

FLARN (Fun Learning)

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Project Vision

The vision of this project is to create a learning portal for people of all ages, with different academic backgrounds.

Functional Requirements

1. User can register to use the system.
2. Registered users can login to the system.
3. User can update their profile.
4. User can apply for moderator status.
5. Administrator can promote a user to moderator.
6. Moderators can add problem sets to the problem bank.
7. Administrator can remove a problem set from problem bank.
8. A user can locate a problem.
9. A user can participate in a learning session.
10. A user can search other users.
11. User can subscribe to other users.
12. User can subscribe to a category.
13. Users can unsubscribe.
14. User can view global ranking of all other users.
15. User can view category wise ranking.
16. User can view global ranking of subscribed users.
17. User can view timeline containing activities of subscribed user's/category's.
18. User can view all attempted problems.
19. User can review a problem set he has attempted.

Non-functional Requirements

1. Authentication through user login.
2. Authorization of moderators.
3. Data encryption/HTTPS.
4. Multi-regional availability.
5. Caching/CDN.
6. Auto scaling.
7. Session recovery.

Use Case (UC1) : Search User

Primary Actor : User

Stakeholders and Interests: User: wants to find other users fast and with minimal effort .

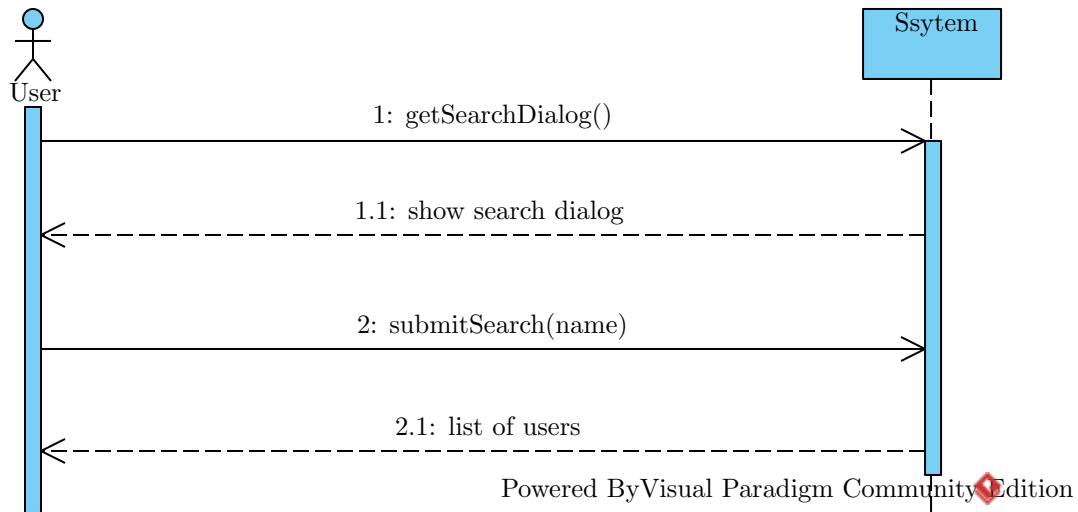
Preconditions: User is identified and authenticated.

Success Guarantee(Post conditions): Does not apply.

Main Success Scenario:

1. User clicks on search button.
2. System returns a search dialog.
3. User enters a search query.
4. System returns search results.
5. User can exit or search again.

Alternative paths: At any time system fails: User may restart the process.



Use Case (UC2) : Promote User

Primary Actor : Administrator

Stakeholders and Interests: Administrator: wants to give moderator status to the right user.

Preconditions:

- Administrator is identified and authenticated.
- User has already been searched.

