Software Engineering Mid-term Exam 2019-20
No document, no smartphone
Use the answer sheet

Exercise 1 (6)

Q1.1) Project risk factor is considered in which development process?

a. Incremental.	d. V-cycle
b. Prototyping	e. Waterfall
c. Spiral	f. None of the previous.

Q1.2) When prototyping is appropriate?

a. When requirements are well defined.	d. When there is a technical risk.
b. For projects with large development teams.	e. None of the previous.
c. When a customer cannot define requirements clearly.	

Q1.3) Requirements are easily understandable and defined. The project is between small and medium size. Which process is best suited among the following?

a. Spiral	d. Incremental
b. Waterfall	e. Iterative
c. Prototyping	f. Agile

Q1.4) Selection of a software development process is based on:

a. Requirements	d. Tools of the company
b. Development team & Users	e. None of the previous.
c. Project type and associated risk	

Q1.5) Which of the following requirements are non-functional? [1]

a. Users must change the initially assigned login password immediately after the first successful login. The initial should never be reused.
b. The software automatically validates customers against the ABC Contact Management System.
c. The Sales system should allow users to record customers' sales.
d. The software system should be integrated with banking API.
e. A website should be capable enough to handle 20 million users with affecting its performance.
f. The software should work on any OS.

Q1.6) Which statements are true?

a. Questionnaires and Interviews are the same elicitation method.
b. Questionnaires cannot be used without Interviews.
c. Conducting some interviews is cheaper than a questionnaire to collect a huge set of data.
d. None of the previous.

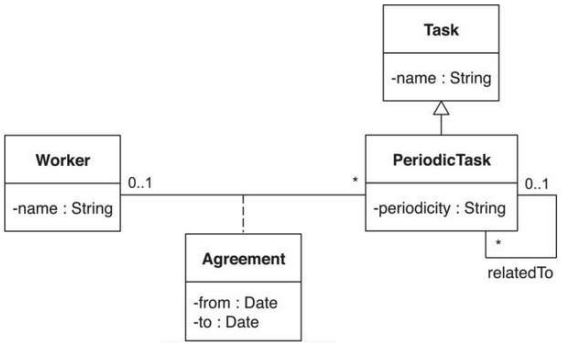
1.7) What is the meaning of requirement elicitation in software engineering? Give a few sentences to explain when, what for, how, who.

Exercise 2 (3)

The diagram given on the right was found on the website [2].

Q2) Rephrase it in English or French.

Advice: take care to express all parts of the model; keep the sentences simple



Exercise 3 (3)

E-business is a software system used in the C-Company. This company is specialized in consulting: its employees are consultants. They help other business companies (their customers) to find solutions to specific issues. When a contract is signed with a customer, the consultant responsible for the project, called senior consultant, initiate a project in E-business software. The consultants that work on the project have to record their consultancy visits in E-business. Optionally, it is possible to record the visit expenses associated with a visit. At the end of the project, the responsible closes the project. This action generates the invoice for the customer.

Q3.1) Propose a use case diagram to model this text.

Exercise 4 (4)

TARS is a Traffic Accident Reporting System dedicated to city police [3]. This system is developed to deal with accident reports inside a city. An accident involves persons, vehicles, or both. Thus, an accident report indicates the date, the vehicles and the persons involved. The plate of a vehicle is recorded. Persons are known by their name, address and phone number. For each vehicle, the owner, and the driver are known. Sometimes, there is no driver because the vehicle is parked. For privacy reason, a vehicle instance or a person instance can only be involved in one accident report[1].

An accident report also indicates the localization of the accident: it corresponds to one street or several in case of a crossroads. All the streets of the city are known. An accident report is issued by one traffic policeman. Like any policeman, a traffic policeman has an id, a name, and a rank. All the policemen of the city are known in the system. To use the TARS system, a traffic policeman needs to pass a qualification. The date of the qualification is recorded in the system. For privacy reasons, policeman data and person data are separated.

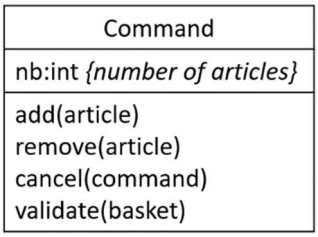
Q4) Propose a class diagram to model this text.

Exercise 5 (4)

A-company is an e-commerce company. The customers can do their commands on the web site of the A-company.

First, the customers are making their choices of articles: They can add articles in their basket and remove them. At any moment, the customer can validate a non-empty basket: after it is not possible to add or remove an article anymore. The customer has two weeks to pay its basket; **meanwhile**, the company prepare the packet to be sent. Note that the payment can be accepted or rejected. So, from the payment viewpoint, the command can be in "waiting payment" state, "rejected" state, or "paid" state. From the packet viewpoint, the command can be in state "preparing", "waiting" (if something is missing), or "ready". When the command is in both states "paid" and "ready", the command is sent (delivering state).

The client can cancel the command at any moment before the command is sent.



Q5.1) Express this text with an appropriate UML model. It should be based on the given Command class.
Q5.2) Propose one non-trivial question which can be asked to remove ambiguities in your model.

References

1. https://www.guru99.com/functional-vs-non-functional-requirements.html
2. https://modeling-languages.com/uml-class-diagrams-practice-usability-tools/
3. Al-Shabi, Mohammed & Ansari, Gufran. (2012). Modeling of Traffic Accident Reporting System through UML Using GIS. International Journal of Advanced Computer Science and Applications. 3. 26-30.

[1] If a vehicle is involved in several accidents, the system will create several instances of the same vehicle. Same for persons.

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