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PCR Hero

Personal Challenge Recognition Software

PCR Hero is an open-source web application that adds a gaming element to synthetic biology applications, serving as an interface for keeping track of users' progress and awarding badges as a result. *Gamification*, or the division of tasks into personal and group challenges, has become a serious business in management and in commercializing software. When tasks are gamified, external goals are set, such as badges or awards, which provide the learner with a tangible sense of progress, and also as an external credential to other team members and colleagues through social media sites. PCR allows administrators (PIs, lab managers) to set external goals (e.g. "permute a set number of designs through such a date,") as well as challenges to spark creativity and friendly competition within and between research groups.

The components (files and dependencies) that make up PCR hero are as follows:

MongoDB

MongoDB serves as the database for PCR hero, with collections for users, apps, badges, tasks, issuers, and admins. MongoDB's non-relational hierarchy is important as badge data is stored in JSON format, and many of the main data-types (users, badges) may have nested data of varying sizes.

Bottle

Bottle is a micro web-framework for Python. It handles HTTP requests, allowing users to serve specific requests with return data including JSON files and templated HTML. It can be used in tandem with Apache or another server client as a WSGI manager, but in the case of PCR Hero, it's managing the whole thing.

pcrserver.py

This is the main framework of PCR Hero, and represents the control layer. HTTP requests (e.g. GET /login) are handled by dedicated functions, and pcserver collects parameters from the requests, feeds them to template (.tpl) files, and returns the resulting HTML back to users. In the case of applications (e.g. Cello) submitting data, pcserver may perform a call to the database without returning specific output save for an HTTP response.

pcrlibrary.py

This is a library of functions for PCR Hero, and contains all of the major class definitions. Many of these are for form validation when entering data into the database, but the Task class performs a variety of useful functions that implement task-tracking in an OOP paradigmatic manner.

****.tpl

These are template files for the main pages, which largely contain HTML with `{{...}}` clauses for template parameters. Some contain simple Python scripts delimited by `%` and `%end`. Lines in between these without a preceding `%` are HTML, but may only be included in the resulting document conditionally depending on the evaluation of the Python code.