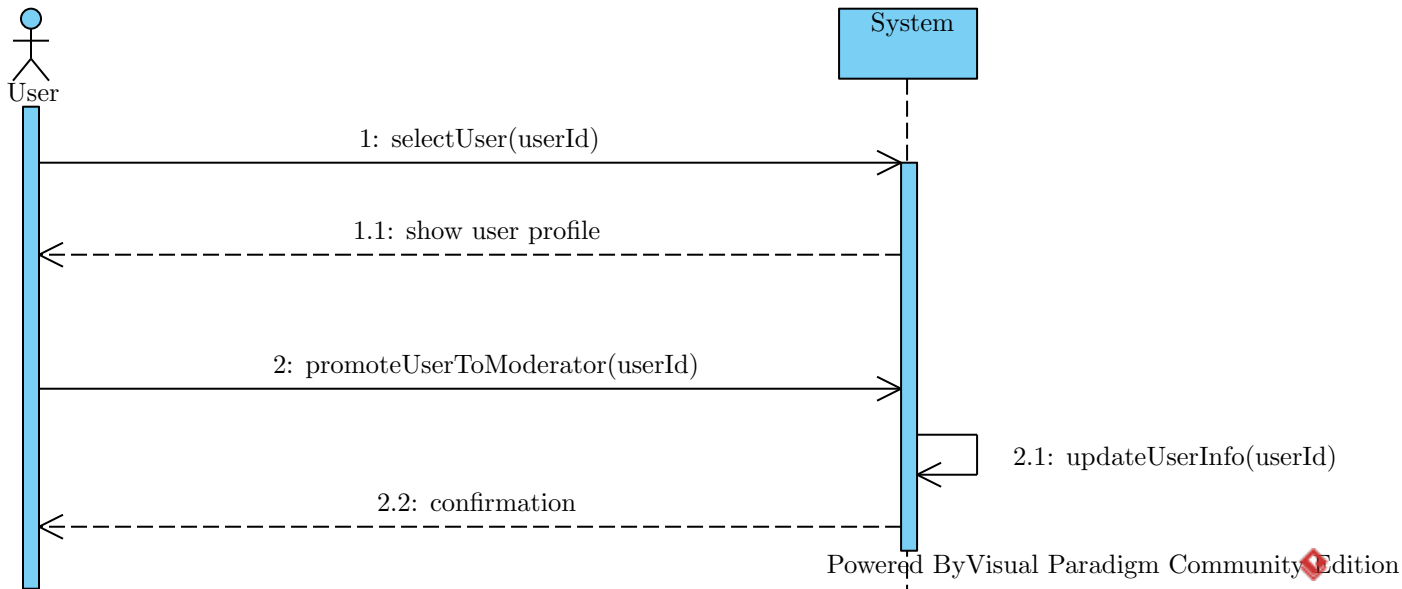
Success Guarantee(Post conditions): Selected user has moderator rights.

Main Success Scenario:

1. Administrator selects a user from the the search results.
2. System returns the profile of the user.
3. Administrator clicks on promote user button.
4. System returns confirmation feedback.

Alternative paths:

1. At any time system fails: Administrator can restarts the process.
2. If user already has moderator rights, system returns an error message. Administrator can exit the system or try again.



Use Case (UC3) : Subscribe to User

Primary Actor : User

Stakeholders and Interests: User: wants to be able to add another user to his subscription list.

Preconditions: User has already been searched.

