

Object-oriented Analysis and Design

Final, Spring 2014

Date: May 17, 2014

Marks: 70

Time: 180 mins.

Note: Please read the case and then answer the questions on next page

Consider a web application to create a discussion forum (e.g. Stack Overflow, Code Guru, etc.). A forum software allows you to create and manage forums and posts, so that users can participate in discussions and learn from each other. The features it provides can be summarized as under:

1. An authorized user (e.g. Admin) can create a forum. A forum is a collection of topics that may be categorized as required. For instance, Code Guru has several forums e.g. C++ Programming, Graphics Programming, Network Programming, etc. Each forum has topics that can be categorized, for instance, under C++ forum there may be several topics related to C++ programming that can be sorted into categories such as: General C++ discussion, GUI programming, etc. Each category may have as many sub-categories as desired.
2. Any registered user can initiate a topic. A topic is a message posted on the forum in order to ask a question or start some discussion. Other registered users can then post replies to the topic (to answer questions or participate in the discussion)
3. Before a message is posted, it can be saved in a draft state. A draft shows that the message is still under construction and may not be complete. Draft message does not appear on the forum but its author can still edit its contents. Only when the message is posted, it appears on the forum.
4. Anybody can read the topics or replies on any forum. There is no registration requirement for that.
5. Moderators may be appointed for some forums whose responsibility is to remove or edit unwanted content and keep the discussion focused. A user may be a moderator for one forum and not for the other.
6. Users can subscribe to alerts. For instance, a user may select an option to be notified through email whenever a new message is posted on a specific topic.
7. Moderators may also specify restrictions. For instance, moderator may set conditions that any message posted in a particular forum/category/topic will be first approved by the moderator. Such posts will be placed in the moderation queue first and not shown on the forum until they are approved. Moderator may also opt for an email notification on posting of such messages.

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Questions:

1. Identify **use-cases** and show a **use-case diagram** for given requirements. Provide a brief description for each usecase (not more than 3 lines each) (20)
2. Identify design patterns that can be applied to solve this problem. Justify your selection with specific references to the problem statement (i.e. which specific requirements lead to your selection of the pattern and how will that be helpful). Your description should not exceed 5 lines for each pattern. Show a **class diagram** applying relevant design patterns identified above. (30)
3. Provide **sample code** for each pattern to highlight implementation issues in the context of given problem (20)