Training Exam

Estimated Duration: 90 Minutes

You can do it in a team. However, I **strongly recommend trying it individually**!

Project Organization and Management

Spring 2016, SDU, BSc-6

Marco Kuhrmann

Task 1: Multiple Choice (24 Points)

For the following questions, please tick every box that is a correct answer. There can be more than one correct answers, i.e., "0..*".

Every correctly ticked box gives 1 point; every incorrectly ticked box gives -1 point. The overall task gives a minimum of 0 points.

	Questions
1.	Changes occur in all projects. In a project in which you have to deal with unclear requirement, you plan to establish a problem- and change management system. Which statements regarding problem- and change management apply? ☐ Every change request is presented to the steering board that decides about the further steps. ☐ Change request should only be considered for implementation after an evaluation of the impact on the project. ☐ After the final delivery, all problems that were found by the client in the system test have to be fixed without extra cost.
2.	In order to determine the project progress, several KPIs need to be collected and evaluated on a regular basis to implement controlling measures. Which statements regarding project controlling apply? ☐ The project manager performs the measurement and controlling tasks to allow the project team to concentrate on the "real work." ☐ A milestone trend analysis is a method to early analyze project progress and to initiate respective counter measures if necessary. ☐ A milestone trend analysis allows for precisely determine the project end date.
3.	Which statements apply regarding Agile Methods? ☐ They do not require project documentation. ☐ Agile Methods can be combined with traditional software processes, such as the RUP. ☐ In risky and highly innovative projects, Agile Methods allow for precisely defining the deliveries' quality and to document the respective definitions in the contract.
4.	Which statements regarding effort- and cost estimation apply? ☐ CoCoMo, Delphi, and Function Points are examples for algorithmic estimation models. ☐ The 2-point method includes the best case as well as the worst case, and balances the outcome with the so-called likely case. ☐ Algorithmic estimation models allow for distinguishing easy and hard software projects.

	Questions
5.	Which statements regarding reviews apply? ☐ In reviews, bugs are found and fixed in the source code. ☐ In reviews, options to improve the quality assurance procedures are discussed. ☐ In a formal review, for each test object, the found deficiencies are documented.
6.	Which statements regarding (project) roles and responsibility apply? ☐ Agile Methods waive the definition of roles. ☐ In a project, project manager and quality manager should be the same person. ☐ The project manager is responsible for the project controlling.
7.	Which statements regarding organization models for companies and project teams apply? ☐ The project organization of project teams is not influenced by the company organization. ☐ A project manager holds a position in an administrative unit and has full authority to issue directives to all team members of a project. ☐ A matrix organization offers the chance to implement flexible resource management, yet bears the risk of goal conflicts of the involved organization units.
8.	Your company has the strategic (long-term) goal to reach the CMMI maturity level 4. An assessor defined a catalog of improvement requirements, and one of the requirements is the consequent implementation of a measurement program. Which statements regarding the application of metrics apply? ☐ For each project, individual metrics should be developed in order to get precise information to be stored in the company-wide knowledge management. ☐ The metric “Lines of Code” is a simple approach to measure the productivity in a project. ☐ Metrics should be selected according to the long-term company goals.

Task 2: Project Planning (29 Points)

The company WI^2 (*We Implement IT*) found a call for proposals of an insurance company. So far, customers must call a call center agent, e.g., to update their master data or to change the tariff. In order to improve the business processes and to allow customers to perform minor changes themselves, the insurance company wants to develop a new internet-based web portal.

Based on the call for proposals, you developed the following work packages, which are considered relevant for the insurance company. Furthermore, you found some dependencies and you also provided some initial estimates regarding the work packages' duration and the required persons.