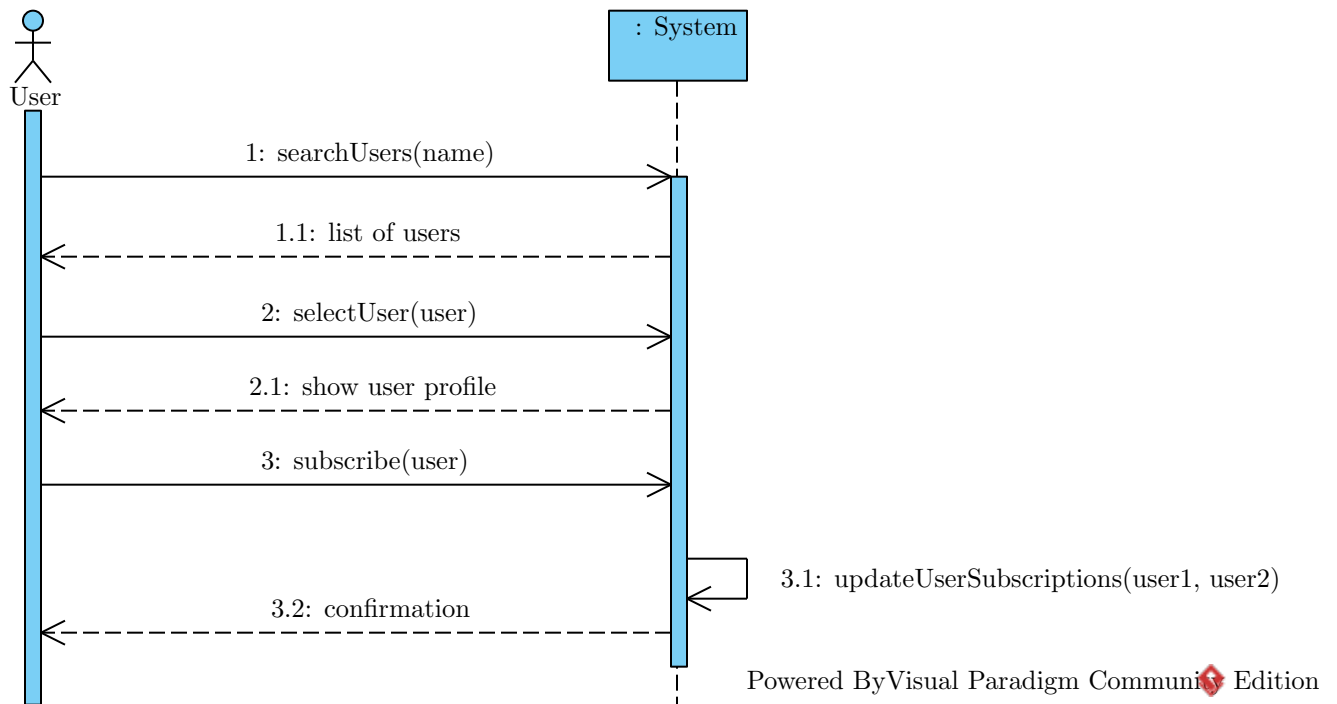
Success Guarantee(Post conditions): Selected user added to current user's subscription list.

Main Success Scenario:

1. User selects a user from search results.
2. System returns selected user's profile.
3. User clicks on subscribe button.
4. System adds selected user to current user's subscription list.
5. User can exit or subscribe to another user.

Alternative paths:

1. At any time system fails: User can restarts the process.
2. If user does not want to subscribe any of the users in the search result, user may exit the system.
3. If user does not want to add a selected user to his subscription list after viewing his profile, user may exit.



Use Case (UC4) : Add New Problem Set

Primary Actor : Moderator

Stakeholders and Interests: Moderator: wants to add a new problem set successfully and with minimal effort.

Preconditions: Moderator is identified and authenticated.

Success Guarantee(Post conditions): A new problem set is added to the problem bank.

