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Date: 03/24/2014

Version #3

RANDOM FRUIT: SOFTWARE TASK MANAGEMENT FOR STUDENTS WITH EARNED-VALUE REPORTING

USER MANUAL

Contents

Overview

This document explains how to use the Random Fruit student project management system.

Abstract

Random Fruit is an open-source project management site for students developing software.

Like existing tools, it allows developers to break work down into tickets, assign the tickets to each other, view and update a page capturing all the information about a ticket, search tickets, and use the information captured in tickets to generate reports. Random Fruit is tailored to the needs of student projects using earned-value reporting, adopting reporting tools likely to be useful in an academic setting and enabling coordination among teams by an instructor.

Random Fruit aims to help students manage their work while demonstrating their progress to an instructor. It tracks time budgets and time incurred for each ticket, as well as hours worked on the project overall. The reporting feature aggregates this information to produce earned-value charts showing the changes in the remaining work volume and highlighting the achievement of milestones. Students can use the system to visualize planned value, earned value, and actual value at any time.

In addition to acting as a superuser with team-member privileges over all the groups, the instructor can use the system to quickly view how the course as a whole is progressing towards its goals. The instructor can compare groups to spot potential problems before they become emergencies.

A dashboard landing page shows users a top-level view of their project's status. Markdown-enabled comments tell the story of a ticket on its view page. Users can filter and sort tickets, and save reports.

For distribution, Random Fruit's installer application places its file structure on the server of a course instructor or department at a university, where it serves a web page to student and instructor users. It is written in PHP, JavaScript, and HTML, and served by a MySQL database. It is accessed through the web.

Quick Start Guide

You can:

1. Log in by going to Random Fruit's home page in your installation, like http://babyhuey.cis.temple.edu/RandomFruit (current production version, ready for use, feel free to mark testing courses as inactive).
2. Create a course by clicking "Create course" from the left dashnav as an instructor.
3. Edit a course by clicking View Courses. You can delete it, add a project to it, mark is active/inactive, or put in or out of planning mode.
4. Create a project by clicking Add Project from the View Courses page.
5. Add a user to a project by clicking Add User from the View Courses page. The user must exist first.
6. Create a new user by clicking the "Create User" link on the left side dashnav.
7. Create a ticket by clicking the pencil-and-paper icon at the top right.
8. View tickets by clicking "View Tickets" on the left dashnav and selecting the desired project.
9. Search and filter tickets from the View Tickets page. Click column headings to sort by them, but only for certain column headings, and sort them cumulatively with shift+click. Filter with the filter icon at the top right of the ticket table. Clear filters by selecting "All" in each filter menu. Don't filter and then sort on top of the filter. Sort first, then filter.
10. Edit a ticket by clicking on its hyperlinked title from the View Tickets page. Just click on the field you want to edit and press enter or click OK. Log work with the Log Work button. Comment with the Comment button.
11. See graphs by clicking Overview on the left side dashnav.

Name

"We could just name it after some random fruit."

Installation

We discuss two ways to install Random Fruit: 1) Deploying Random Fruit on a Linux server, and 2) Setting up a Vagrant Virtual Machine as a Webserver for Random Fruit. Option 1 is useful if you are a professor and want to host Random Fruit so your students can use it. Option 2 is useful if you want to contribute to Random Fruit, because it involves having your instance of the application sit locally for easy testing. You can also use option 2 to host Random Fruit using a No IP service if you do not have your own IP address.

If you have access to http://babyhuey.cis.temple.edu, Random Fruit is already hosted there at http://babyhuey.cis.temple.ed/RandomFruit, and is ready to use.

Deploying Random Fruit on a Linux server

(with additional Ubuntu specific details)

Dependencies

1. **Git** - Not only is this required to clone the repository, but it's also needed to download additional php packages; we'll address this later on
   command: sudo apt-get install git

2. **Apache2 Web Server**- It *could* be possible to use a different web server, but that would require new instructions. Apache2 requires the following additional packages
    a. **mod_rewrite** - Allows for urls to be dynamically modified by rules set by an .htaccess file. This, in some respects optional but without it, URLs will have to include a reference to index.php in order for links to work.
    b. **mod_php** - The RandomFruit backend is added

    command: sudo apt-get install apache2 libapache2-mod-php libapache2-mod-php5

3. **PHP 5.3+** - The PHP Hypertext Processor must be installed in order for any of the php backends to work.
    a. **php5-mysql** - MySQL is the only database tested for this project

    command: sudo apt-get install php5 php-mysql

4. **MySQL** - MySQL is the only database tested with this project. It's great.
    command: sudo apt-get install mysql-server mysql-client

5. **Composer** - Composer is a package manager for handling application specific php packagers. The installation instructions are straightforward, but in case they change in time, the best place to look for installation is the composer website at https://getcomposer.org.

Installation steps

This installation is for installing git in a subdirectory of your apache server root. The point of this is to simplify the installation process without having to modify your default apache configuration.

1. Get the code

    Clone the copy for the repo into a folder using git or unpack the tarball. Clone the Git repository from git@github.com:douglasnaphas/RandomFruit.git, or from git@babyhuey.cis.temple.edu:RandomFruit/naphas. The master branch is currently naphas-docs. It has all the docs.

2. Enable the correct permissions

    a. The apache user must be able to read all the files in the RandomFruit folder.
        i. chmod a+rX -R <cloned project>/RandomFruit
    b. The apache user must also have all privileges to the RandomFruit/app/storage folder
        i. chmod a+rX -R <cloned project>/RandomFruit/app/storage

3. Link the apache root to the public folder of the site

    This can be done through apache configurations, but the easiest fix is to create a symbolic link to the RandomFruit/public folder. For example, if your apache root is /var/www/, then the command would be:

    ln -s <cloned project>/RandomFruit/public /var/www/RandomFruit

4. Enable mod_rewrite and mod_php5 (just in case)

   If mod_rewrite and mod_php5 are not enabled, enter the following command:

   ```
   sudo a2enmod rewrite; sudo a2enmod php5
   ```

5. Enable the .htaccess overriding

   Once again, this is optional, but it's highly suggested, and is required in order for mod_rewrite to behave properly.

   Wherever the apache default http configuration is located, make sure that the following element is included.

   ```
   <Directory "/var/www/RandomFruit>
       AllowOverride All
   </Directory>
   ```

6. Prepare the database

   Open a root mysql prompt and take the following measures. The *italicised* words are the default values.

   1. Create a database - CREATE DATABASE "*RandomFruit*"
   2. Create a user - CREATE USER '*RandomFruit*'@'localhost' IDENTIFIED BY '*Durian';*
   3. Give all permissions to RandomFruit user - GRANT SELECT, CREATE, INSERT, DELETE, ALTER ON 'RandomFruit' TO 'RandomFruit'@'localhost'; Flush privileges;

7. Configure the project to access the database

   Navigate to the RandomFruit/app/configure.php file. And look for the array defining the 'mysql' attribute of the 'connection'. If any changes were made to the username, password or database name, then modify the default values.

