Software Project Management
(A.Y. 2018/2019)
Mock Exam Paper – 2h

January 30th, 2019

Preamble

The Silly Software Company (SSC) has been asked to develop a complex software system. You, as an employee of the company, have been appointed as Project Manager. The management is now asking you to provide some forecasting in order to decide on how to proceed with the project.

In deriving your prediction you should consider that the **week** gross salary of the emplyees is as following specified:
- *Senior developer:/Analysts* 2000€
- *Junior developer:* 1200€

Moreover historical data show that the company generally experiments a 60% overhead

Exercise 1.

At first in order to derive a more reliable estimation you sketch a set of workpackages (WPs) and tasks that you consider necessary in order to complete the project. WPs and tasks are detailed in Table 1. The table also includes information concerning the dependencies among the various tasks.

Activity (Precedents)	Activity Duration (weeks)				
	Optimistic (a)	Most likely (m)	Pessimistic (b)	Expected te	Standard deviation (s)
T1.1	9	9	15	10	1
T1.2	6	7	14	8	1,33
T1.3 (T1.2,T2.1)	14	16	18	16	0,66
T2.1 (T3.1,T1.2)	7	8	9	8	0,33
T2.2 (T1.1, T1.2)	5	13	15	12	1,66
T2.3 (T3.1)	8	15	16	14	1,33
T3.1	9	9	15	10	1
T3.2 (T2.1,T2.3)	8	9	16	10	1,33
T3.3 (T2.2,T3.1)	7	8	9	8	0,33
T4.1 (T3.2,T3.3)	7	7	13	8	1
T4.2 (T3.1,T3.3)	3	6	9	6	1
T4.3 (T4.1,T4.2)	9	10	11	10	0,33

Table 1: Activities time estimates (in weeks)

TO derive a first estimation you should now apply the PERT approach to:

- Compute the duration of the project

- Compute the probability of successfully terminating task T4.2 within 36 weeks

- Compute the deadline by which the probability of having finished task T4.2 is 95%

- Immagine to have just observed that tasks T1.1 and T1.2 just ended at week 11 and now task T2.2 can then start. Which is now the probability to have it done by week 22?

12 points

Exercise 2.

In order to derive the plan you now consider the critical chain method. For deriving the plan you consider the numbers reported in Table 2 and you consider as duration the one expressed by t_e, and the corresponding comfort zone is the one derived considering a probability of 95% with an approximation derived using ceiling to the whole week.

Once you have defined the plan according to the critical chain method you now derive the expected costs on the base of the effort needed by each task in relation to Senior Developers (SD) and Junior Developers (JD) respectively (the effort should be uniformly distributed over the weeks for the whole duration of the corresponding task):

Task	Effort
T1.1	10 SD/10 JD
T1.2	16 SD/16 JD
T1.3	16 SD/0 JD
T2.1	0 SD/8 JD
T2.2	12 SD/6 JD
T2.3	14 SD/14 JD
T3.1	10 SD/0 JD
T3.2	0 SD/10 JD
T3.3	16 SD/8 JD
T4.1	0 SD/8 JD
T4.2	6 SD/12 JD
T4.3	40 SD/40 JD

Table 2: Activities, effort and dependencies

- Provide the resource allocation and compute the total cost.
- Compute the total cost, possibly suggesting modification to the plan, to respect the following constraints (if possible) (Tables 3 and 3 are provided for your convenience):
  - activities cannot be split in subactivities
  - the company does not have more than 4 Senior Developers and 3 Junior Developers, and recruitment activities should be avoided, if possible (otherwise the cost is 10000€ for each resource to be recrutied)
  - in order to simplify management activities, resources are charged to the project budget for a minimum of 3 weeks (i.e. in case a resource is assigned to a project for less then three weeks in any case the budget to be considered is the one corresponding to three weeks).

12 points

Question 1.

Describe the strategy based on the "probability impact matrix" in order to identify the most relevant risks worthy to be considered during risk planning activities.

Question 2.

Give a description for values, principles and practices in the context of agile methodologies. Explain then the meaning of the sentence "Better-then-not-doing-it" in relation to the adoption of agile practices. **3 points**

Question 3.

Explain what the "last responsible moment" is and how it relates to planning in agile methodologies and in particular in SCRUM. **3 points**

Question 4.

Describe the characteristics of COCOMOII and its underlying hypothesis **3 points**

Weeks	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	TOT.
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Table 3: Exercise 2 - Resource Allocation

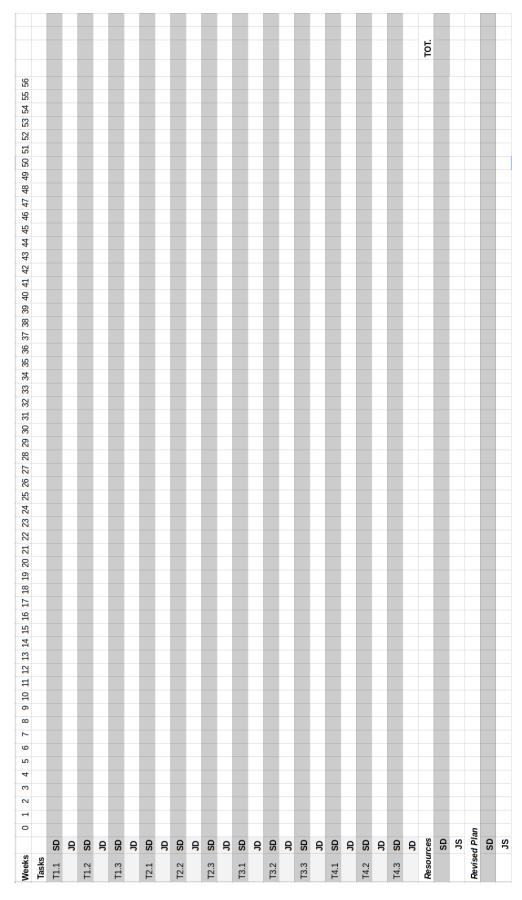| Weeks	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
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