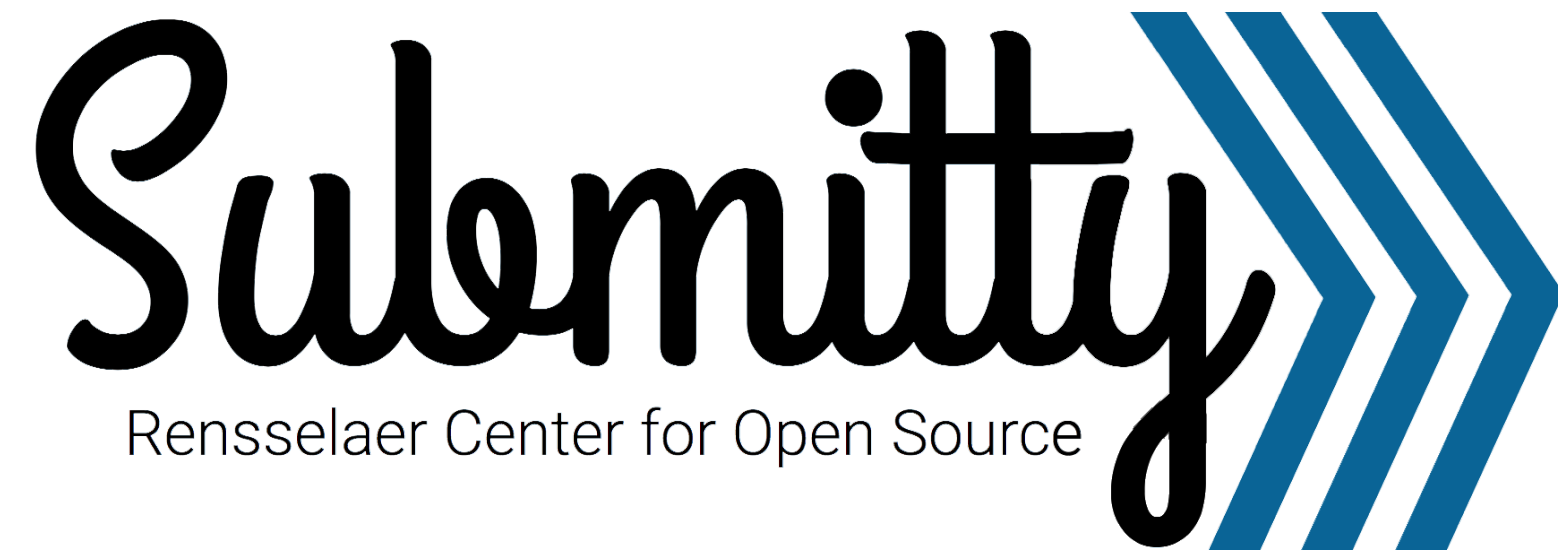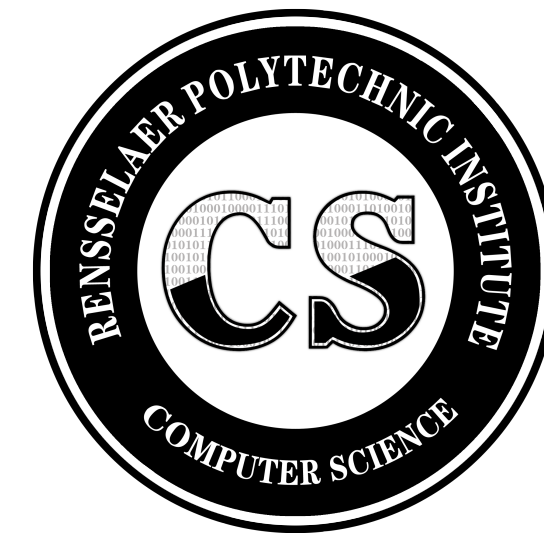# Submitty Discussion Forum

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Introduction

The RCOS Submitty project is an ongoing open source project used to collect, compile, and automatically grade programming homeworks for students in our introductory, sophomore, and upper level computer science classes. As the number of courses have grown that are using the environment, there exists a need for students to be able to communicate with their classmates and have a dialogue with the instructor and teaching assistants, we have implemented a Discussion Forum within the Submitty environment. Unlike other systems, this will not need another login to be able to access. Users can login normally through the Submitty website with their RCS id.

We have received feedback from students, TA's and instructors, who have helped influence the design and new features.