8. Finally, deploy the RandomFruit package

   a. Navigate to the RandomFruit folder in the source tree
   b. execute 'composer install' -- wait for the packages to download
   c. enter "./artisan migrate", to deploy the database setup
   d. enter "./artisan db:seed" to deploy default data set.

Setting up a Vagrant Virtual Machine as a Webserver for Random Fruit

Requirements

Disk Space

Random Fruit requires 60 MB for installation. This is subject to change depending on updates to package dependencies. The database can also take up a considerable amount of space.

Virtual Machine Software

VirtualBox and Vagrant are both needed to run Random Fruit from a virtual machine.

Virtual Machine Preparation: Utilizing Vagrant for the First Time

Random Fruit sits on Laravel, a backend framework written in PHP. Laravel uses composer to automatically maintain dependencies for a Laravel project's environment.

All you have to do to get Random Fruit running is:

1. Clone the master repository
2. Navigate to the root of the repository
3. Run 'vagrant up'

After step 3, Vagrant will execute the provisioning script in the root folder and prepare the virtual machine for use. This process can take anywhere from 2 minutes to 25 minutes depending on the computing power of the server.

Accessing Random Fruit

Once your vagrant virtual machine is up and provisioned, you're ready to start using Random Fruit. Navigate to http://localhost:8888/RandomFruit in a browser and you will see the Random Fruit login page.

Using Dynamic DNS

Why use dynamic DNS?

If you plan on hosting Random Fruit on a server that does not have a static IP address, keeping track of your server's IP address could be quite a task to keep up with. Dynamic DNS programs provide a domain name with the most current IP address of the server to make the server easily accessible for anyone on the internet.

Setting Up Dynamic DNS

There are many dynamic DNS services out there and some are even free. No IP is one of the free services that offers a choice of free subdomains to choose from and offers a lightweight update client that can run as a background service on your server.

Port Forwarding

If your server is running from a home network with a router, you will need to utilize your router's port forwarding feature to make your server accessible by others from the Internet.

If you know how to setup a static IP address for your machine within your home network and forward a port to it, then go ahead and forward port 8888 to your server.

If you do not know how to do this, follow this guide and make sure to forward port 8888, **not** port 80.

Once your port forwarding is setup and your dynamic DNS service is running, your server should be viewable by the world. Your instance of Random Fruit can be accessed at http://<YourNoIPDomain>:8888/RandomFruit.

Configuration

See Installation above for web server and database configuration, and deployment and hosting options.

Changing Administrator Password

By default, the administrator username is “admin” with the password “admin”. This can be changed with the following procedure.

- Log in to the main page with the default combination.
- When redirected to the dash, select “Settings” (the gear icon at the top right).

Security

Random Fruit stores encrypted passwords, but as a best practice do not make your password anything easy to guess or, more importantly, the same as your password for any other system. If you forget your password, click on “Forgot login or password” on the login page and follow the instructions, or have your instructor reset your password.

Random Fruit operates over HTTP, not HTTPS. The information you send back and forth could be viewed by someone else.

Database

Random Fruit uses MySQL. You will have a Random Fruit database after installation in addition to any existing MySQL databases. Database interaction is meant to happen through the web interface, but anyone logged into the server can access the database from the command line with `mysql`.

Application Functions

Random Fruit is for managing software projects using earned-value reporting. This technique tracks, as a function of time:

1. Plan value: the number of hours planned to be incurred on the project.
2. Actual value: the number of hours actually incurred on the project.
3. Earned value: the sum of the plan value for completed tasks.

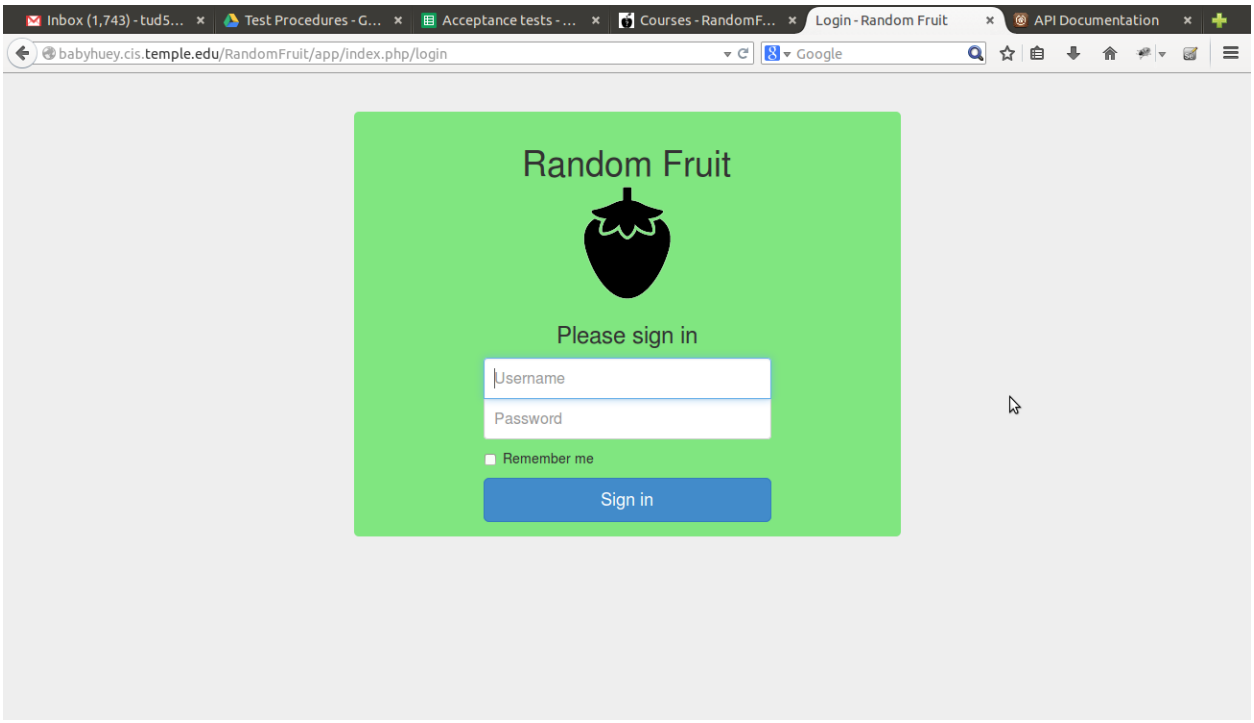
Each of these values can be tracked with respect to a specific task. The sum of the values for all the tasks in a project give the values for the project. Random Fruit lets you do the following:

1. Create tasks for your project.
2. Assign plan value to them.
3. Log actual value against them.
4. Log when value is earned (when a task is complete).
5. Look at the values in real time in a graph.
6. Use the tasks as containers for information helpful in completing the task, like the assignee, a description, and comments.

