User Instructions

ProofChecker - SE691

Rakhfa Amin, Thoman Andrews, Kersley Jatto, Aiasha Sattar, Colton Shoenberger

Getting Started

Our system is publicly available at the following URL: https://proof-tool.herokuapp.com/. Please note that the website may take a few extra seconds to load if it has not been visited within the past 30 minutes.

You do not need to install the system locally on your computer; however, if you are interested in doing so, you can clone our Git repository found at https://github.com/cmsho/Proof-Tool and follow the instructions in the README.md file.

Create an Account

The first thing you will want to do to get started is create an account. Click the “Sign Up” link in the left-hand menu. From there, you will have the option to Create a Student Account or Create an Instructor Account. I recommend creating an Instructor Account if you are interested in viewing more of the functionality. Proceed by providing a username, e-mail address, and password. After doing so, you will receive a confirmation email from proofchecker.pwreset@gmail.com with a link to activate your account (check your spam or junk folder if it does not appear in your regular inbox). Click the activation link in that email to activate your account. It will redirect you to our website.

Profile

After signing into your account, you have the option to customize your profile. You can do so by clicking the Profile link in the left-hand menu. You can optionally provide your name, phone number, date of birth, and a bio. If you provide a name, you will be greeted by your name on the homepage of the website.

Courses

If you have created an instructor account, you have the ability to create courses. The concept of a course is similar to that of a course in Blackboard. You can specify a name, term, and

section value for the course. Additionally, you can enroll students in your course. Adding students to your course gives an instructor the ability to view proofs created by those students. If you have a Student account, on the Courses page, you can view Courses you are enrolled in, as well as available courses which you can join.

Assignments

If you have created an instructor account, you have the ability to create assignments. An assignment is essentially a partially complete proof, with some additional attributes, such as "points" and "target steps". When you create an assignment, you can also create Problems to add to that assignment. An assignment is associated with a particular course. When an assignment is saved, users with Student accounts who are enrolled in that course can view the assignment from their Assignments page. They can navigate to each problem in the assignment, create a solution, and save the proof for their solution.

My Proofs

The My Proofs link in the left-hand menu brings you to a page where you can view all proofs you have created. You can also create a proof from this page by clicking the "Add a new Proof" button at the top of the page.

Create Proof

The Create Proof page is the most important and sophisticated component of the system. On this page, you will see four form fields at the top of the page:

- *Name:* If you provide a Proof with a name, it will appear with that name displayed on the "My Proofs" page.
- *Rules:* There are four rule sets available to choose from, which determine what rules are legal to reference in your proof. The options are "TFL - Basic Rules Only", "TFL - Basic and Derived Rules", "FOL - Basic Rules Only" and "FOL - Basic and Derived Rules". Explanations of how to reference the rules within a proof are available in the right-hand menu under the "Rules" tab.
- *Premises*: Here you can input desired premises with which to begin your proof. If there are multiple premises, separate them using semicolons (e.g. "A→B; A"). Please note that help is available under the Help tab in the right-hand menu
- *Conclusion*: Here you can input the desired conclusion which the proof seeks to justify.

To make it easy for users to enter mathematical symbols such as connectives and quantifiers, we introduced a text-replacement functionality that uses escape commands to represent these symbols. This list is also available in the Help section of the right-hand menu, which we strongly encourage you to review. For example, if you wanted to input "A→B", simply type "A\impB".

After filling in the above four fields (note that "Name" and "Premises" are optional), you should click "Start Proof" to begin the proof. This will automatically enter any premises you provided as the initial lines of the proof.

The "Click here to understand what each button does!" link will expand a legend that explains the functionality of the ProofChecker form.

- The + button adds a new line to the proof (below the current line)
- The <- button pulls the current line out of a subproof, if it is in one. For example, pressing this button on line 2.1 would renumber the line to 2
- The -> pushes the current line into a subproof. For example, pressing this button on line 2 would renumber the line to 2.1
- The x button deletes the current line from the proof

Line numbers are handled automatically by the system. The user is left to input the expressions and rules.

- Expressions should be in valid TFL and FOL syntax, depending on which ruleset is being used. Again, help on syntax rules is available in the Help menu on the right-hand side.
- Rules should begin with a symbol representation of the rule being applied on the line (e.g. "∧I" for Conjunction Introduction), followed by any line numbers being cited in the rule. For clarification on the available rules and how to use them in a proof, please reference the "Rules" tab in the right-hand menu.

When you believe you have a complete proof, you can click the "Check Proof" button to confirm whether the proof is valid. Clicking this button will result in a message being displayed along the bottom of the page, informing you if the proof is valid or not. If there is an error, it will specify the reason for the error, to guide you in the right direction to resolve the error.

When you are all done working on the proof, click the “Save” button at the bottom to save the proof to your account. This is important! If you do not click “Save”, the proof will not be available for you to revisit.

After saving a proof, if you click the “My Proofs” link again, you will see the proof saved in your proofs. You can revisit the proof by clicking the “Edit” button on that proof, where you can make changes and save them if desired. You can delete the proof by clicking the “Delete” button.

Student Proofs

If you have an Instructor account, you can view proofs created by Students from the “Student Proofs” link. Note that Student accounts will not have access to this link.

Version Log

The “Version Log” link in the left-hand menu brings the user to a page that explains all recent change to the system.

Logout

The log out button, as expected, logs you out of your account. You can sign back in with the “Sign In” link.

Report Bug / Feedback

Users can email us directly with bug reports and any other feedback they have of the system using this page. This feedback is sent to the same email account that we use to send account activation links, as well as password reset emails.