WP	Description	Dur. in days	Predecessor	Required persons
A1	Analysis of the business process "Master Data Management"	5		1
A2	Analysis of the business process "Query Tariff Information"	5		1
A3	Analysis of system-related requirements	20		2
M1	Modeling the business process "Master Data Management"	5	A1	1
M2	Modeling the business process "Query Tariff Information"	5	A2	1
D1	High-level and detailed design of the overall system architecture	25	A3	2
E1	Implementation of the business processes	20	M1, M2	2
E2	Integration of the business processes with the application framework	10	E1, E3	3
E3	Implementation of the application framework	15	D1	2
E4	Implementation of the user interface	30		3
E5	Integration of the overall system	10	E2, E4	1

The following milestones are defined for the project:

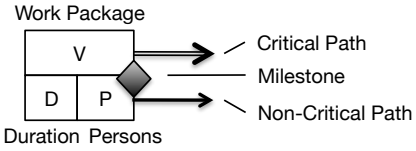
- M1: D1 is finished
- M2: E1 is finished
- M3: E2 is finished
- M4: E5 is finished

You have the following resources at your disposal:

- 2 analysts (work package classes A and M)
- 2 architects (work package class D)
- 4 developers (work package class E)
- 1 project manager

The project starts at t=0.

A) [3 Points] Develop an project network diagram in MPM notation that reflects the aforementioned work packages, and highlight the milestones. Highlight the critical path. Use the following simplified notation:



Solution:

B) [12 Points] For all work packages, calculate the earliest/latest start and end dates (*fet, fat, set, sat*), and the project end date *pet*. For every work package, also note available buffer.

Solution:

Work Package	fat	sat	fet	set	Buffer
A1					
A2					
A3					
M1					
M2					
D1					
E1					
E2					
E3					
E4					
E5					

Solution: Project End Date (pet):

C) [2 Points] Based on the provided work package information, calculate the overall effort for the project in the unit PD (Person Days).

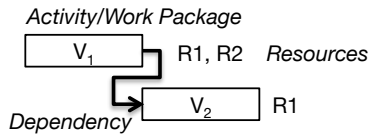
Solution: Overall Effort in PD:

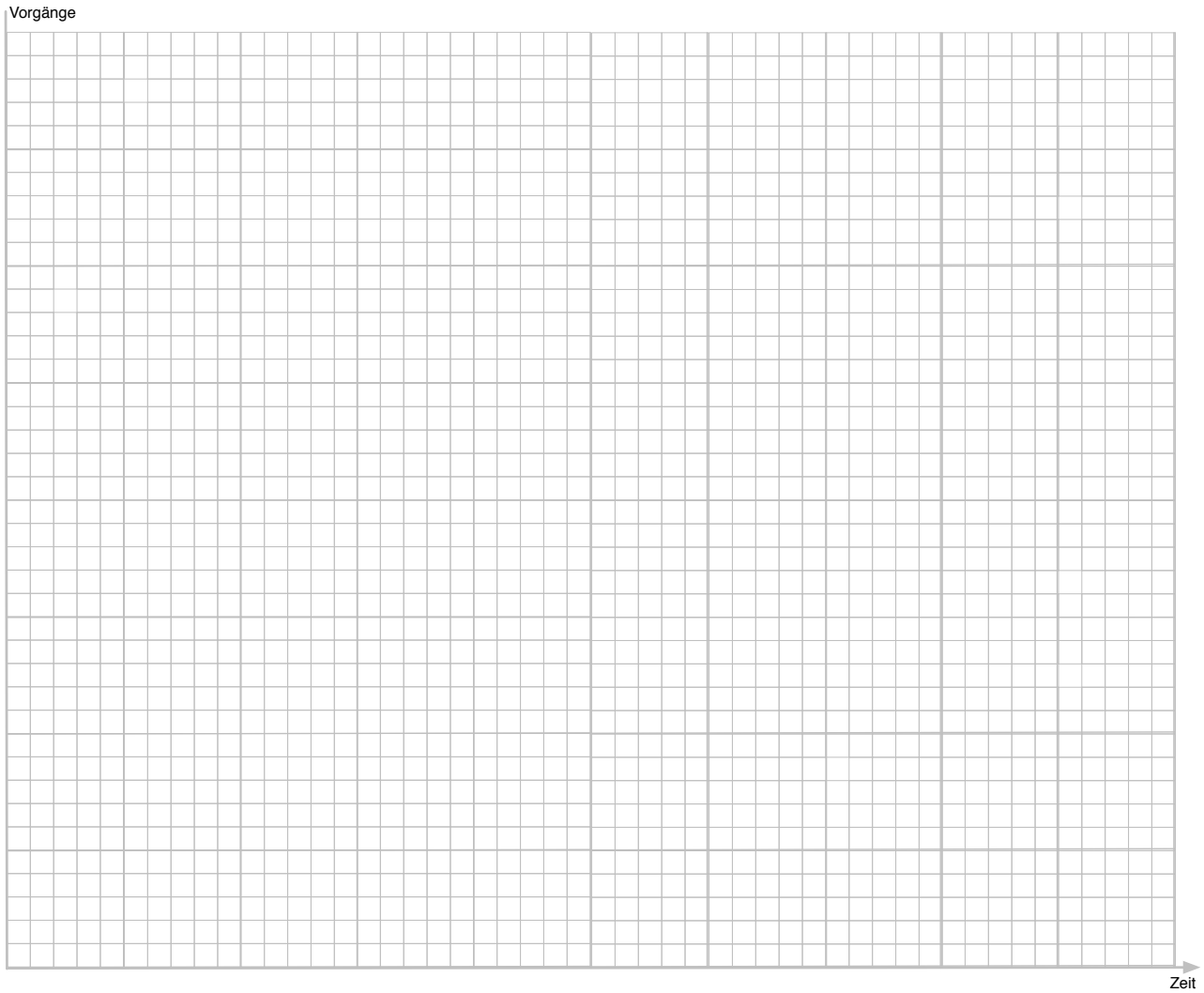
D) [2 Points] Assume you have 5 working days per week and that you need 1 day/week for meetings and other management tasks, how many weeks will the project last?