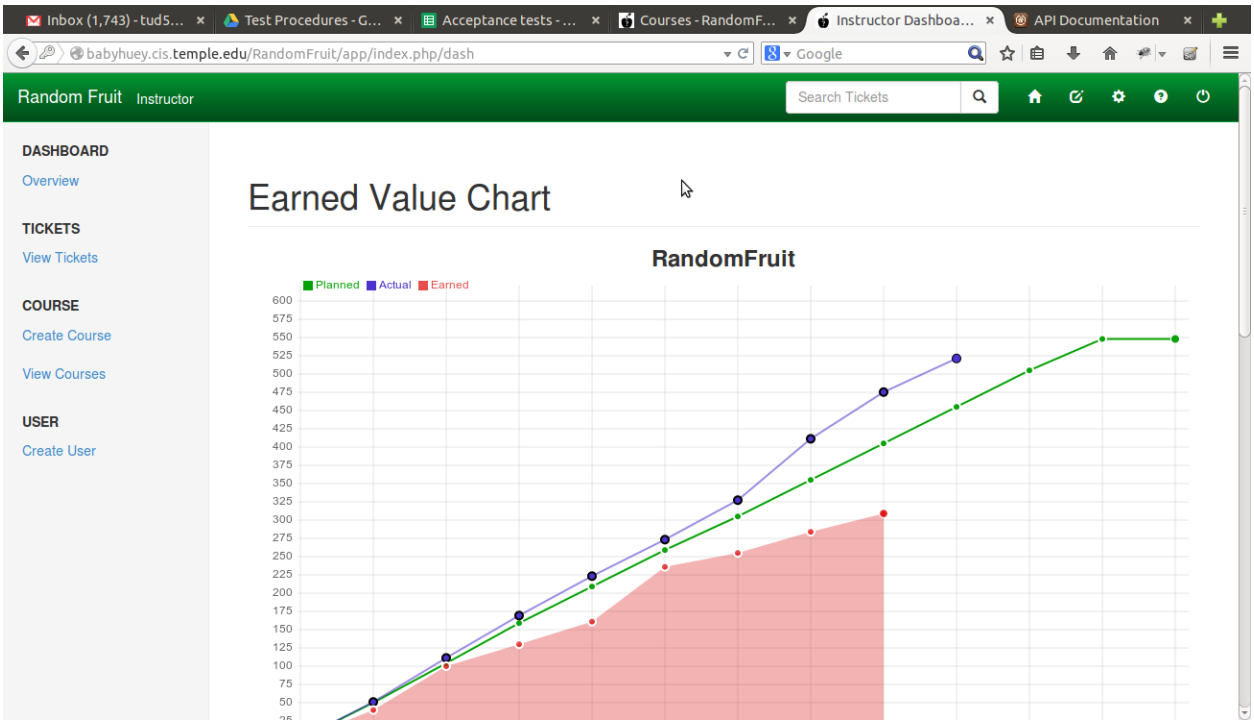
The following subsections explain how to use Random Fruit.

Log in

Go to the page where Random Fruit is hosted (see the Installation section for options). Enter your username and password (provided by your instructor) and click “Sign in.”



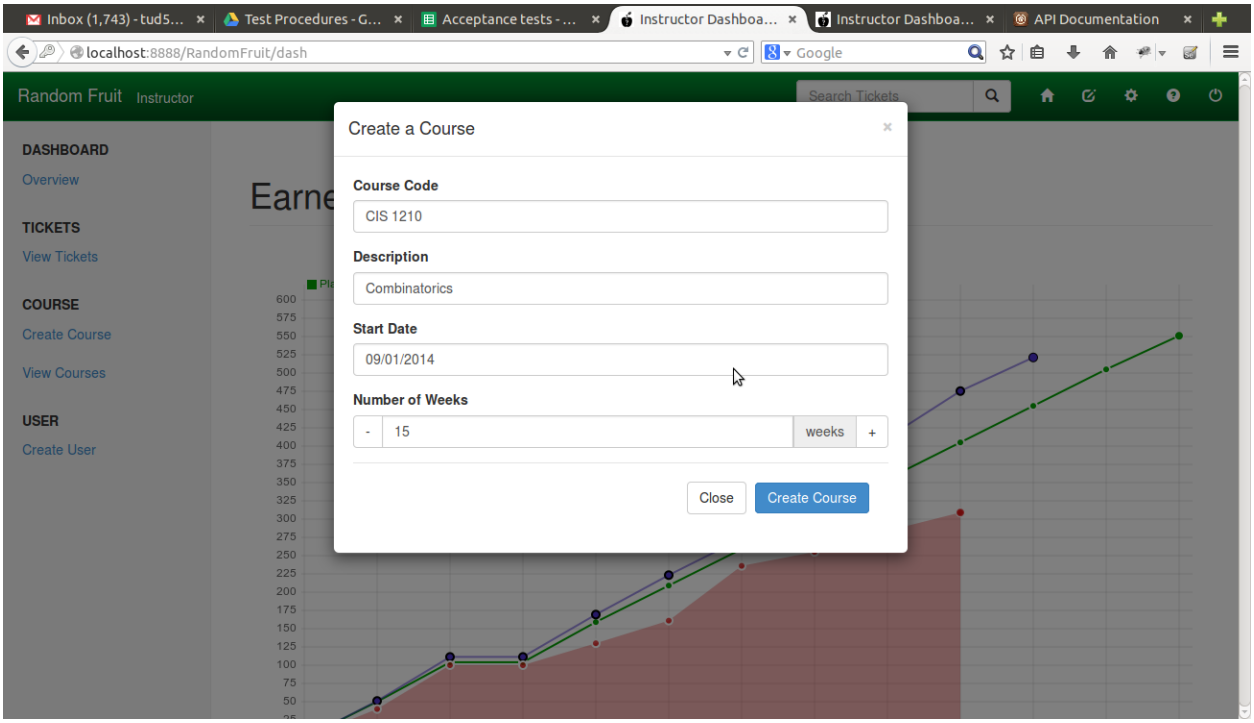
You start at the landing/overview/dashboard page.



This shows an earned-value graph for every project of which the currently logged-in user is a member, and a table of tickets assigned to the user. Note that this allows an instructor to view the status of all projects in a course on login.

Create a course

Click “Create Course” on the left sidebar, the dashnav. Use the Create Course modal to create a course.

