1. (2 points)

Cost Element	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Total Cost
Hardware	0	20000	128000	2012000	12000	0	2172000
- Purchase HW	0	20000	120000	2000000	0	0	
- Install HW	0	0	8000	12000	12000	0	
Software	20000	68000	34000	30000	30000	20000	202000
- Purchase SW	0	30000	0	0	0	0	
- SW Labor	20000	38000	34000	30000	30000	20000	
Project Management	22496	25568	29024	27120	25872	12320	142400
- Client Interface	15040	15040	17296	16208	15456	7360	
- Project Plan	6400	0	0	0	0	0	
- Tracking	704	7040	8048	7392	7056	3360	
- Status Meeting	352	3488	3680	3520	3360	1600	
Total Cost	42496	113568	191024	2069120	67872	32320	2516400

Table 1. Initial cost budgeting

Points: The task is simply to add up the figures. Points are distributed according to the number of correct sums.

Task 2. (2 points)

Cost Element	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Total Cost
Hardware	0	20000	148000	2160000	2172000	2172000	2172000
Software	20000	88000	122000	152000	182000	202000	202000
Project Management	22496	48064	77088	104208	130080	142400	142400
Project Total	42496	156064	347088	2416208	2484080	2516400	2516400

Table 2. Planned Values

Points: The task is to add up the figures cumulatively. One point is given for the idea of using cumulative sums, the other point is given for the correct figures.

Task 3. (3 points)

Question	Earned Value Term	Abbreviation and Formula	Month 1	Month 2	Month 3
What is the efficiency at which tasks are getting done from a financial point of view?	Cost Performance Index	$CPI = EV / AC$	1.16	0.97	0.97
How fast does the project progress in relation to the expected progress?	Schedule Performance Index	$SPI = EV / PV$	0.76	0.95	0.99
How much will the project cost at completion?	Calculated Estimate at Completion	CEAC 3 different formulas			
What is the efficiency that must be achieved to complete the project within budget?	To Complete Performance Index	TCPI = $(BAC - EV) / (BAC - AC)$	0.998	1.002	1.005

Table 4. Variance data for month 1, 2, and 3

CEAC can be calculated in three different ways:

1. **BAC/CPI**, if variances are typical for the future.
This gives **\$2169310** for month 1 and **\$2594226** for month 2 and 3.
2. **AC + BAC – EV**, if variances are atypical for the future.
This gives **\$2511944** for month 1, **\$2521406** for month 2 and **\$2526522** for month 3.
3. **AC + ETC** (ETC is a new estimate), if original estimates were flawed. The figures here depend on the estimates students come up with. However, this formula shouldn't be used.

The best solution is to use the second formula in month 1 and the first in month 2 and month 3.

Points: One point is given for the correct terms and formulas. One point is given for the correct CPI, SPI and TCPI figures. And one point is given for the calculation of CEAC together with the reasoning when/why used the different formulas.

Task 4. (3 points)

In month 1, the project was much cheaper than expected, but the earned value was also far from planned value, though, was higher than the actual costs. Thus, CPI was good, but the project was way behind schedule ($SPI < 1$).

In month 2, the project became more expensive and the costs exceeded the earned value, however, only by a small margin. The costs were still below the planned, but got much closer to it. The earned value was still below the planned value, but got much closer to it. Thus, both CPI and SPI got closer to 1.

In month 3, the project progressed in a very similar way as in month 2: it was still a bit more expensive than planned and after month 3, the costs exceeded the planned cost for the first time. Earned value was very close to planned value.

After month 1, the Project Manager realized that the project is behind schedule and cheaper than expected. This could have been caused by cheap and inexperienced employees. Thus, he/she decided to hire more expensive, but very experienced staff. The result can be seen via the indices of month 2 and 3:

- Performance got quickly better and the project became more expensive in month 2.
- Costs and performance became stable, which resulted in: more costs than planned; project got even closer to the planned schedule in month 3.

Points: Two points is given for the summary of the project-situation in month 1-3. One point is given for the explanation of the PM's reaction after month 1.

Task 5. (2 points)

The project will finish in budget, since $AC = \$3,500,000$ and $EV = \$3,500,000$, which gives $CPI = 1.0$.

Points: One point for using CPI, the other for concluding that the project is doing fine budget wise.

(Students might also calculate other indices, e.g. SPI. With correct figures and reasoning that is also accepted.)

Task 6. (2 points)

The indices tell that the project is more expensive than expected and is behind schedule. The only useful information in the description is about the hiring process, which was done very quickly. Together with the indices, this indicates that the hired workers were not the right ones for the actual job (probably they were not inexperienced in general, since they were not cheap).

The solution is to replace/modify the team by hiring more skilled people.

Points: One point for recognizing the problem and possible cause, and one point for the proposed solution.

Task 7. (2 points)

The estimate was done analogously, which should only be done for the early, rough estimates. Later on bottom-up estimation should be used, which is always more precise.

Points: One point for realizing the need for bottom-up estimation, the other for explaining why it is better.

(Students might answer that the initial planned costs were underestimated. This is only accepted if the need for bottom-up estimation is also mentioned.)

Task 8. (2 points)

Project A is over budget and behind schedule, however, we are rather early in the project, thus the indices might not be stable enough to conclude that the project is in trouble.

Project B is ahead of schedule, but is too expensive. By now the indices should be stable, so it is an indication that something has to be done. A solution might be to release employees that are not needed in the last month. This will decrease costs and slow down the project.

Project C is close to its deadline and such a TCPI in this phase indicates that the project is not performing well. This project is the most troubled one.

At this point, nothing can be really done, but the senior management and client has to be informed about the situation.

Points: One point for describing the project-states, the other for describing how one could help them, if needed.

Task 9. (2 points)

Since we are talking about an unfinished activity, one has to use the 50/50, 20/80 or 0/100 rules. The earned value is \$5,000 or \$2000 or \$0, respectively.

Students can freely decide which rule to use.

Points: One point for realizing the three possibilities, the other point for giving one of the correct figures.