OHJ-1406 Introduction to Object-Oriented Programming Exam 24.05.2010
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-Write your answers in English only; try to use a readable handwriting...
-Answer on a separate paper; do not use this question paper.
-No calculators or literature...
-There are **five** questions each worth of 6 points -> max. points 30.

1) Explain the following concepts briefly (1 point/correct answer, max three lines/answer):
   a) CRC card
   b) Copy constructor
   c) Encapsulation
   d) Slicing and assignment
   e) Const member function (in C++)
   f) Interface class

2) In the following you are presented six claims about object-oriented programming and C++. Your task is to answer if the claims are correct or faulty. If you think a claim is faulty, explain why or how it is faulty. (1pt/for a correct answer, with a correct explanation, if needed)
   a) *Protected* can be used to hide the operations from the sub classes.
   b) *Forward declaration* is used to define ownership relations similar to aggregation in the UML class diagrams.
   c) In C++ an *abstract class* can only have public or protected member variables.
   d) *Mutable* keyword can be used to tell a member variable can be changed in const-member functions also.
   e) *Abstract data types* cannot be instantiated as they are abstract.
   f) *Static lifetime* means the programmer is responsible of using delete to free the reserved memory.

3) Inheritance (6 pts, 2pts each)
   a) What is inheritance and what benefits a program designer can gain from it?
   b) List five (5) most essential terms related to inheritance and explain briefly (2-3 sentences) the meaning of each term.
   c) What new inheritance introduces to construction and destruction of objects?

4) Draw a UML class diagram of a game described below. Use the necessary relations e.g. associations, compositions, generalizations to describe the connections between the classes. Include functions in the classes to describe the functionality/behaviour discussed in the given description. (6pts)

An adventure game called "Indianapolis Jones and Republic of the Plexiglas Skull" tells a story of a brave "archaeologist" who enters an ancient South American temple. The temple is filled with dangerous creatures like alligators, snakes, and Soviet agents. All the creatures, including the hero, can move from room to room and bite the other creatures. The temple consists of three different sections and each section consists of several rooms (3-8). There are at least four different kinds of rooms: tomb chambers, corridors, stairs, and halls. The creatures including the hero and agents can leave and enter the rooms. All humans are also capable of picking up items like gold treasure or Plexiglas skulls from the rooms.