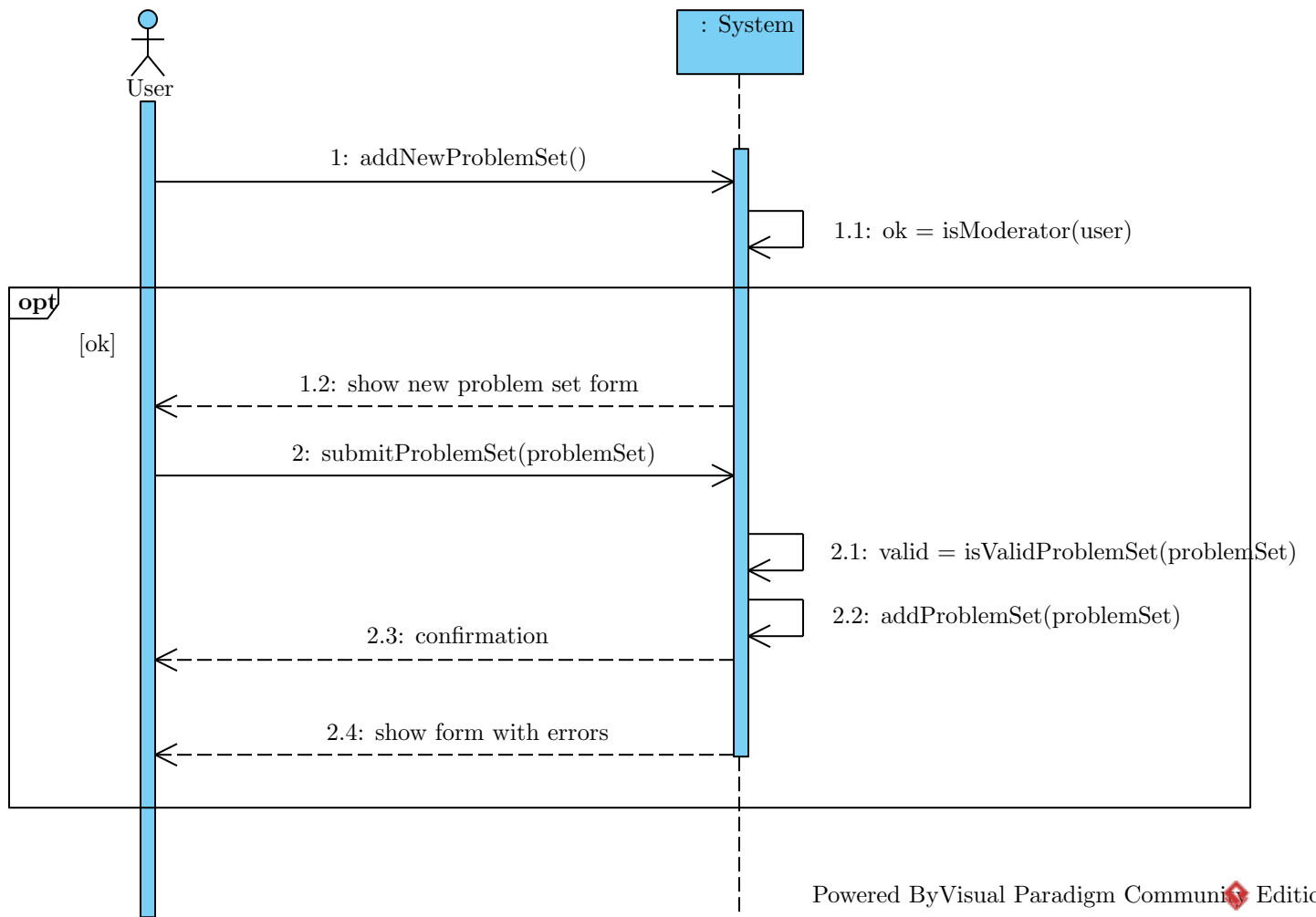
Main Success Scenario:

1. Moderator initiates addition of a problem set.

2. System returns a form for moderator to fill.
3. Moderator fills form with problem set details and submit.
4. System verifies the problem set.
5. Upon verification, system adds the problem set to the problem bank.
6. System returns a confirmation feedback.
7. Moderator can add new problem set or exit.

Alternative paths:

1. At any time system fails: Moderator can restart process or contact Technical support.
2. If moderator does not want to fill form or submit a form after receiving the form, moderator may exit.



Use Case (UC5) : Search Problem Set

Primary Actor : User

Stakeholders and Interests: User: wants to find a problem set fast and with minimal effort.

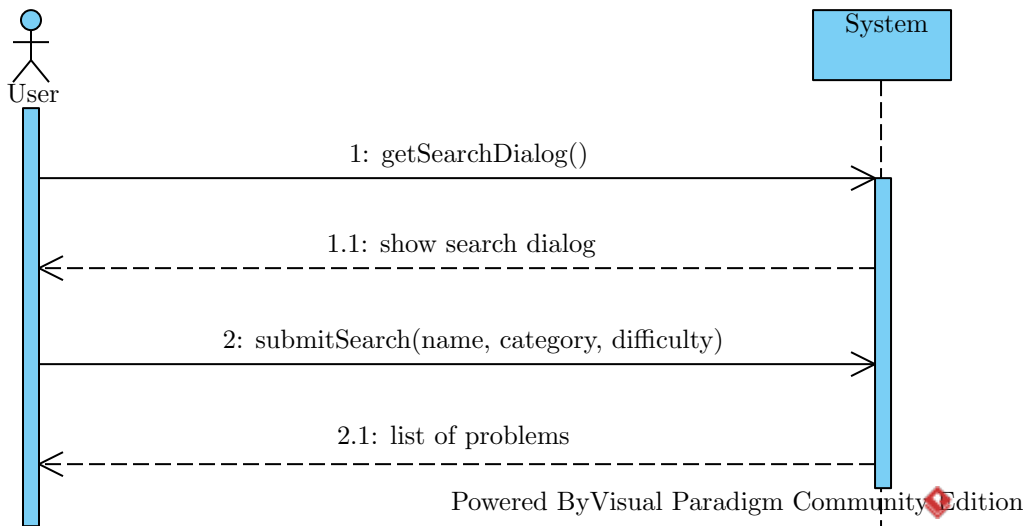
Preconditions: User is identified and authenticated.