TA/Instructor moderation

Creating a discussion platform enables students to develop and grow. But, there needs to be a way for instructors and graduate TA's to be able to moderate this discussion which helps prevent students from violating university or course policies. Instructors and TA's have abilities:

- Edit posts/threads.
- Delete posts/threads.
- Post announcements.
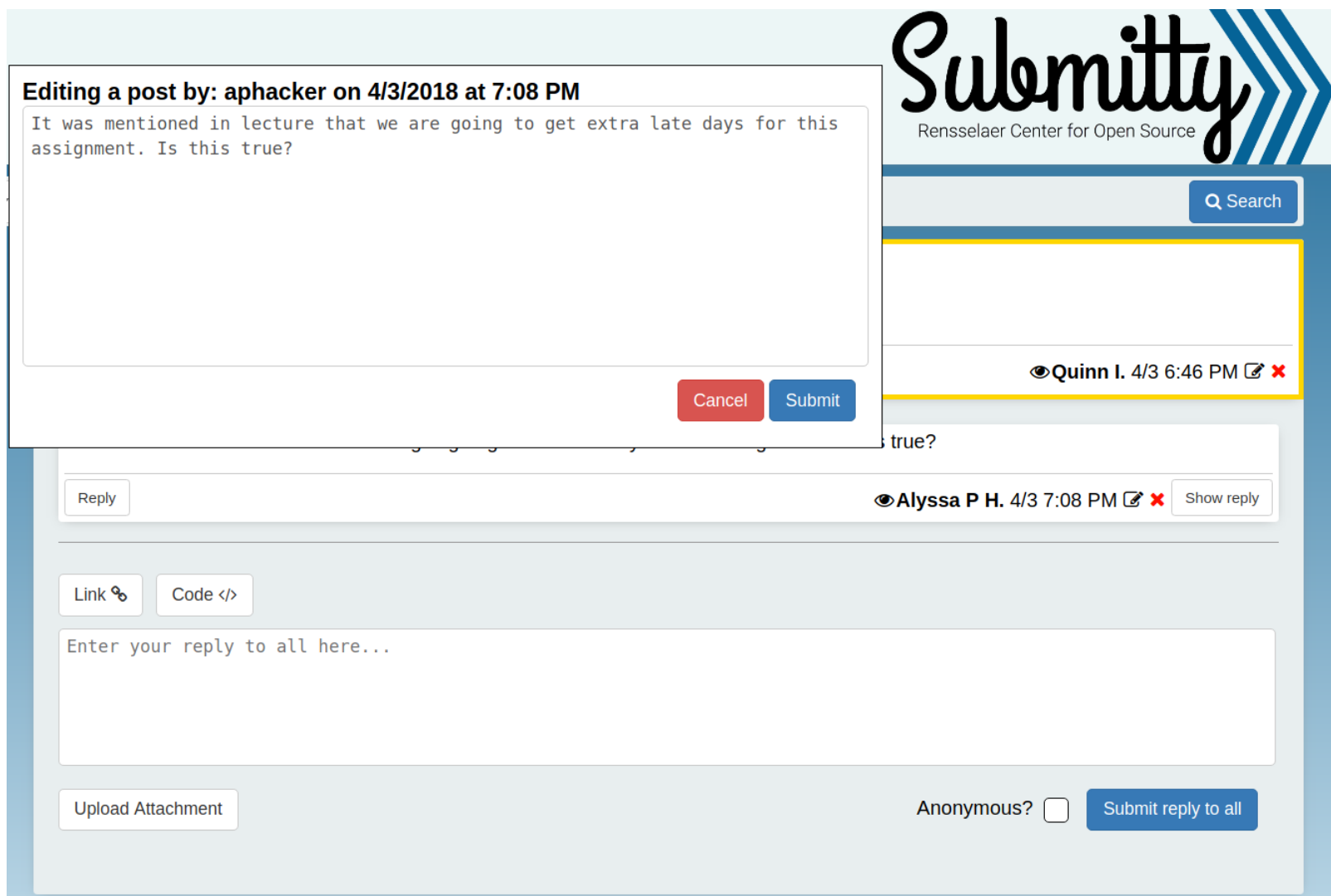- View usernames for users who posted anonymously.

Figure 1: Instructor - Editing a post

We soon want to have students be able to edit their own posts, this requires that a descriptive log be kept in order to preserve any previous edits a student makes.

