Exam Software Engineering (400071) - 31 August 2005

Part of this exam is centered on the following case study:

A toy company wants to offer an interactive game called “Animal Builder” on the Internet. Its potential users are children that use its toys and are learning to do interactive games. Therefore, the interface must be colorful, intuitive, simple and attractive.
The system should allow to build an animal out of a set of available building bricks. The user needs first to select the animal she/he wants to build, and then start the game. The graphical interface shows:

- The grid on which building bricks can be placed: the grid is a 3D area in which building bricks can be moved in three directions: up and down; left and right; forward and backward. Note that all directions are defined relative to the animal (e.g. left to the tiger).
- The shape of the animal projected on the grid: the shape shows the types of building bricks the animal is made of. In this way, the user can see which brick to put first.
- The toolbar with all the building bricks available and all the available colors: the user can select a brick and afterwards select the color for that brick. Once selected, the brick appears on top of the grid and the user can start moving it in the three different directions.

During the game session, the user can always select a brick placed in the building area and remove it. In addition, to get some hints, the user can select the “show-me” function, which depicts how the completed animal should look like. The user can print the building area with what has been done, select the help facility, and close the current game session. The game is freely accessible to everyone on the Internet. However, a possible future extension is to add more features for registered users.

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.

Questions about the theory

1. Which are the disadvantages of prototyping? [1 point] select one or more answers from the following possible answers, and motivate your answer:
   - 1.a) The final system usually delivers more functionalities than needed.
   - 1.b) The resulting system is more difficult to use.
   - 1.c) It requires more experienced developers.
2. Let's suppose that a certain software system X makes use of a database that all of a sudden does not react to its requests for data access, because it crashed. Is this lack of reaction an error, a fault or a failure? [1 point] (select one from the following possible answers):
   - 2.a) error.
   - 2.b) fault.
   - 2.c) failure.
3. What does a Test Case documentation specify? [1 point] (select one from the following possible answers):
   - 3.a) It specifies, for each software feature or combination of features, the details of the test approach and identifies the associated tests.
   - 3.b) It specifies inputs, predicted outputs and execution conditions for each test item.
   - 3.c) It specifies the sequence of actions for the execution of each test.

Questions related to the case study

4. Provide a list of functional requirements of the case study, and organize them in a MoSCoW list. [2 points]
5. For the case study, provide the data model in UML. [2 points]

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6. For the case study, provide the description for one use case corresponding to one requirement given in answer 4). The description must include the normal course of events (c.o.e.), one alternative c.o.e. and one exceptional c.o.e.. [1.5 points]
7. Select a UML diagram and use it to model a specification able to show how the operations given in the list of functional requirements given in answer 4) interact with the end-user, with the available resources and among one another. [1.5 points]

Exam rules:

- No books or reference material.
- No calculator or similar electronic device.