# OOP Exam – Console Forum

Back in the beginning of the Millenium, Stamat got his first girlfriend. Not so long after, unfortunately, the Surecheck had two lines and Stamat got very worried. Luckily, it was just at the dawn of the TeenProblem internet forum, so he could easily share his problem with the rest of the world. Inspired by the result, Stamat wanted to make his own forum. Back at the days, he didn't know about databases and it was right after the first .NET framework was released, so he decided to persist all the data in memory. After a hard time of headbanging, he managed to make an engine and a simple registration. Your task is to help Stamat to build a fully functional forum with login, posting questions, answers, etc.

A forum has **users**, **questions** and **answers**. **Users** can be guests, registered or admins. *Guests* can register, login, view all questions, open a question, and exit the forum. *Registered users* can login and after login they can logout, view all questions, open a question, post questions, post answers to questions, choose best answers to questions they posted, exit the forum. *Admins* can login and after login they can logout, view all questions, open a question, post questions, post answers to questions, choose best answers to all questions, exit the forum. **Questions** have id, author, title and body (content) as well as answers. **Answers** have id, author and body.

Carefully read **all the code** from the given skeleton – you are going to need it, as well as the **description** below and the **notes** at the end.

You are **NOT** allowed to edit the contents of the **Interfaces** and **Utility** namespaces. You are **NOT** allowed to directly edit the **Forum**, **CommandFactory** and **CommandException** classes.

### Part I – Building the Forum Functionality

### Implement the Necessary Classes

Using existing interfaces, implement the necessary classes (**Question**, **Answer**, **BestAnswer**, **User** and **Administrator**) in order for the forum to function properly. Avoid code duplication by applying the best practices of Object-Oriented Programming.

### Implement the Forum Commands

The forum somewhat works, but the number of commands it supports is too insufficient. **Add** the following commands and **implement their functionality**, following the **model of command implementation** in the forum.

* **Register *{username} {password} {email}* –** should register a user. The username and email should be unique, so registering with the same email or username is not allowed.
  + If it is successful

|  |
| --- |
| User {username} with Id: {id} successfully registered |

* + If the username or email is already taken:

|  |
| --- |
| User with the same mail or username already exists |

* **Register *{username} {password} {email}* administrator –** should register an administrator. This command should be allowed only when no users are registered yet. The engine uses this when it is started to create a default admin user. This command should print on the console the following result:
  + If no permission to register an administrator:

|  |
| --- |
| Cannot register administrator |

|  |  |  |  |
| --- | --- | --- | --- |
| Sample Input  |  | | --- | | register pesho 123 12@12.com  register pesho 456 abv@abv.abv  register gosho 123 gosh@a.bg administrator | | Sample Output  |  | | --- | | User pesho with Id: 2 successfully registered  User with the same mail or username already exists  Cannot register administrator | |

* **Login *{username} {password}* –** logins a user.
  + If another user is already logged in, cannot login the second user

|  |
| --- |
| Already logged in. In order to switch to another user - logout first |

* + If username or password is invalid

|  |
| --- |
| Wrong username/password or username not registered |

* + If successful

|  |
| --- |
| User {username} successfully logged in |

* **Logout –** logouts a user. Should be allowed only when a user is logged in.
  + If successful

|  |
| --- |
| Logout success |

* + If no user is logged in

|  |
| --- |
| Operation not permitted. You have to login first |

|  |  |  |  |
| --- | --- | --- | --- |
| Sample Input  |  | | --- | | register pesho 123 [12@12.com](mailto:12@12.com)  register gosho 123 [g@abv.bg](mailto:g@abv.bg)  login pesho 456  login pesho 123  login gosho 123  logout  logout | | Sample Output  |  | | --- | | User pesho with Id: 2 successfully registered  User gosho with Id: 3 successfully registered  Wrong username/password or username not registered  User pesho with Id: 2 successfully logged in  Already logged in. In order to switch to another user - logout first  Logout success  Operation not permitted. You have to login first | |

