**SE exam - 15th of June, 2015**

1. A company has a set of employees. Each employee may be member of a team having from 3 to 5 members. Each team has a manager, member of that team. In turn, team managers may have another manager (leader) who is not a member of any team.
   1. By means of a UML class diagram, please describe the structure of a model which structure complies with the above requirements. 1.5 pt
   2. Using OCL please specify in the context of Company an observer computing the set of managers for the current company. Also, in the same context, please specify an invariant stating that all teamMembers of all the company teams are included in the set of employees of that company. 0.5 pt
   3. In the context of the operation Company::addEmployee(p:Person, t:Team) that adds a new p employee to the company, as member of the team t; please specify appropriate pre and postconditions ensuring that the value of the above invariant will remain true after executing an addEmployee(...) message. 1 pt
2. By means of an object diagram (snapshot) please represent a model instantiation in which a company c1 has 7 employees: p1,...,p7 and 3 teams t1, t2 and t3. p1 and p2 are t1 members, p3 and p4 are t2 members and p5 and p6 are t3 members. p1 is p2 manager, p3 is p4 manager, p5 is the manager of p6. p7 is the manager of p1 and p5. Does this snapshot comply with the UML model? Justify your answer. 1 pt
3. Please mention the "types"(kinds) of objects used in analysis models and describe shortly the role of each "type" and the rationale of using this distinction in describing analysis models. What's the mechanism/manner of distinguishing the types in a class diagram describing the structure of the analysis model? 1 pt
4. Please explain the concept of model transformation. What's code generation and which are the terms used for referring code generation? Which are the advantages that can be obtained by code generation? Please describe shortly which parts of code can be generated for each kind of diagram and complementary specifications. 2.5 pt
5. Please describe the concepts related to software testing and represent these by means of a class diagram. 1.5 pt

1 pt by default