Vrije Universiteit Amsterdam

Faculty of Exact Sciences

Exam:	**Software Project Management**	**Version A**
Code:	**X_401093**	
Coordinator:	**Dr. Nelly Condori-Fernandez**	
Date:	**May 28, 2014**	
Duration:	**2 hours 45 minutes**	
Calculator allowed:	**Yes**	
Graphical calculator allowed:	**Yes**	
Number of questions:	**10**	
Type of questions:	**Open and multiple choice**	
Total points:	**The maximum amount of points is 10.**	
Grades:	**The grades will be made public on: Monday June 9, 2014 (latest!)**	
Number of pages:	3	

SOFTWARE PROJECT MANAGEMENT-EXAM

Surname:

Read each question carefully and keep in mind that you have 2 hours and 45 minutes for the exam. All the required tables and formulae can be found in the appendix.

FIRST PART

Read the following scenario:
A software supplier negotiated a fixed-price contracts with a three-month delivery time with the Dutch government to supply a system supporting map-making. It later became apparent that the original estimate of effort upon which the bid was based was about half the real effort! The project manager had considered using an advanced CASE tool for reducing the coding time, and other advanced techniques for testing. But the development team never had worked with similar technology.
So, the project had to be re-planned in order to meet the target of 3 months. One of the most important actions was to change the original life cycle model (Design-to-tools model).

1) Select from the list below the life cycle model that you consider as the most appropriate. Justify your selection (***1 point***)

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

2) Describe the most important mistakes that can be found in the scenario above, with respect to the following dimensions ***(1 point)***:

a) Process
b) Technology
c) People

3) Suppose you are involved in a large project concerning the development of a patient planning system for a hospital. You may opt for one of the two following strategies:

The first strategy is to start with a thorough analysis of user requirements, after which the system is built according to these requirements.
The second strategy starts with a less complete requirements analysis phase, after which a pilot version is developed. This pilot version is installed in one or a few small departments. Further development of the system is guided by the experience gained while working with the pilot version.
Which one would be your choice? Also motivate your choice. (***2 points***)

SECOND PART (Formula and Table in Appendix)

4) A software development team is developing an embedded system that needs innovative data processing architectures, and algorithms. A very precise software engineering document lays down very strict requirements. The good news is that support tools for resolving risk items, developing and verifying architectural specifications is available. Moreover, the development team is highly cooperative, and processes of the organization are very well formalized.
   a) Considering that the size of the application is 350 function points, and it will be developed in C++, estimate the effort and development time required for this project.

(1.5 points)

5) Consider the next table representing network diagram data for a small project, and assume that all estimated durations are in working days (***2 points)***

Activities	Estimated duration	Predecessors
A	6	
B	15	A
C	25	B
D	10	B
E	28	B
F	12	C,D
G	12	E,F
H	5	G
I	5	H

   a) Determine the critical path of the project
   b) Identify any non-critical tasks
   c) Calculate free slack (float) for tasks E and G and interpret both results.
   d) Calculate the earliest time it will take to complete this project.

6) The next table shows the critical activities required for developing a software project, as well as their respective estimated times. Calculate the probability of meeting the target of 34 days. (***1.5 points)***

Activity	Optimistic duration	Most likely duration	Pessimistic duration
A	3	5	6
B	3	4	6
C	1	3	7
D	3	4	5
E	1	2	5
F	5	6	14
G	3	7	8
H	0,5	1	1,5

THIRD PART

7) Indicate whether statements are true or false:

a) Liaising with clients, users, developers and other stakeholders is one of the activities of the team leader. ( )

b) The Work Breakdown Structure (WBs) must capture all internal, external, and interim deliverables, including project management. ( )

c) The product acceptance criterion is not part of the project scope statement. ( )

d) Risk mitigation tries to reduce the impact if the risk does occur. ( )

e) The pure waterfall model suits for ill-defined and dynamic requirements. ( )

f) According to COSMIC, the size of a piece of software is defined as the total number of data movements (Entries, Exits, Queries and Writes). ( )

1 point

Appendix I: COCOMO constants

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

Appendix II: Scale factor values

Effort= **A(size)^(sf)** ×(em1) ×(em2) ×(em3)….
Development time (D) = i × (effort)^{J} months
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: Table for converting functions points to LOC

Language	SLOC / UFP
Ada	71
AI Shell	49
APL	32
Assembly	320
Assembly (Macro)	213
ANSI/Quick/Turbo Basic	64
Basic - Compiled	91
Basic - Interpreted	128
C	128
C++	29
ANSI Cobol 85	91
Fortan 77	105
Forth	64
Jovial	105
Lisp	64
Modula 2	80
Pascal	91
Prolog	64
Report Generator	80
Spreadsheet	6

Appendix IV: 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 V: Graph of Z-values