Success Guarantee(Post conditions): Does not apply.

Main Success Scenario:

1. User clicks on search button.
2. System returns a search dialog.
3. User enters a search query containing problem name, category and difficulty.
4. System returns search results containing problem set list.
5. User can exit or search again.

Alternative paths: At any time system fails: User may restart the process.



Use Case (UC6) : Get Random Problem Set

Primary Actor : User

Stakeholders and Interests: User: wants to a random problem set that he haven't attempted already.

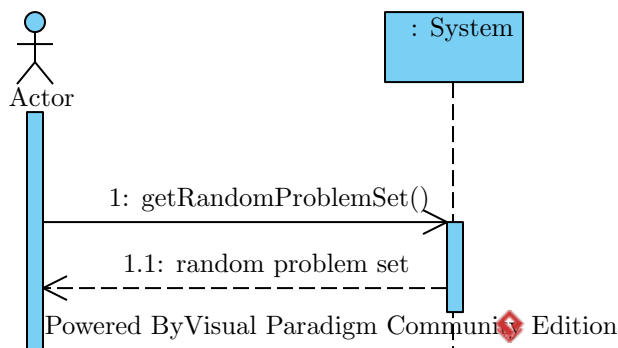
Preconditions: User is identified and authenticated.

Success Guarantee(Post conditions): Does not apply.

Main Success Scenario:

1. User clicks on get random problem set button.
2. System returns a random problem set.
3. User can exit or try getting another random problem.

Alternative paths: At any time system fails: User may restart the process.



Use Case (UC7) : Participate in Session

Primary Actor : User

Stakeholders and Interests: User: wants to be able to read a problem and answer it's questions with ease.

Preconditions:

- User should be identified and authenticated.
- Problem set is located by user.

Success Guarantee(Post conditions):

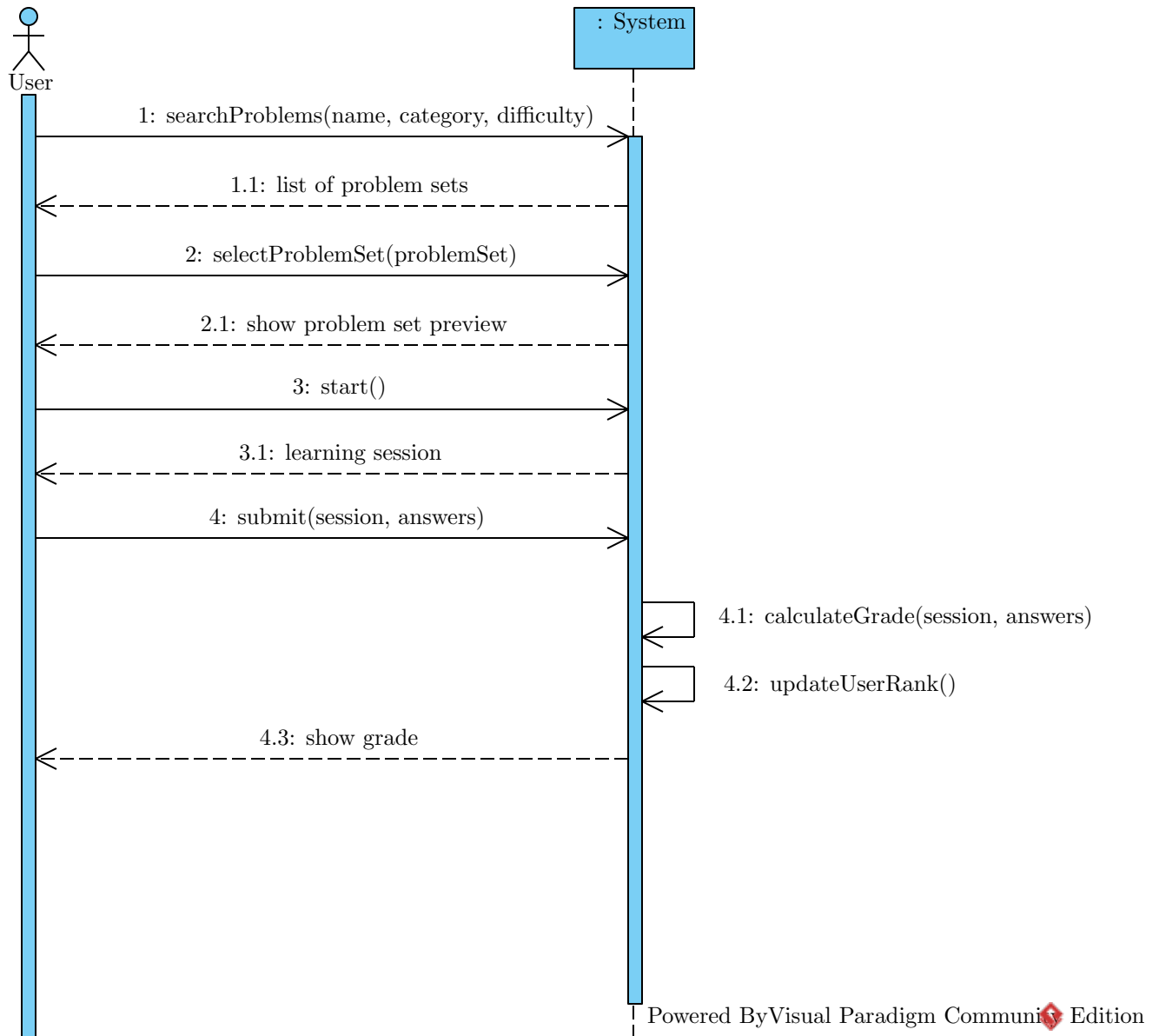
- User is graded for the problem set.
- User's rank is updated.

