

CSE 191 Proposal

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1 Research context and problem statement

Learning a new paradigm in programming languages can be challenging. We are interested in analyzing students learning process, particularly, when learning functional programming. We have gathered data from many undergraduate students at UCSD when taking a functional programming class using OCAML, CSE 130. We want to find out where exactly students face problems or fail when doing homework, such as the types of errors that they encounter, the amount of time taken for them to fix a problem, and instances where students give-up in doing their homework in order to help improve teaching about functional programming.

2 Proposed solution

In order to solve the problems mentioned above, there are several basic questions we first want to answer:

- How long does it take students to complete homeworks and where do the errors show up?
 - By answering this question, we can have a general idea on how hard each problem is for the students, and therefore knowing what type of errors should we focus on.
- What kind of errors do the students encounter?
 - If the compiler is not friendly in telling students exactly what is wrong for this kind of error, then we may do something to improve students' learning experience.
- How long does it take them to fix the error?
 - We will be able to see whether students get better over time if they spend less time to fix the error

We have recorded students activity when doing homework in functional programming language by taking a snapshot every 30 seconds to observe any problems that a student may have—such as getting stuck on a particular line, or running the code with an error. The recorded data is compiled into JSON files. We will write Python scripts to analyze data to answer those questions.

3 Evaluation and Implementation plan

Evaluation The data was collected and compiled into JSON files and each log is composed of five different sections: unix timestamp, filename, file contents, offset into file contents, and event where event is one of six different kinds of objects (eval, abort, restart, timer, confused or submit). First, using Python, the data will be anonymized by converting text in the string literals to repetitions of single character to protect the privacy of the students.

Timeline

- FALL 2015
 - Get familiar with the techniques that we will be using for the following quarters, i.e. Python and OCaml.
 - Help implement the functions needed for the code as assigned by Prof. Jhala