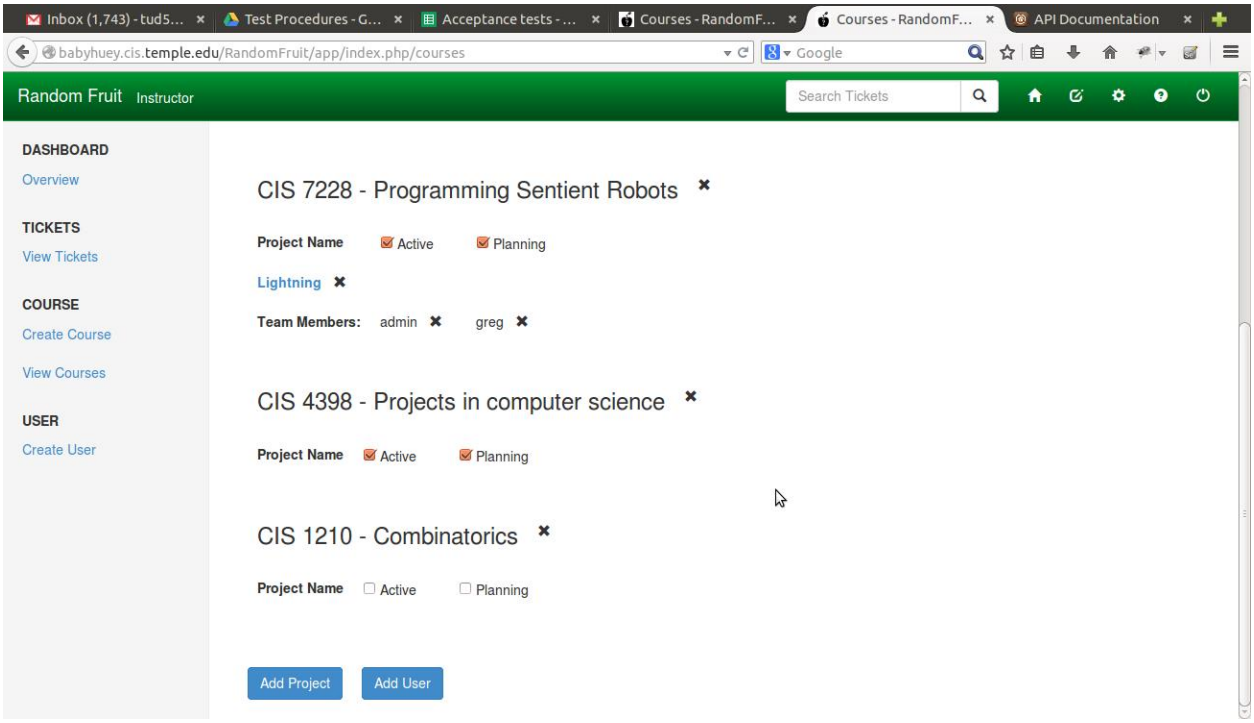


Courses have weeks. The weeks are the data points for the graphs. In “start date”, enter the ending date of the first reportable week of class. Values will be reported 0, 7, 14, 21, … days from that date. There will be as many weeks in the course, and on the graph, as you specify in the “Number of Weeks” selector. This can be different for each course, but these values are the same for each project in the course.

Click Create Course to create the course.

Edit a course

Click on View Courses to go to the View Courses page.



Courses have projects. Projects are the entities reported on by graphs. The View Courses page shows what projects are in a course, and who is in what project. Click on the "x" by a user to remove a user from a project. Click on the "x" by a project to delete it, and on the "x" by a course to delete it. You can only remove users from projects. You cannot delete users.

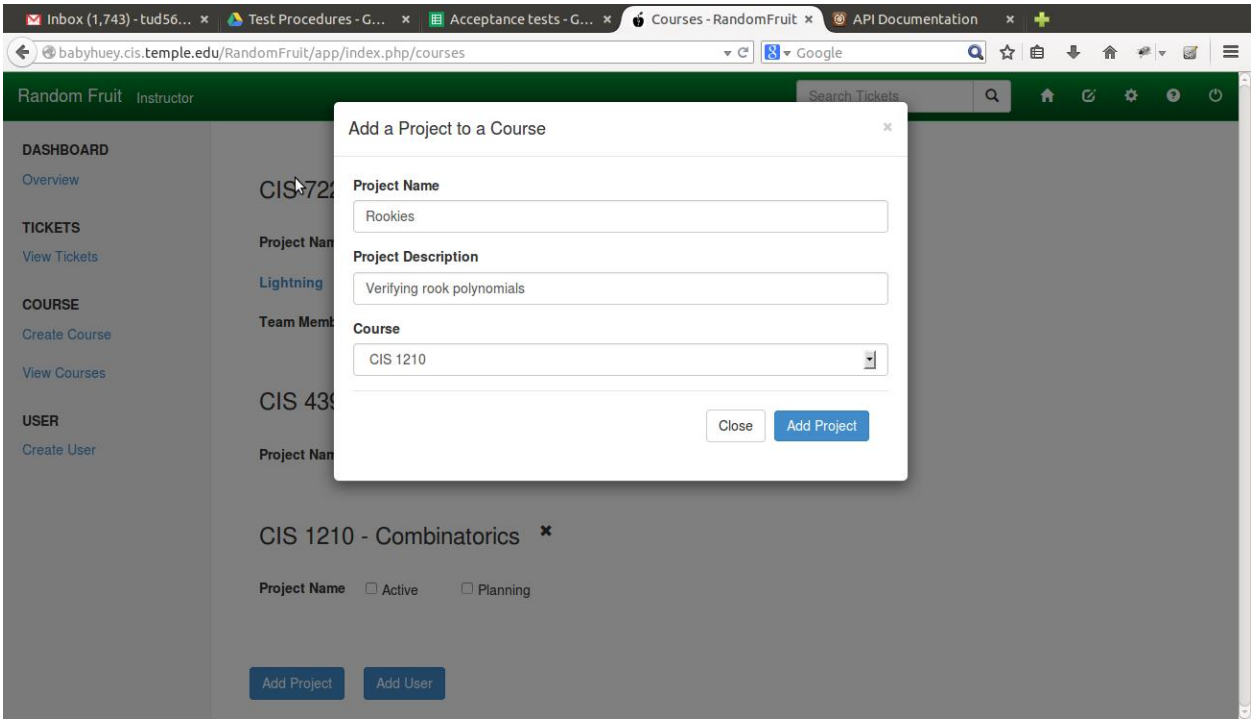
There is no "semester" field. If you want to use Random Fruit for the same course over multiple semesters, give it a course code like "CIS 4398 FA15" or "CIS 4398 FA15 sec 1" instead of "CIS 4398."

The "Active" box controls whether a course is in progress. If selected, the course will show up on members' Overview pages, and as an option for the View Tickets page. If not selected, the course will not show up in these places. This is to prevent an instructor's Overview page from being cluttered with old projects if the system is used for multiple semesters.

The "Planning" box controls whether a course is in planning mode. If a course is in planning mode, the tickets in its projects can have their plan value edited. If it isn't, they can't. This is so that an instructor can let students start working, making updates to plan values, and then cut off planning after a time, so that students do not simple address overages by increasing the budget.