Solution: Duration in weeks:

E) [4 Points] Draw a Gantt chart for the purpose to determine the shortest possible project duration. Consider the maximum of available persons per role while compiling the chart.

Use the following notation:





F) [6 Points] Calculate the overall project cost with respect to the following constraints (all cost items are net cost, i.e., no taxes etc.):
   - 1 project manager, availability half day for the whole project duration, 1,000 €/day
   - 1 architect, 1,000 €/day
   - 1 analyst, 1,000 €/day
   - 1 developer, 750 €/day
   - Overhead cost: 10% on top of the project net cost
   - Added value tax 20% on top of the overall net cost

Some space for calculation steps:

Solution: Project Budget (in €):

Task 3: Milestone Trend Analysis/Controlling (27 Points)

The company WI^2 (*We Implement IT*) acquired a new project for an insurance company. In order to start the project as soon as possible, WI^2 must allocate resources. You run another project. The company asked your (as project manager) to report on the status of your project.

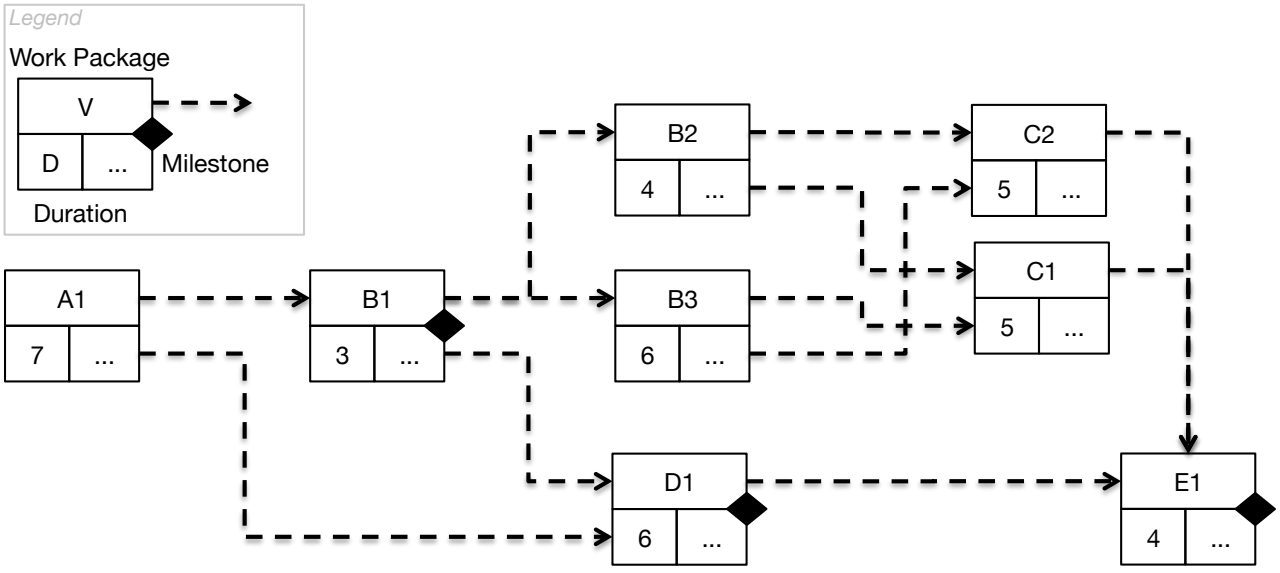
In your project, the following work packages are planned:

Work Package	Description
A1	Requirements elicitation
B1	High-level design and specification
B2	User interface design
B3	Design of the business logic and database
C1	Implementation of the Backend/Server
C2	Implementation of the Client
D1	Quality Assurance
E1	Integration

The following milestones are planned:

- M1: High-level design completed (after finished B1)
- M2: Test concept developed (after finished D1)
- M3: System integrated (after finished E1)

The following MPM diagram was developed for your project:



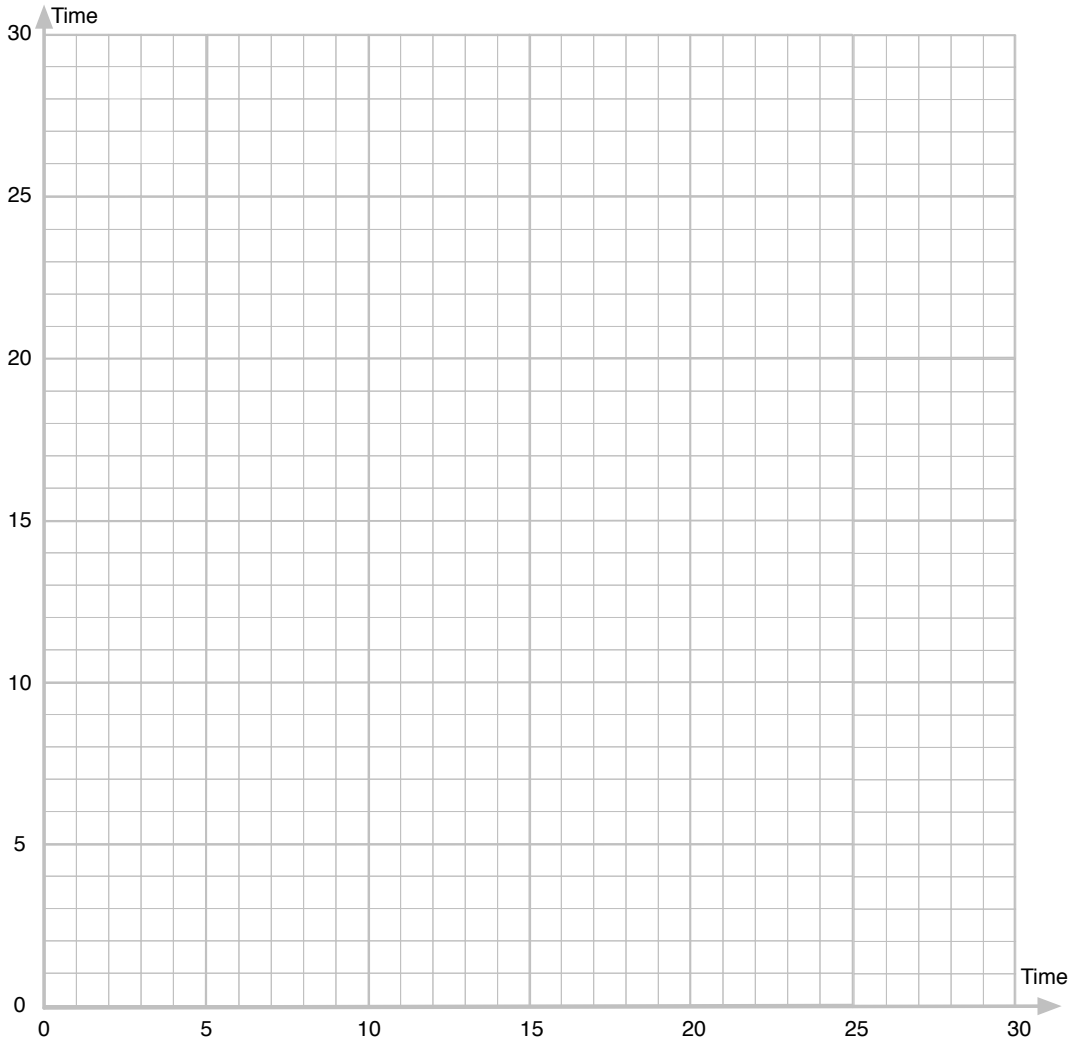
All work packages start as early as possible. In the controlling, you found the following deviations:

