Vrije Universiteit Amsterdam
Faculty of Exact Sciences

Exam:	**Software Project Management**	**Version A**
Code:	**X_401093**	
Coordinator:	**Dr. Nelly Condori-Fernandez**	
Date:	**May 27, 2015**	
Duration:	2 **hours 45 minutes**	
Calculator allowed:	**Yes**	
Graphical calculator allowed:	**Yes**	
Number of questions:	**8**	
Type of questions:	**Open and close questions**	
Total points:	**The maximum amount of points is 10.**	
Grades:	**The grades will be made public on: June 10, 2015**	
Number of pages:	7 (including Appendix)	

SOFTWARE PROJECT MANAGEMENT-EXAM

All the required tables and formulae can be found in the appendix.

FIRST PART

First read the following scenario:

I was hired by the company Solutions when only the Project Manager (PM) and one senior analyst were on board. As I was the only person with significant experience in building similar recommender systems to the product that our customer needed, the PM asked me to give him an estimate of the project to help him produce a reasonable plan. I estimated the project to take approximately 12 months if we had a team of 4 or 5 members, depending on their skills. My estimates were mainly based on the fact that the customer wasn't sure what exactly they wanted. However, the company had signed a contract for 8 months with the possibility of counting with one senior developer that could be added later to the team.

Given that PM agreed completely with my estimates, he and I decided to ask the project sponsor for more staff and for new negotiations with the customer for more time. After a long negotiation, only the customer agreed to extend the total duration to 12 months. But during the project our customer insisted for adding some more features.

At the end, we got to complete the project in 16 months! but we had to work day-and-night.

1) **Select one of the life cycle models in the list below that you think that PM considered as the most appropriate to complete the project. Explain your rationale *(1 point)*.**

   a) Evolutionary prototyping
   b) Sashimi model
   c) Evolutionary delivery
   d) Design to schedule

2) **Identify two risks that the PM could have considered, and propose its respective risk planning.**

(1.5 point)

No	Risk	Category	Root cause	Probability	Impact

3) **Explain what estimation method (s) was (were) used for estimating the development duration of this project.**

(0.5 point)

SECOND PART

4) Assume that you have information for matching on the basis of two parameters: the number of reads (R), and writes (W) data movements. As PM of a new project, interested in estimating its cost, you found two past cases A and B as more similar to your new project (See table).

(1 point)

a) Which source case would you use for estimating the new project, A or project B? Justify your choice

	Projects	**Read**	**Write**
Source cases	Project A	34	32
	Project B	32	34
Target case	New Project	30	32

5) Considering that the size of an information system is 800 Cosmic function points (CFP), and it will be developed in FoxPro, estimate the development time required for this project, by considering the following characteristics:

- Clear understanding of objectives and requirements,
- Number and criticality of risk items is very low, but
- Software conformance with external interface specifications is highly needed.
- Development team is extensive experienced and highly motivated!

(1.5 point)

Language	**SLOC/CFP**
FoxPro	**36**

6) The following table represents all the activities of a small project carried out by three developers Maria, Joseph and Fermin.

Activities	**Predecessors**	**Duration**
A		4
B	A	2
C	A	6
D	A	6
E	B	4
F	C	5
G	D	7
H	E,F	3

Activities	Predecessors	Duration
I	E	8
J	I, G	2
K	J, H	3

Draw the activity network (graph), and answer the following questions, by considering the following responsibilities distribution:

Resources	Activities
Maria	A, D,G, K
Joseph	C, F, H,
Fermin	B, E, I, J

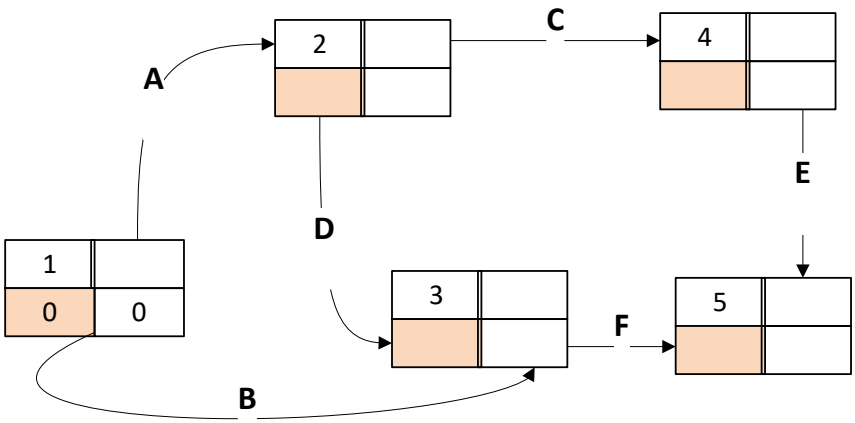
a) Identify the developer (s) responsible of critical activities:
b) Joseph needs to take 2days-of after finalizing the activity F.
   - Do you think it would cause any delay on the project? Explain your rationale
   - Do you think it would cause any delay on the following activity? Explain your rationale

(2 points)

7) Given the following activity network diagram, and estimates for each activity, calculate the probability of meeting the target of 19 weeks.

(*1.5 point)*

Activity	Optimistic duration	Most likely	Pessimistic Duration
A	3	5	6
B	5	6	8
C	14	18	20
D	13	10	15
E	5	8	10
F	6	7	9



THIRD PART

8) Indicate whether the following statements are true or false, and for the false statements explain the mistake:

(1 point)

a) A risk is an uncertain event that, if it occurs, has a negative effect on the project's objectives.
b) Risk exposure allows us to evaluate the cost-effectiveness of a risk reduction action.
c) COCOMO II allows estimating the effort at two different stages of the development process: early design and post architecture.
d) Network diagrams help us to identify when resources will need to be deployed to activities.
e) A Gantt chart for a project does not show the life cycle model.
f) The Work Breakdown Structure (WBS) is used to discuss and validate the requirements with the customer.

Appendix I: Basic COCOMO Table

System type	A	B	I	J
Organic (broadly, information systems)	2.4	1.05	2.5	0.38
Semi-detached	3.0	1.12	2.5	0.35
Embedded (broadly, real-time)	3.6	1.20	2.5	0.32

Effort (E) = A × size^{B} (person-months)
Development time (D) = i × (effort)^{J} months
People required (P)= E/D

Appendix II: COCOMO II

Effort= **A(size)^(sf)** ×(em1) ×(em2) ×(em3)….
sf = 1.01 + 0.01 × Σ scale factors

COCOMO II Scale factor values

Driver	Very low	Low	Nominal	High	Very high	Extra high
PREC	6.20	4.96	3.72	2.48	1.24	0.00
FLEX	5.07	4.05	3.04	2.03	1.01	0.00
RESL	7.07	5.65	4.24	2.83	1.41	0.00
TEAM	5.48	4.38	3.29	2.19	1.10	0.00
PMAT	7.80	6.24	4.68	3.12	1.56	0.00

PREC = Precedentedness
FLEX = Development flexibility
RESL = Architecture/risk resolution
TEAM = Team cohesion
PMAT = Process maturity

Appendix III: Assessing the Risk to the schedule with PERT

Expected duration of an activity/task: $t_e = (a + 4m + b) / 6$
Standard deviation of an activity/task: $s = (b - a) / 6$

Standard deviation of a project event

$$S = \sqrt{((s_A)^2 + (s_B)^2 + (s_C)^2 \ldots . + (s_N)2)} = \sqrt{\sum_{i \in Task} {s_i}^2}$$

Z value:

$$Z = \frac{Target\ duration - Expected\ duration}{S}$$

Appendix IV: Graph of Z-values