Main Success Scenario:

1. User starts a new problem set.
2. System returns a preview of the problem.
3. User clicks the start problem button.
4. System returns the actual problem set.
5. System starts a timer.
6. User attempts the problem and submit answers.
7. System returns the grade.
8. System updates the user's rank.
9. User can exit the system or start a new problem set.

Alternative paths:

1. At any time system fails: User restarts the process.
2. When problem session is timed out, system automatically submits.
3. If User does not want to proceed after viewing problem set preview, user may exit or try another problem set.



Use Case (UC8) : Review Problem Set

Primary Actor : User

Stakeholders and Interests: User: wants to review a problem set.

Preconditions:

- User should be identified and authenticated.
- User should have already attempted the problem set.

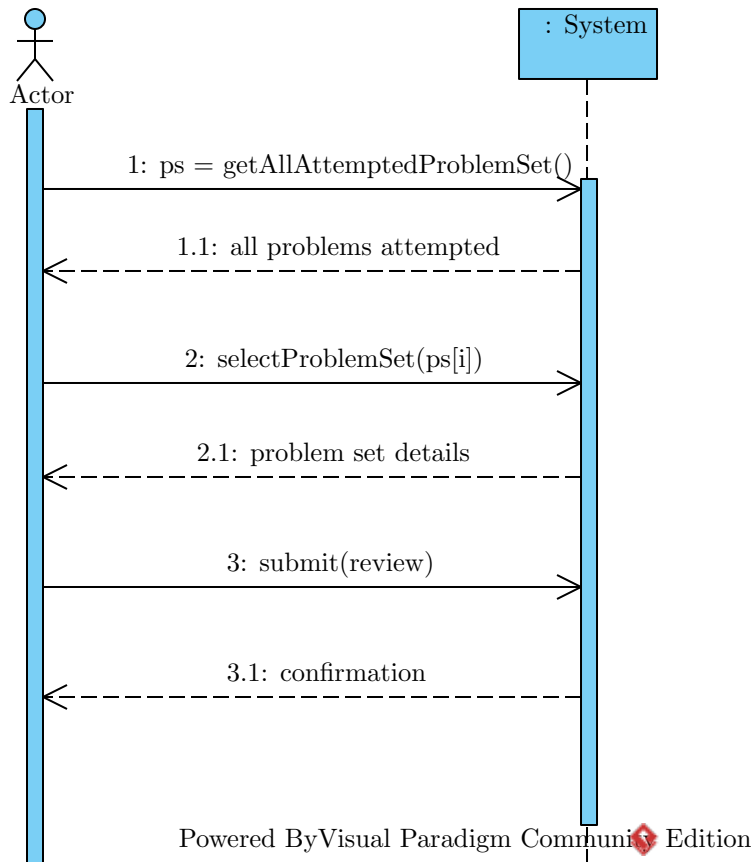
Success Guarantee(Post conditions): Review of a problem set is updated.