Create a project

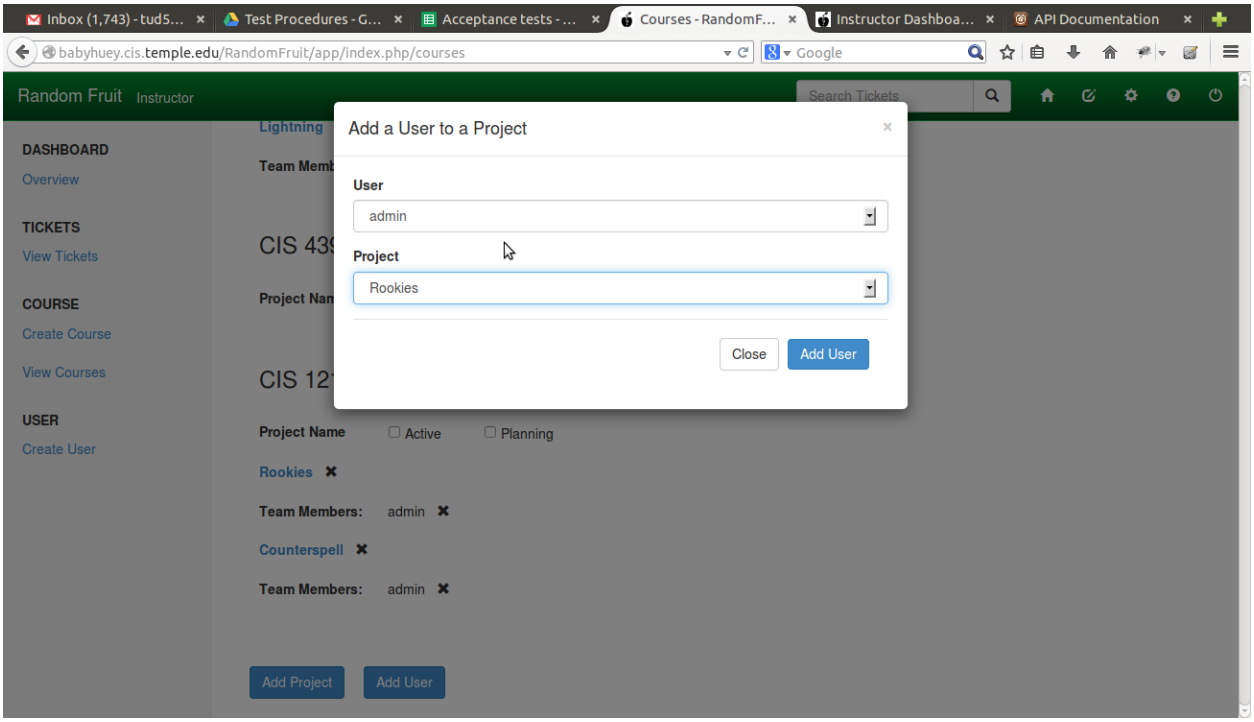
Click the Add Project button on the View Courses page to add a project. The add project modal appears.



Give the project a name and a description, and say which course it belongs to.

Add a user to a project

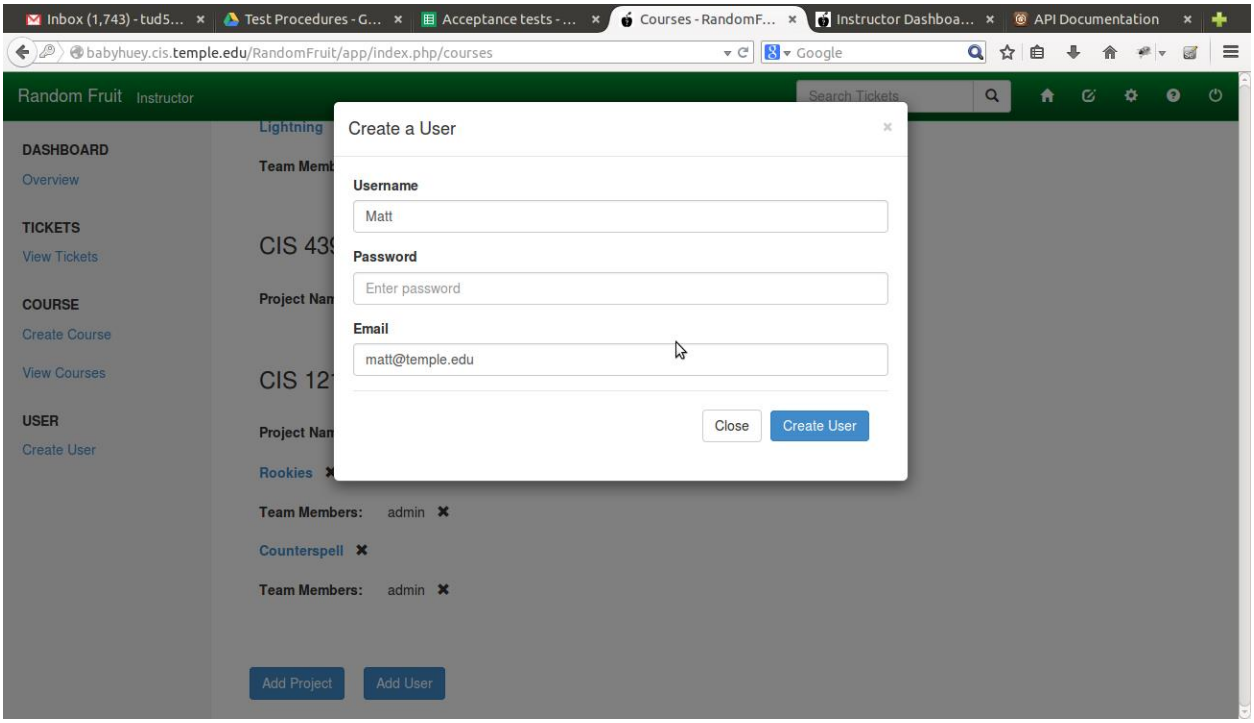
Click “Add User” on the View Courses page. The add user modal appears.



Select the user and the project. If you are an instructor, you have to manually add yourself to each project if you want to see its graph when you log in. This is not done for you.

