Tentamen Software Engineering (400071)
<Typical>

This exam is centered on the case study "Electronic Elections System" (EES). All questions refer to the EES case study.
The EES must support the following requirements:

1. Elections are like referendum (electors can vote yes, no, or nullify their vote).
2. Each elector as a personal code identifier (PID).
3. Each elector can vote only once and his/her vote is secret (cannot be stored in the system).
4. Before voting, the elector must state his/her generalities and PID. The system allows only registered electors to vote (supplied data must coincide).
5. System manager can
    a. Monitor elections (access percentages of electors, know who did vote)
    b. After elections terminate, access to results

Note: this problem description may be ambiguous and incomplete. In answering the questions, you are free to complete it (if needed) and to briefly motivate your assumptions.

Question 1: Life cycle models

a) Provide the definition of the following models:
- Waterfall model
- Evolutionary prototyping
- Incremental development

b) For each model, provide a graphical representation, which shows the specific phases and their interactions.
c) Show how these models fit into the spiral model.
d) Choose a software life cycle model for the EES case study. Motivate your answer.

Question 2: Requirements engineering

a) Provide the list of functional requirements of the EES case study, and organize them in a MoSCoW list. Briefly motivate your choices. Also, formalize the "Must have" requirements by means of a Use Case diagram.
b) Provide at least one non-functional requirement for the EES case study. Motivate briefly each of them.
c) Analyze the EES case study and provide the domain model in UML. Describe shortly the classes and their associations.
d) For the EES case study, provide the description for one use case represented in the Use Case diagram of point a). The description must include the normal course of events, one alternative c.o.e. and one exceptional c.o.e.

Question 3: Software architectural/design patterns

a) What are architectural styles/patterns? What are design patterns? What is the general structure of a pattern?
b) Provide one design view showing the global software structure of the system for the EES case study.
c) Show on the result of point b), which patterns you use, and motivate your choices.

Question 4: Software design

a) What is software design?
b) Which is the main difference between requirements engineering and software design?

c) Explain one design criterion.

Question 5: Testing

a) Explain the difference between verification and validation.

Scoring

With this exam, you can gain 90 points at most. Your final mark is calculated as follows:

Exam mark = (#points + 10) / 10

If you gained bonus points for the assignments, these will be added to the Exam mark.

The weight of each question is as follows:

1a: 4 b: 2 c: 4 d: 5
2a: 10 b: 5 c: 15 d: 5
3a: 5 b: 10 c: 5
4a: 3 b: 3 c: 4
5a: 10

Exam language

If possible, you are kindly requested to write your answers in English. In any case, be sure that your handwriting is clear and understandable.