Software Design

Midterm

November 19th, 2019.

During this Exam I will not undertake any illegal acts of accepting or providing any solutions to other students. I also state that my health condition is good and that I am capable for taking this Exam.

Student ID	*Name and Surname*	*Hand-written signature*

1. (1 point) List three features of a good software product.

2. (1 point) Give at least three examples of stakeholders.

3. (1 point) List all ways to specify (express) system requirements.

4. (1 point) Name three stages of the spiral model of requirement elicitation and analysis.

5. (1 point) Which techniques can be used for software requirements elicitation (discovery)?

6. (1 point) Which type of relationship can be between two actors in UML use case diagrams?

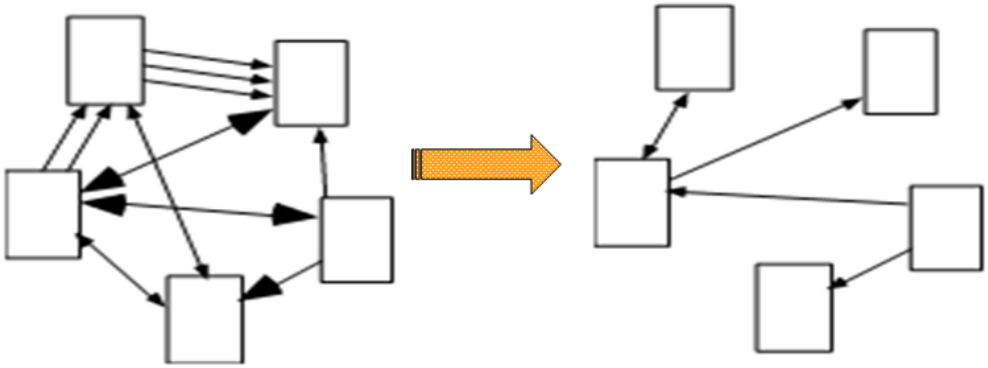
7. (1 point) Draw a destroy message in a UML sequence diagram.

8. (1 point) In the unified software development process, software testing, as the core activity is implemented in several phases, but mostly during the _____ phase.

9. (1 point) Extreme programming and lean development are some examples of _____ methods of the software development process.

10. (1 point) The set of items from the project backlog that has been set for implementation in a sprint is called a _____.

11. (1 point) Which object-oriented software design principle leads to architecture transformation as illustrated on the picture?



12. (1 point) Draw a UML class diagram for the following code:

```
public class Key {

    …
}
public class Vehicle{

     public void Unlock(Key k){
       k.getUnlockCode();
     }
}
```

13. (1 point) Which Git command can cause a conflict and how is it resolved?

Problem solving – **Web application for non-profit organizations**

Develop a web application that will be used by non-profit organizations to organize workshops, charitable and socializing events.
Within the application, each organization can create its own profile, i.e. register. The registration of an organization is done by its manager. To do so, they must enter the basic information about the organization (name, address, contact phone and e-mail address) and their personal information (PIN, name, e-mail address). Upon successful registration, the organization's profile and the manager's personal account with the status of "*manager*" are created simultaneously. The manager is the only one allowed to edit the organization's profile afterwards. All other members of the organization can also register by entering their personal information (PIN, first name, last name, email address). Their registration is verified by the manager within the application and they are given the status of "*regular member*". The leader can promote a regular member to the status of "*administrator*", transfer leadership to a regular member or an administrator and delete existing members.
A list of events in the past year is publicly available on the organization's profile and anyone can comment on each event. Administrators and the manager can create new events. Event types are: workshop, charity event and socializing event. Name, type and short description are listed for each event. For workshops and socializing events time and location must also be provided. The location can be seen on the map, and the application uses the external GeoMaps service to display the map. The charity action indicates what is being collected (money, goods, other), the period of donation collection and the bank account number for monetary donations. All event information is publicly visible.
All members of the organization can apply to participate in organization of events with a status: "*participating*", "*maybe*", "*not participating*". Members can also change their interest. A list of members who have set their status is visible to all members for each event.

14. (4 points) Use Case Diagram

Model the web application for non-profit organizations using UML use case diagram.

15. (4 points) Sequence Diagram

Use UML sequence diagram to model the registration process of a member (other than the manager). Beside the general task description, also consider the following: when filling out the registration form, web browser checks that all fields are filled in correctly and only allows the registration to be submitted after everything correct. When the request is sent, the application checks the database to determine if a user with the same username already exists, and only if it does not exist, sends the registration application to the manager for confirmation. The manager gets a list of registration applications for approval and considers them in turn: confirm or deny. The web application notifies the member of the decision.

16. (4 points) Class Diagram

Use UML Class Diagram to model the web application for non-profit organizations.