Create a new user

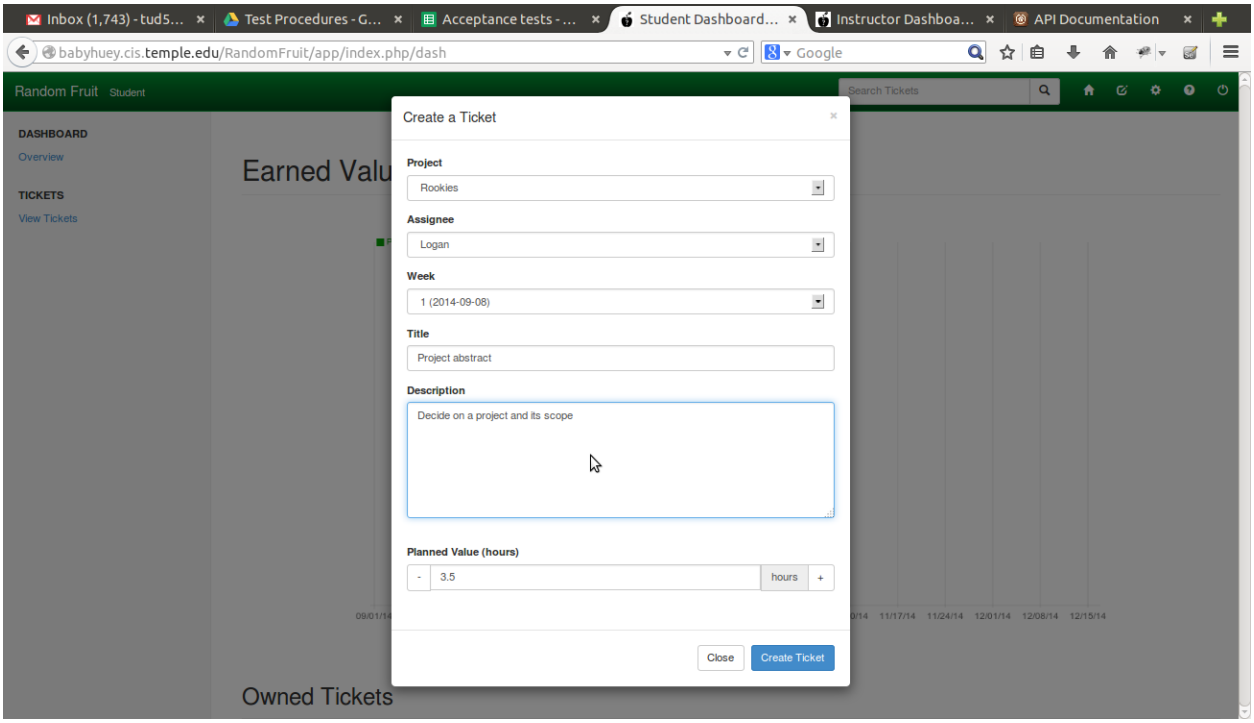
Click the “Create User” link on the left side dashnav. The create user modal appears.



Complete the fields. The e-mail is stored in the database but not used for any current feature. It is there for future features. After the password is set, only the user can change it once authenticated. Instructors should keep a list offline of student passwords, and encourage students not to ever use a password in Random Fruit that is used for any other system.

Create a ticket

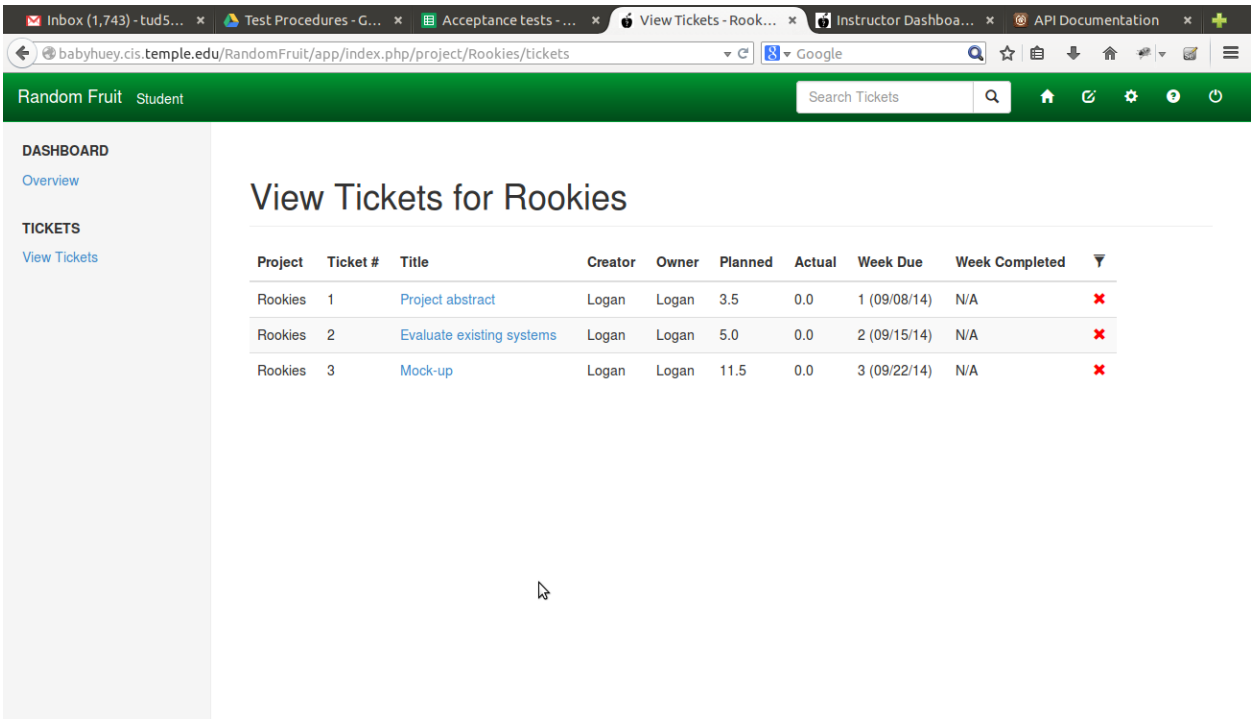
Tickets are tasks, pieces of work. Their pages show information about them. To create one, click the pencil-and-paper icon at the top right. The create ticket modal appears.



Complete the fields. Title is required. “Week” means the week the task is planned to be completed. This controls in which week this ticket’s planned value will hit the graph.

View tickets

Click “View Ticket” on the left side to see the ticket table.