Main Success Scenario:

1. User clicks on attempted problems button.
2. System returns all problems attempted by the user.
3. User selects a problem.
4. System returns problem details(reviews,difficulty level, statistics on submission, etc.).
5. User adds his review.
6. User clicks on submit button.
7. System updates reviews of the problem set.
8. User may exit or add another review.

Alternative paths:

1. At any time system fails: User starts the process or can contact support.
2. If user does not want to add review after viewing all problems, user may exit.
3. If user does not want to add review after viewing problem details, user may exit.



Use Case (UC9) : Timeline

Primary Actor : User

Stakeholders and Interests:

- User: User wants to view the activities of subscribes users.
- User: User wants to view activities of subscribed categories.

Preconditions: User is identified and authenticated.

Success Guarantee(Post conditions): Does not apply.

Main Success Scenario:

1. User clicks to open timeline.
2. System returns the most recent activities of subscribed users and categories.
3. User may exit or repeat step 2 by clicking next page.

Alternative paths: At any time system fails: User may start the process again.

Use Case (UC10) : View Rankings

Primary Actor : User

Stakeholders and Interests: User wants to view his ranking along with other subscribed users.

Preconditions: User should be identified and authenticated.

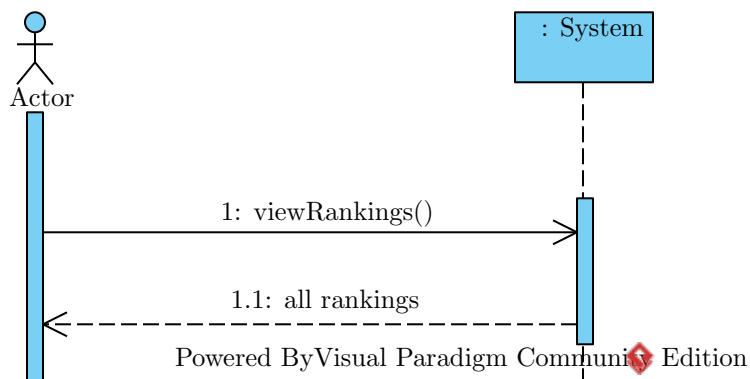
Success Guarantee(Post conditions): Does not apply.

Main Success Scenario:

1. User clicks on view rank button.
2. System returns a rank of all subscribed users along with his rank on top on the same page.

Alternative paths:

1. At any time system fails: User may restart the process.
2. User can also select category and click on rank to view category wise ranking.