* **ShowQuestions** – should show all questions in the forum. Should work for all users.
  + If no questions

|  |
| --- |
| No questions |

* + If there are some questions – each question in the following format, ordered in ascending order by Id:

|  |
| --- |
| [ Question ID: {id} ]  Posted by: {author}  Question Title: {title}  Question Body: {body}  ====================  {answers} |

* + - If there are no answers, print:

|  |
| --- |
| No answers |

* + - If there are some answers, print:

|  |
| --- |
| Answers:  {list of answers} |

* + - * The best answer (if there is any) should be in the following format, always on top:

|  |
| --- |
| \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  [ Answer ID: {id} ]  Posted by: {author}  Answer Body: {body}  --------------------  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |

* + - * All other answers should be in the following format, ordered in ascending order by Id:

|  |
| --- |
| [ Answer ID: {id} ]  Posted by: {author}  Answer Body: {body}  -------------------- |

* **OpenQuestion *{questionId}* –** displays the specified question, following the same format as in ShowQuestions command. Should work for all users.
  + If the id is not valid

|  |
| --- |
| No such question |

* **PostQuestion *{title} {body}* –** saves the question in the system the current user as author. Should work only after login.
  + If no user is logged in

|  |
| --- |
| Operation not permitted. You have to login first |

* + If successful

|  |
| --- |
| Question with Id: {id} successfully posted |

* **PostAnswer *{body}* –** saves the answer in the system to the question that has been opened. Works only after login and when a question is opened.
  + If no user is logged in

|  |
| --- |
| Operation not permitted. You have to login first |

* + If no question is opened

|  |
| --- |
| Operation not permitted. You have to open a question first |

* + If successful

|  |
| --- |
| Answer with Id: {id} successfully posted |

|  |  |  |  |
| --- | --- | --- | --- |
| Sample Input  |  | | --- | | register pesho 123 pesho@abv.bg  login pesho 123  showquestions  postQuestion helloooooo i'mpeshoooo  SHOWQUESTIONs  logout  register gosho 123 g@g.bg  login gosho 123  ShowQuestions  OpenQuestion 1  PostAnswer hii'mgosho  PostQuestion homework help  ShowQuestions | | Sample Output  |  | | --- | | User pesho with Id: 2 successfully registered  User pesho successfully logged in  No questions  Question with Id: 1 successfully posted  [ Question ID: 1 ]  Posted by: pesho  Question Title: helloooooo  Question Body: i'mpeshoooo  ====================  No answers  Logout success  User gosho with Id: 3 successfully registered  User gosho successfully logged in  [ Question ID: 1 ]  Posted by: pesho  Question Title: helloooooo  Question Body: i'mpeshoooo  ====================  No answers  [ Question ID: 1 ]  Posted by: pesho  Question Title: helloooooo  Question Body: i'mpeshoooo  ====================  No answers  Answer with Id: 1 successfully posted  Question with Id: 2 successfully posted  [ Question ID: 1 ]  Posted by: pesho  Question Title: helloooooo  Question Body: i'mpeshoooo  ====================  Answers:  [ Answer ID: 1 ]  Posted by: gosho  Answer Body: hii'mgosho  --------------------  [ Question ID: 2 ]  Posted by: gosho  Question Title: homework  Question Body: help  ====================  No answers | |

* **MakeBestAnswer *{answerId} –*** makes the specified answer the best answer for the opened question. A question can have **only one best answer**.
  + If no user is logged in

|  |
| --- |
| Operation not permitted. You have to login first |

* + If no question is opened

|  |
| --- |
| Operation not permitted. You have to open a question first |

* + If the id is not valid

|  |
| --- |
| No such answer |

* + If the user is not the author of the question or an administrator

|  |
| --- |
| You do not have enough permission to perform the desired operation |

* + If successful

|  |
| --- |
| Answer with Id: {id} successfully made best answer |

* **Exit** – stops the forum execution. Should work for all users.
* **Any other command** should print

|  |
| --- |
| Invalid command! |

### Additional Notes

* The engine splits the command data by whitespace, so no whitespace is allowed in the parameters.
* The **id** of the users, questions and answers is a positive integer number starting from **1** and **incrementing by 1** for every new entry. There is a different id counter for the different classes of objects – one for users, one for questions and one for answers. When an entry is edited it should preserve its original id.
* There is already registered one admin user with id 1, so the next registered user will have id 2 and so on.
* The delimiter ('**=**', '**-**', '**~**' or '**\***') is exactly 20 symbols.
* The command names should be case insensitive.
* A question is considered opened after the **OpenQuestion** command and before **Logout** or **ShowQuestions** command.
* After an answer is made "best answer" it will be printed as first answer, all other answers preserve their order by id.