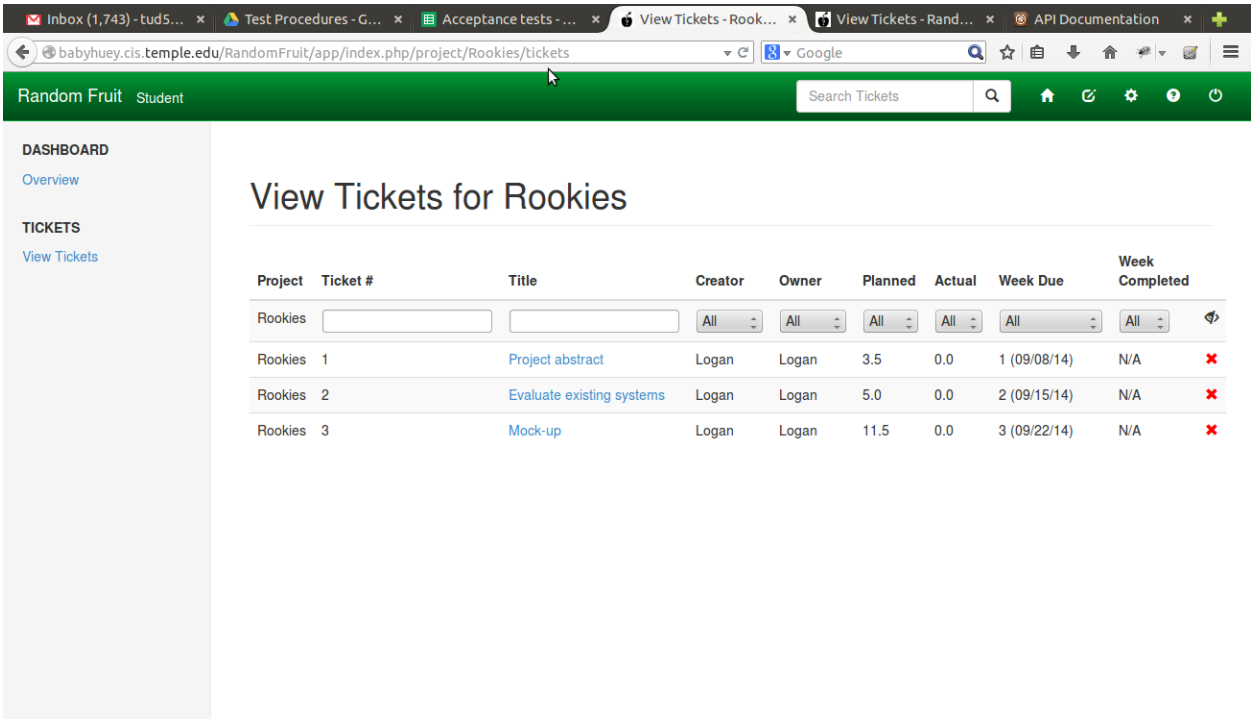


These are all the tickets for any project in which the user is a member. Click the “x” to delete a ticket.

Search and filter tickets

In the ticket table from View Tickets, click a column heading to sort by that column. Shift+click another heading to cumulatively sort by another column. You cannot sort by week due or completed, but this would be a great feature to add, and you can filter by week due or completed.

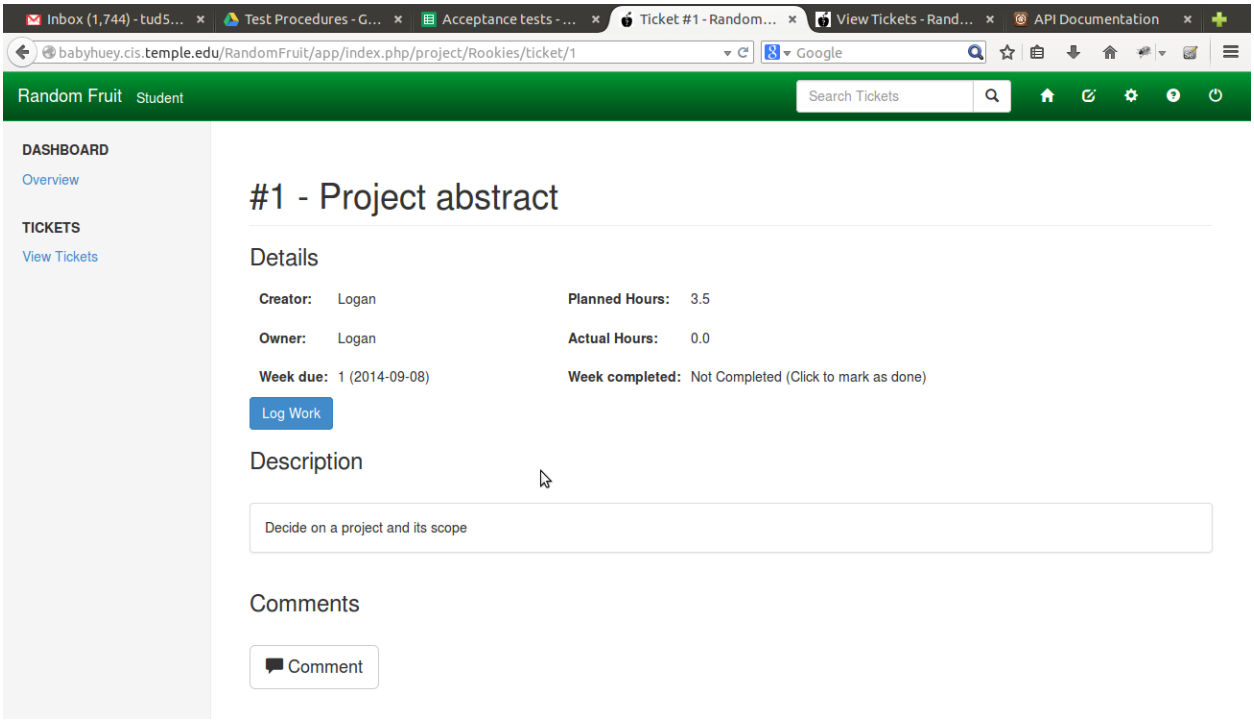
To filter, click the filter icon at the top right of the table. Filter menus appear atop each column.



Clear filters by selecting “All” in the respective filter. Remove the filter menus by clicking the icon again. Do not sort with filters in place.

Edit a ticket

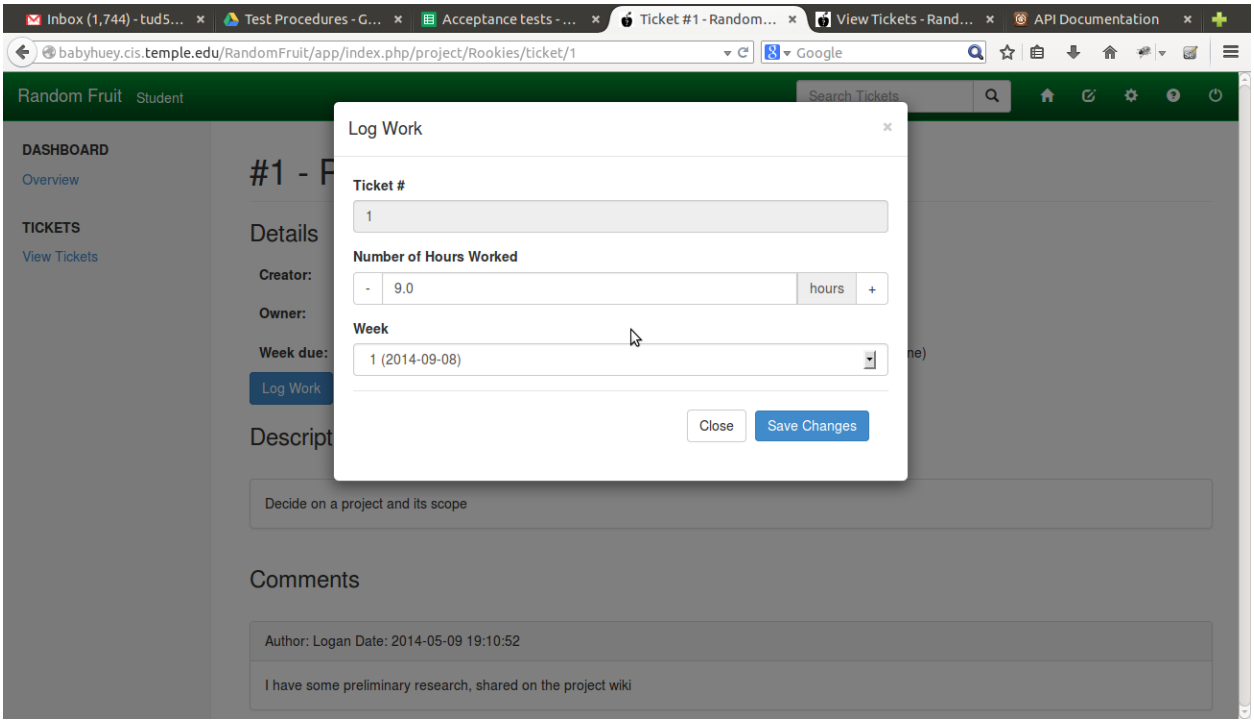
Click on a ticket’s hyperlinked title in the ticket table to view its ticket page and edit it.