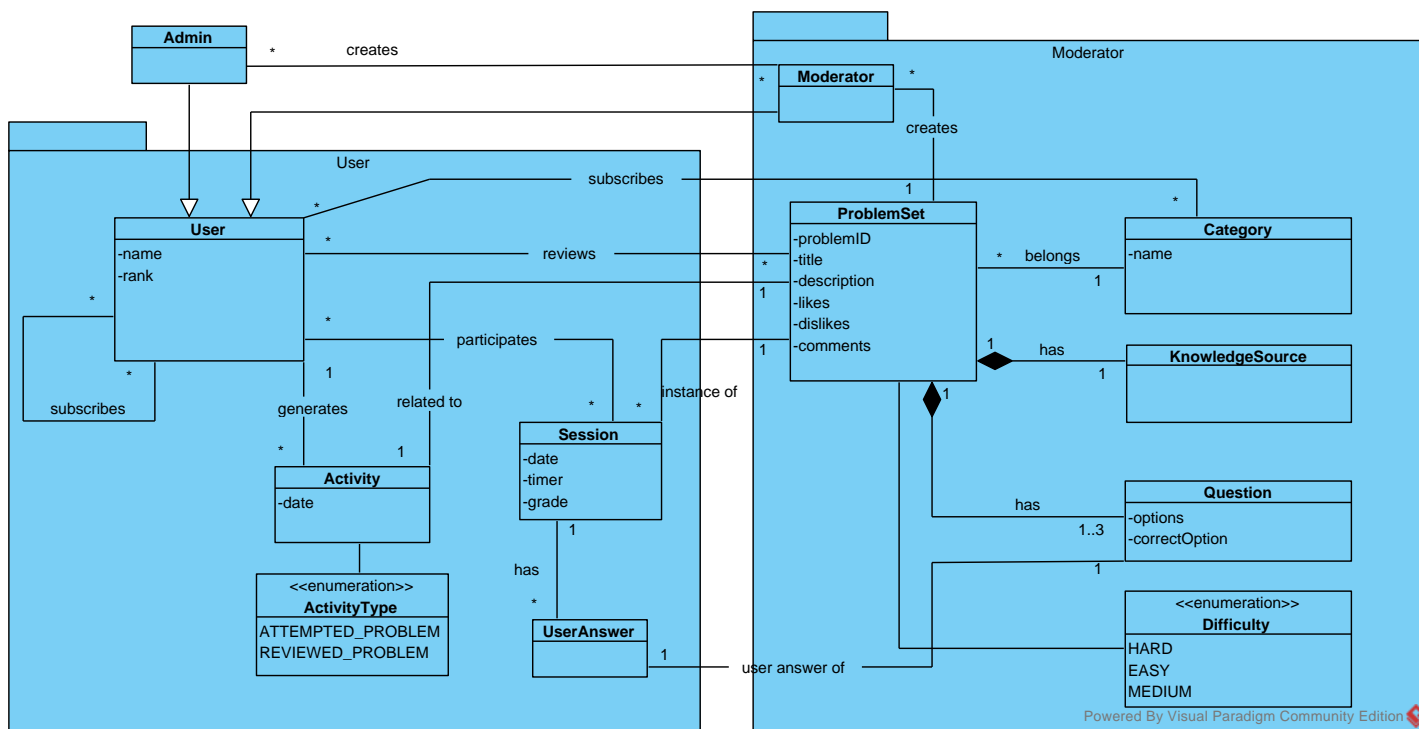


System Operations

System
<div>+getSearchDialog() +submitSearch(name) +selectUser(userID) +promoteUserToModerator(userID) +subscribe(user) +updateUserSubscription(user) +updateUserInfo(userID) +addNewProblemSet() +isModerator(user) +submitProblemSet(problemSet) +isValidProblemSet(problemSet) +getRandomProblemSet() +searchProblemSet(name, category, difficulty) +selectProblemSet(problemSet) +startProblem(problemSession) +submitProblemSession(session, answers) +calculateGrade(session, answers) +updateUserRank(userID) +getAllAttemptedProblemSet() +submit(review) +viewRanking() +openTimeline()</div> <div>Powered ByVisual Paradigm Community Edition</div>

Business rules

ID	Rule	changeability	Source
RULE 1	Only a user with moderator status can add a problem set.	low	FLARN policy
RULE 2	Only an administrator can grant moderator privileges.	low	FLARN policy
RULE 3	A user cannot review a problem set he has not attempted.	low	FLARN policy
RULE 4	A user cannot see reviews, specifically comments on a problem set he has not attempted.	low	FLARN policy



Traceability Matrix

UC i refers to use case i, where i is an number

R i refers to use case i, where i is an number

	R5	R6	R8	R9	R10	R11	R12	R14	R15	R16	R17	R18	R19
UC1	×						×						
UC2	×						×						
UC3					×	×							
UC4		×											
UC5			×	×									
UC6			×	×									
UC7			×	×									
UC8												×	×
UC9											×		
UC10								×	×	×			

Future Work

- Adding a private channel feature, where only restricted users can only participate in problem sets of that domain.

Glossary

- User : A user is a generic person who interacts with the system. A user can be an administrator, a moderator or a learner.
- Moderator : A moderator is a user with permission for adding problem set. The permission assigned to a moderator is moderator status.
- Review : A review is a users view of a problem set, it can be likes, dislikes or comments.
- Activities : These are events generated in the system by a user, like attempting a new problem set, adding a new problem set, etc.
- Problem set : A problem set consist of a knowledge source(text,videos,animations,graphics,etc) and related questions.
- Problem bank : A problem bank is a repository of all the problem set.
- Learning Session : A learning session is an active instance of a problem set, started by a user.
- Problem preview : A problem preview is a trimmed down description of a problem set.