Measurement at the beginning of day	9	12	12	15	17	20	21
Delay in work package	B1	B3	B2	D1	C2	C1	C1
Estimated/measured delay	+2	+1	+3	+4	-4	-2	-1

A) [17 Points] Perform a milestone trend analysis for the milestones M1, M2, and M3. Prior to the analysis, calculate the earliest/latest start and end dates as well as the respective buffers. Draw the milestone trend chart in the provided space:

Solution:

Work Package	fat	sat	fet	set	Buffer
A1					
B1					
B2					
B3					
C1					
C2					
D1					
E1					



B) [1 Point] Your department head asks you for a statement regarding the project end, notably, if you are able to finish the project on time. Which answer do you give? (Select exactly one!)

- ☐ Currently, it seems that the project will be finished on time.
- ☐ Currently, it seems that the project will be finished early.
- ☐ Currently, it seems that the project will be late.

Complementing the milestone trend analysis, you aim to develop a statistic regarding the current state of the change management. According to the company policies, you manage *Change Requests* in a ticket system.

The Change Management Process: A Change Request can have the following states: “Postponed”, “Active”, “In Progress”, “Change implemented”, and “Change closed”. Furthermore, the company’s change management process defines that a change is always in the initial state “Active” when it is entered into the change list. Then, it is decided if a changed is scheduled for implementation in the project or postponed to be decided later. If the change is implemented, the new state is “Change implemented”, and the implementation is handed to the quality assurance. When the quality assurance was successfully passed, the change is closed, or returned for rework otherwise.

C) [3 Points] Draw a minimal state machine that realizes the process described above.

Solution:

Analysis: Using Agile Method, you got data and feedback fairly quick. For the first 8 workdays of your project, the ticket system contains the following data:

Measured in week	Change closed	Change implemented	In progress	Active	Postponed
1	0	0	0	1	0
2	0	0	0	3	1
3	0	0	1	3	1
4	0	1	3	2	0
5	1	2	3	1	0
6	3	1	3	2	1
7	3	3	4	1	0
8	5	3	2	1	0

D) [6 Points] Visualize the current state of the change management system by providing a Burn Up Chart for tickets of type “Change Request.”