|  |  |  |  |
| --- | --- | --- | --- |
| Sample Input  |  | | --- | | register pesho 123 12@12.com  login pesho 123  PostQuestion WTF! textExplain  logout  register pepi 123 12@.gmail.com  logout  login pepi 123  OpenQuestion 1  PostAnswer NemashGriji  PostAnswer PakAz  MakeBestAnswer 2  logout  login pesho 123  MakeBestAnswer 2  OpenQuestion 1  MakeBestAnswer 2  ShowQuestions  exit | | Sample Output  |  | | --- | | User pesho with Id: 2 successfully registered  User pesho successfully logged in  Question with Id: 1 successfully posted  Logout success  User pepi with Id: 3 successfully registered  Operation not permitted. You have to login first  User pepi successfully logged in  [ Question ID: 1 ]  Posted by: pesho  Question Title: WTF!  Question Body: textExplain  ====================  No answers  Answer with Id: 1 successfully posted  Answer with Id: 2 successfully posted  You do not have enough permission to perform the desired operation  Logout success  User pesho successfully logged in  Operation not permitted. You have to open a question first  [ Question ID: 1 ]  Posted by: pesho  Question Title: WTF!  Question Body: textExplain  ====================  Answers:  [ Answer ID: 1 ]  Posted by: pepi  Answer Body: NemashGriji  --------------------  [ Answer ID: 2 ]  Posted by: pepi  Answer Body: PakAz  --------------------  Answer with Id: 2 successfully made best answer  [ Question ID: 1 ]  Posted by: pesho  Question Title: WTF!  Question Body: textExplain  ====================  Answers:  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  [ Answer ID: 2 ]  Posted by: pepi  Answer Body: PakAz  --------------------  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*  [ Answer ID: 1 ]  Posted by: pepi  Answer Body: NemashGriji  -------------------- | |

### Part II – Forum Extension

**Note**: This problem **does not take part** in the Judge System evaluation.

Extend the forum so that every time a user is prompted to enter a command, a **header** appears. The header should be in one of the **two formats**, depending on whether the user is logged or not:

|  |  |  |
| --- | --- | --- |
| ~~~~~~~~~~~~~~~~~~~~  Hey stranger, care to login/register?  Hot questions: ***{count}***, Active users: ***{count}***  ~~~~~~~~~~~~~~~~~~~~ |  | ~~~~~~~~~~~~~~~~~~~~  Welcome, ***{username}***!  Hot questions: ***{count}***, Active users: ***{count}***  ~~~~~~~~~~~~~~~~~~~~ |

* **Username** is the logged user's username
* The hot question's **count** represents the number of all **questions** in the forum with a **best answer**
* The active users' **count** represents the number of all **users** in the forum with **at least 3 answers**

The header should appear each time before the user enters a command.

**Reminder**: You are not allowed to edit the **Forum** class.

|  |  |  |
| --- | --- | --- |
| Sample Input |  | Sample Output |
| register batko 123 bateto@abv.bg  register kakata 567 kaka@yahoo.com  register penio 789 penio@gmail.ru  login batko 123  postQuestion baba\_marta\_party at\_20:30\_:)  postQuestion OOP\_Exceptions what\_is\_exception?  OpenQuestion 2  postAnswer i\_really\_have\_no\_idea  OpenQuestion 1  PostAnswer 1 anybody\_coming?  PostAnswer 1 I\_sure\_am\_:^)  postAnswer 1 See\_you\_after\_the\_exam!  MakeBestAnswer 3 |  | …  ~~~~~~~~~~~~~~~~~~~~  Welcome, batko!  Hot questions: 1, Active users: 1  ~~~~~~~~~~~~~~~~~~~~ |