Vrije Universiteit Amsterdam
Faculty of Exact Sciences

Exam:	**Software Project Management**	**Version A**
Code:	**X_401093**	
Coordinator:	**Dr. Nelly Condori-Fernandez**	
Date:	**July 10, 2014**	
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:Friday July 18, 2014**	
Number of pages:	5 (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) was on board. As I was the only person with significant experience in building similar financial 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 predicted 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 5 months with the possibility of counting with one junior 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 and money. After a long negotiation, only the customer agreed to extend the total duration but they insisted for some more features in exchange.

So, not only we had to work day-and-night but we had no spark of motivation - there would be no reward, no recognition, no bonus. However, at the end, we got to complete the project in 16 months!

1) **Describe all the mistakes that can be found in the scenario above (*1 point*)**

2) **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) Staged delivery model
   c) Evolutionary delivery
   d) Design to schedule

3) **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? Explain your choice

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

4) Select the lifecycle model that aligns more with the following WBs (Work Breakdown Structure). Explain why you chose this lifecycle.

(1 point)

1. **Concept of operation**
   - 1.1 Determine objectives, and constraints
   - 1.2 Identify and resolve risks
   - 1.3 Evaluate alternatives
   - 1.4 Develop deliverables and testing
   - 1.5 Plan next iteration
2. **Software Requirements**
   - 2.1 Determine objectives, and constraints
   - 2.2 Identify and resolve risks
   - 2.3 Evaluate alternatives
   - 2.4 Develop deliverables and testing
   - 2.5 Plan next iteration
3. **Software product design**
   - 3.1 Determine objectives, and constraints
   - 3.2 Identify and resolve risks
   - 3.3 Evaluate alternatives
   - 3.4 Develop deliverables and validation
   - **3.5** Plan next iteration
4. **Detailed design**
   - 4.1 Determine objectives, and constraints
   - 4.2 Identify and resolve risks
   - 4.3 Evaluate alternatives
   - 4.4 Develop deliverables and testing
     - 4.4.1 Unit test
     - 4.4.2 Integration and test
     - 4.4.3 Acceptance test
   - **4.5** Release

Work Breakdown structure at level 2

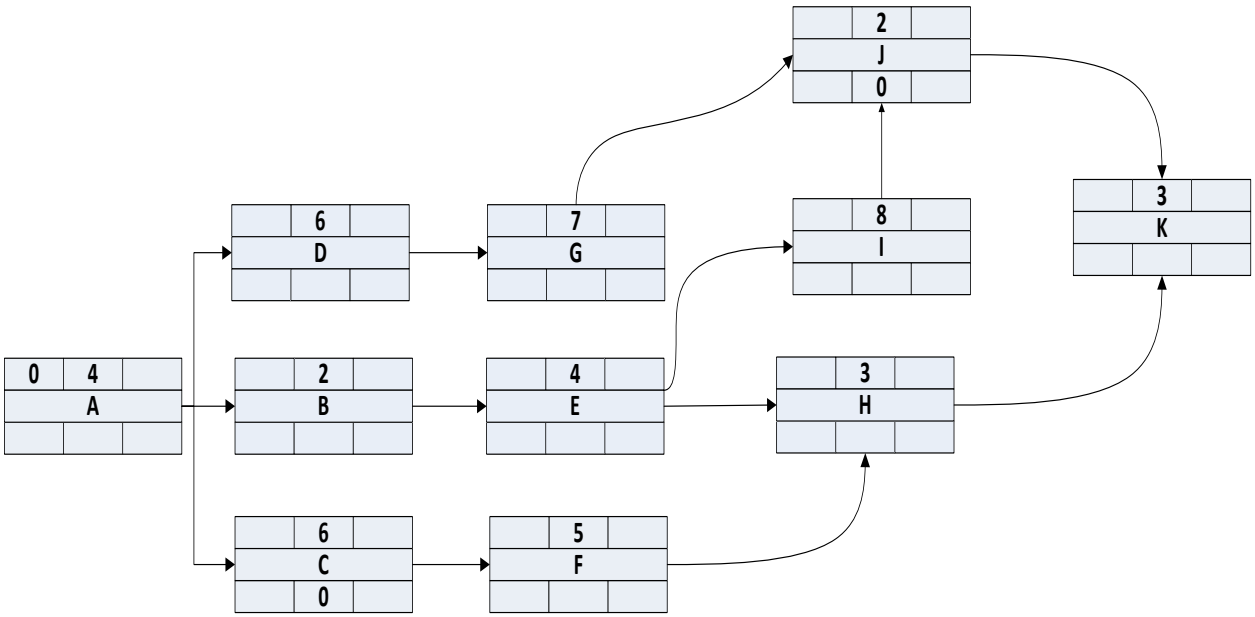
a) Evolutionary prototyping
b) Evolutionary delivery
c) Spiral model
d) Sashimi model

SECOND PART

5) Considering that the size of an information system is 500 function points, and it will be developed in FoxPro, estimate the development time and team size required for this project. ***(1.5 points)***

Language	SLOC/FP
FoxPro	**36**

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



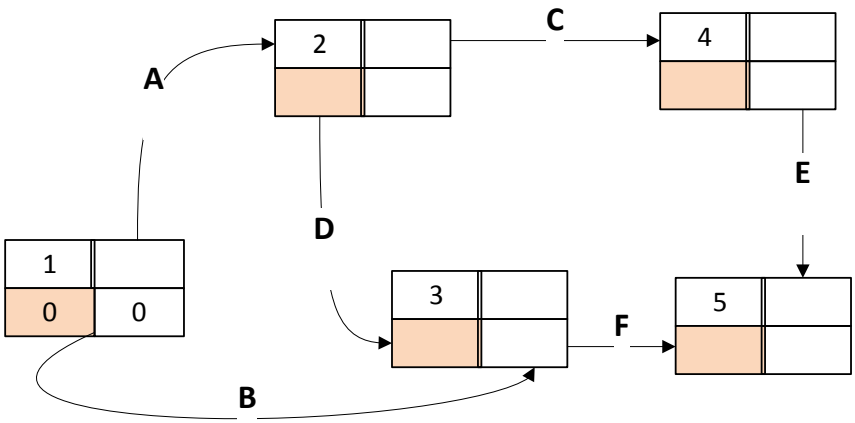
Complete the graph, and answer the following questions, by considering the following responsibilities distribution: ***(2 points)***

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

a) List the critical path (s) of the graph
b) Identify the developer (s) responsible of non-critical activities.
c) 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

7) Given the following network diagram (AoA), and estimates for each activity, calculate the expected duration for completing the project. ***(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, there is no need for argumentation: ***(1 point)***

a) The project charter is the informal document to initiate the Project
b) Time estimation is difficult using the Evolutionary Prototyping model
c) COCOMOII allows estimating the effort at two different stages of the development process: early design and post architecture.
d) Effective risk management is made up of risk assessment and risk monitoring
e) The triple constraint concerns on Cost, Time and Risk
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: 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

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