Figure 2: Instructor - Display username for an anonymous post

User Experience

Users have the ability to reply to other users utilizing the following:

- Posting anonymously to class
- Code segments
- Hyperlinks
- Image attachments
- Filtering on categories
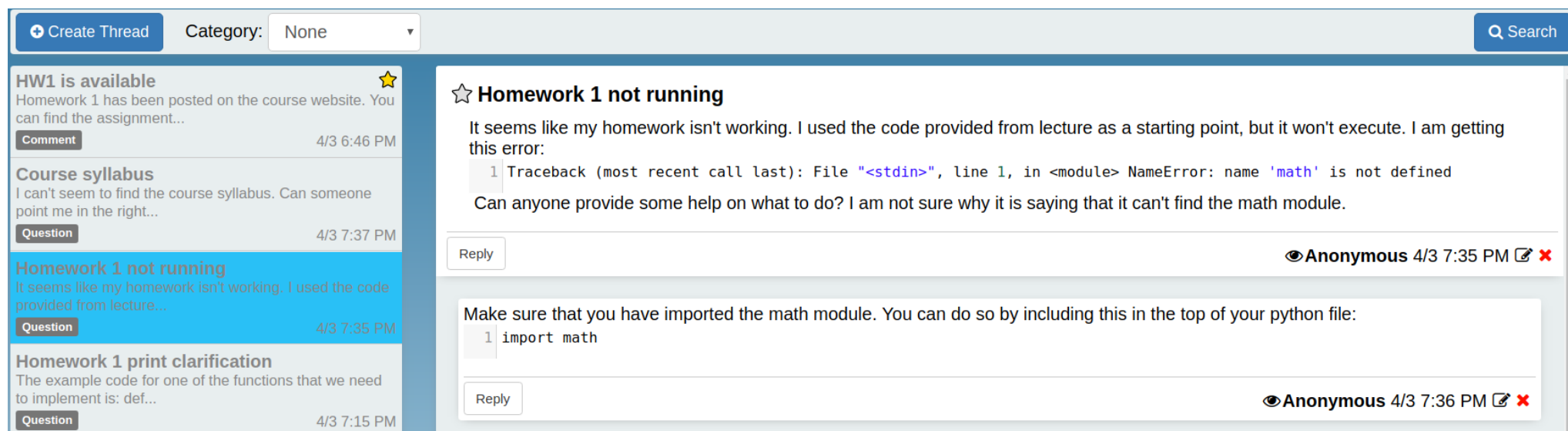- Collapse post replies
- Thread and post searching

Figure 3: General features

Collapsing posts is especially useful when there is a long discussion within a thread, allowing the user to filter clutter and only see information that they find pertinent.

Categories

Each thread is associated with at least one category which allows for filtering threads in the thread list. This allows users to filter and quickly show threads that they find pertinent. We plan to expand this feature to be able to filter on multiple categories. Each course comes with default categories of "Comment" and "Question", with the instructor having the ability to add new categories.
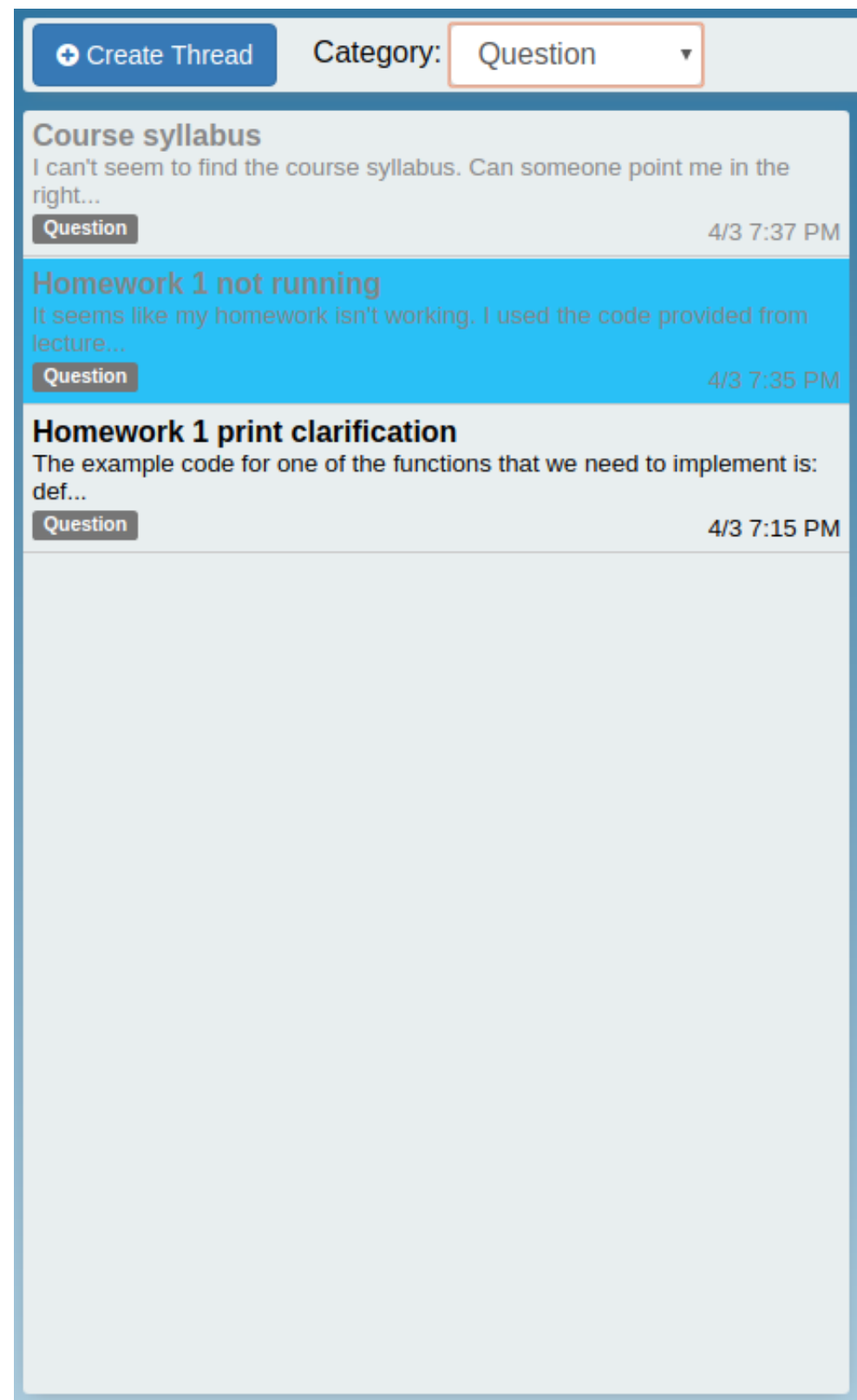