Hover over the fields, and a pencil icon appears. Click in the field to edit it. If there is an OK button, you need to press it to save changes. If not, you need to press enter to have your changes saved. You cannot just click outside of the box. Mark a ticket done by giving it a “Week completed”. This will affect in which week its planned value contributes to earned value on a graph.

Click “Comment” to comment. The comment modal appears. Enter your comment, and it appears on the ticket’s page. You can add as many comments as you like.

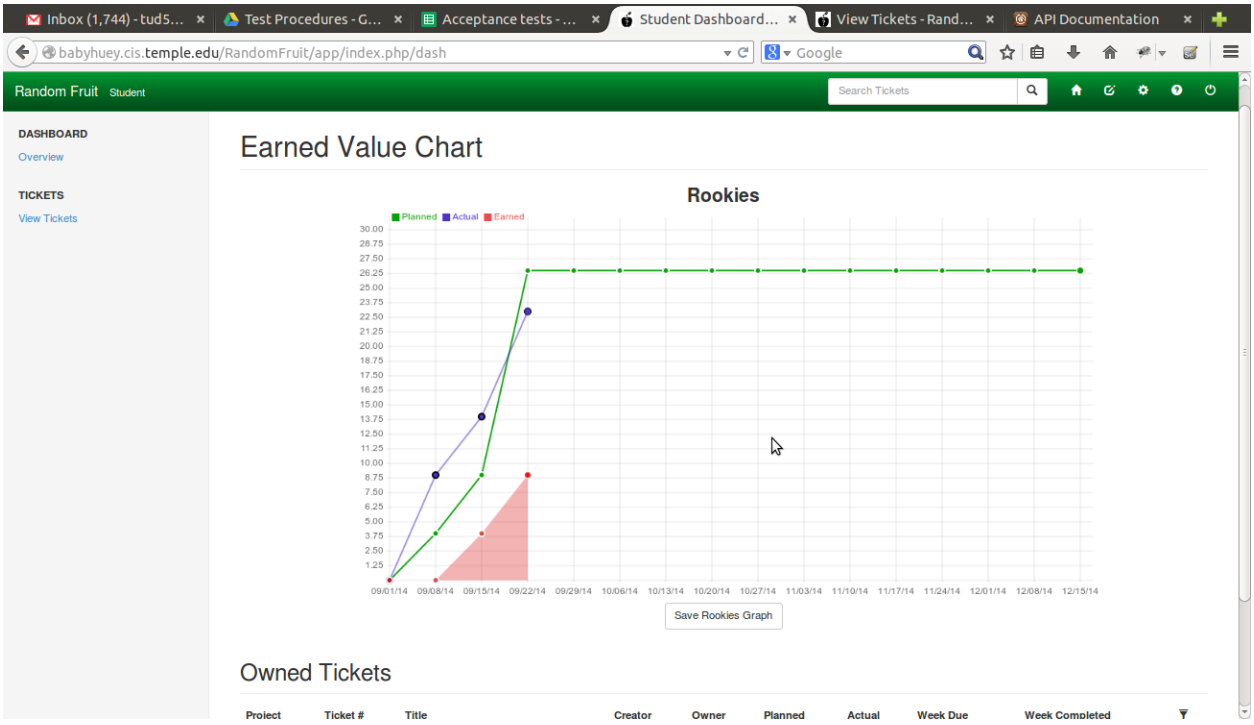
Click “Log work” to record actual hours worked on a ticket. The log work modal appears.



Enter the number of hours and the week they were incurred. This determines actual value in the graph, and actual value on the ticket page.

Graphs

Click on the Overview link to go to see an earned value graph for each active project in which you are a member.



In the example graph above, the Rookies worked overtime through week 2, but did not work as much as they planned in week 3. They did not complete anything until week 2, though they had planned to, and still had not completed at least one planned task by week 3.

Click the “Save <project_name> Graph” button to save an image of the graph, as for a presentation. If this doesn’t work, right click on the graph you want to save, and select “Save image as” to save the same image that would have been generated by the button.

Backup and Recovery

Random Fruit does not provide a customized backup feature. To backup your database, periodically dump the tables to a file hosted somewhere other than the location of Random Fruit. Restore it by passing the file name to mysql on the command line after re-installing Random Fruit, and it should be as it was before you lost your system. See http://dev.mysql.com for information on how to dump and restore MySQL tables. The instructor has to do this. Students cannot.

Error Messages

There are few impermissible actions to attempt in Random Fruit. The following error messages or exceptions are possible.

1. “username/password is incorrect” on attempted login. If you forgot your username or password, your instructor needs to create a new account for you. Only you can reset your password, and only once authenticated.
2. “Please fill out this field.” This appears in modals for required fields. You cannot create certain objects without certain fields. You cannot create a ticket without a title, a course without a course code, a user without a user name, or a project without a project name.

3. You may be logged out after a period of inactivity. Log in again. Close the tab and navigate to the home page again if behavior is still unusual.
4. You may get an error page if you click “Save <project_name> Graph” from the Overview page. Click the back button, or log out and in again, then right-click on the desired graph and select “Save image as” to save it.

Troubleshooting

Common web service troubleshooting techniques can work on Random Fruit. If something is not updated, or looks wrong, or disagrees with a change you’ve made to a data object, try refreshing the page, logging out and in again, opening the page in a different browser, restarting your browser, and clearing your browser’s cache.

If there is truly a problem, the contacts in the Support section will be happy to hear about it.

Support

Douglas Naphas (douglasnaphas@gmail.com), Alex Curtin (viperx120@gmail.com), Greg Aiello (gregory.aiello@temple.edu, gregory.aiello693@gmail.com), Jeff Ramspacher (jtr31993@gmail.com, jeffreyramspacher@temple.edu), and Dave Mayer (tuc05799@temple.edu) developed Random Fruit as part of a computer science class at Temple University. We plan to support Random Fruit as long as it is in use. Please contact any, or, preferably, all of us with any problems, failures, questions, feature requests, suggestions, or bugs.

The product lives at https://github.com/douglasnaphas/RandomFruit. Any updates to the software or documentation will go there.

Contribute

Random Fruit is open source, hosted at https://github.com/douglasnaphas/RandomFruit. Please clone the repository and contribute.

We use the Laravel framework (http://laravel.com/) for routing and database access, the Model-View-Controller pattern, and Twitter Bootstrap (http://getbootstrap.com/) for the front-end.