COMP 734 Midterm 2

Tue, Nov 26, 2013, 2:00-3:15

Instructions
1. Please spread out and try and sit in alternate seats.
2. This is a closed book exam.
3. Write on the exam itself.
4. Write on the opposite side of a question page if there is not enough space to solve a problem.
5. There are:
    - 8 numbered pages including this one; there are no blank numbered pages
    - 2 questions
    - 75 possible points. Point values appear in brackets next to each question
6. You have 75 minutes.
7. *Explain all answers*.
8. If you need to make any assumptions to clarify a problem, *write your assumptions down.* Only reasonable assumptions get full credit.

Name (in Capitals)

_____

Pledge: I have neither given nor received unauthorized aid on this exam.

(signed)_____

Please do not write below

1. _____/64   2. _____/11

Total: _____/ 75

1. [64pts.] Logical vs. Physical Serialization: Implementation

In this question you must describe in depth the *differences* in the (implementation of) serialization (*not* deserialization) of physical and logical components of a composite Java object. You must give not only the differences between the serialization algorithms in the two cases but also the difference and relationship between the predefined mechanisms provided by Java and the course libraries to implement these algorithms. As we are only interested in the differences, you can make some simplifying assumptions. Assume:

1. No extensibility – that is, assume that the programmer does not influence in any way the nature of serialization.
2. Tree structures in which every node is serializable.
3. That it is possible to determine the exact class to be deserialized from the declared type of a logical/physical component.
4. The order in which components are to be deserialized is well known.
5. The only two patterns you need to consider for serialization of logical components are the Bean and List patterns used in your implementation.
6. Your physical implementation is based on the (Java and OE) mechanisms discussed in class and used in your implementation.
7. You need to consider *only serialization* and *not deserialization*.
8. You do not have to give details regarding the similarities between the two implementations – only the differences.
9. You can abstract away other common details such as serializing atomic objects – that is, you can assume some library exists to handle these details and simply use this library.

Your answer should consist of three parts.

a) [24pts] First, explain the two kinds of predefined mechanisms you will use for extracting physical and logical components, respectively. For this part, you need only describe those operations of the mechanisms needed in serialization and not those needed for deserialization. Naturally, you are not expected to get the syntax of these operations right, but you should give enough detail to explain the semantics.

b) [16pts] Next, describe the relationship between two kinds of mechanisms, being as specific as you can. If one mechanism is implemented using another, explain the specifics of the implementation. You are free to give algorithms showing the relationship, but can also answer in pure English.

c) [24 pts] Finally, give (pseudo) serialization algorithms for the two cases showing how the predefined mechanisms are used in serialization. As mentioned above, factor out what is common in the two algorithms and emphasize the differences.

These subparts are reproduced below on different pages.

[24pts] First, explain the two kinds of predefined mechanisms you will use for extracting physical and logical components, respectively. For this part, you need only describe those operations of the mechanisms needed in serialization and not those needed for deserialization. Naturally, you are not expected to get the syntax of these operations right, but you should give enough detail to explain the semantics

[16pts] Next, describe the relationship between two kinds of mechanisms, being as specific as you can. If one mechanism is implemented using another, explain the specifics of the implementation. You are free to give algorithms showing the relationship, but can also answer in pure English.

[24 pts] Finally, give (pseudo) serialization algorithms for the two cases showing how the predefined mechanisms are used in serialization. As mentioned above, factor out what is common in the two algorithms and emphasize the differences.

2. [11pts.] Logical vs. Physical Serialization: Performance

Given the implementation differences above, compare their performance, in terms of both the size of the serialized output and algorithm runninf time. In particular, compare the space and time costs for the simulation object you were required to serialize in the last three assignments – the command interpreter with the command history.