Figure 4: Filtering categories

Searching

The search functionality breaks down search queries into lexemes utilizing PostgreSQL Text Search Types. This normalizes different variations of the same word which then can be used to find similarities to determine what rows need to be returned. This becomes extremely important in larger classes when trying to find specific information. In fact, this semester, Principles of Software has been using the Discussion Forum with over 200 students.

Figure 5: Example search result

Forum Statistics

This portal enables teaching staff to be able to analyze student participation on the forum. This can be used to award points based on participation in larger classes. With this analysis teaching staff can also have a different aspect when considering undergraduate mentor recommendations.

User	Total Posts (not deleted) ↓	Total Threads	Total Deleted Posts	Show Posts
Hacker, Alyssa P	4	1	0	Expand
TA, Jill	3	0	0	Expand
Student, Joe	2	1	0	Expand
Bitdiddle, Ben	1	1	0	Expand
Instructor, Quinn	1	1	0	Expand

Figure 6: Full course view

User	Total Posts (not deleted) ↓	Total Threads	Total Deleted Posts	Show Posts
Hacker, Alyssa P	4	1	0	Expand
TA, Jill	3	0	0	Collapse
	2018-04-03 19:16:53.942187-04		Yes, the instructor will be giving one extra late day for this assignment.	
	2018-04-03 19:17:37.832837-04		You should print out to two decimal places (this includes for example "5.00").	
	2018-04-03 19:39:14.84398-04		The course syllabus can be found [url=http://example.com]here.[/url]	
Student, Joe	2	1	0	Expand
Bitdiddle, Ben	1	1	0	Expand
Instructor, Quinn	1	1	0	Expand

Figure 7: View users posts

In the future, using similar methods for searching with PostgreSQL Text Search Types, we can examine and flag posts with inappropriate content which the teaching staff can handle appropriately.

Future Work

- A notification system.
  - This system would notify users on having action items on the Discussion Forum. This is a result of activity on the forum relative to each user. This means that, a user responded to a previous post of yours, a member of the teaching staff has resolved your question or there was an announcement posted. This would be able to be expanded system wide to create notification outside of the forum. This could be especially useful for Team Assignments.
- Overall performance optimization.
- Investigate whether there exists a link between forum participation and quality of submitted assignments.

Submitty

Submitty is an open source programming assignment submission system from the Rensselaer Center for Open Source Software (RCOS), launched by the Department of Computer Science at Rensselaer Polytechnic Institute.
http://submitty.org.

Related Publications

- *Correlation of a Flexible Late Day Policy with Student Stress and Programming Assignment Plagiarism*
  Breese, Maicus, Peveler, and Cutler. SIGCSE 2018 Poster
- *Program Analysis Tools in Automated Grading*
  Dinella, Breese, Maicus, Cutler, Holzbauer, and Milanova. SIGCSE 2018 Poster
- *Supporting Team Submission and Peer Grading within Submitty*
  Peveler, Breese, Maicus, Aikens, Cyrus, Dinella, Anderson, Barthelmess, Lee, Montealegre, Wang, Holzbauer, Cutler, and Milanova SIGCSE 2018 Demo

Acknowledgments