

Collecting Large Programmers' Learning Traces

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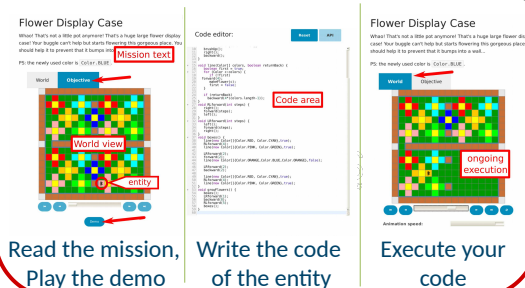
The Programmer's Learning Machine (PLM)

About the Project

- Developed for our undergrads
- Used in Production since 2008
- Freely available online
- Included in Debian / Ubuntu
- English, French, Brazilian, ...

github.com/BugleInc/PLM

Programmers' Exerciser

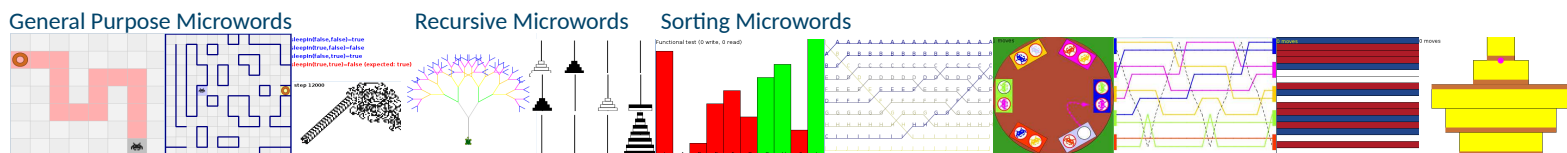


Read the mission, Play the demo | Write the code of the entity | Execute your code

Large base of exercises

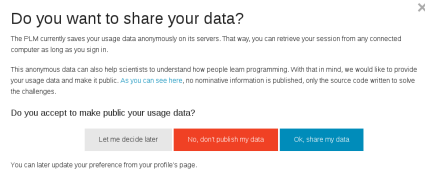
- 200+ exercises
- Basics: Loops, Methods, etc.
- Sorting, Recursivity
- Many specific Microwords
- Java, Python, Scala, etc.

plm.telecomnancy.univ-lorraine.fr



Every Learner's Attempt is Saved to a Permanent Database

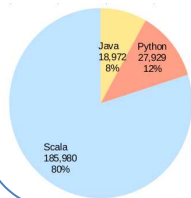
- Capture the code state when the 'Run' button is pushed
- Also mission text and auxiliary code for latter re-analysis
- Also timestamp and learner's anonymous ID
- Pushed to a public database (if the learner accepted to)



Many Published Events

235,197 submissions since Feb 2014
(as of July 17, 2016)

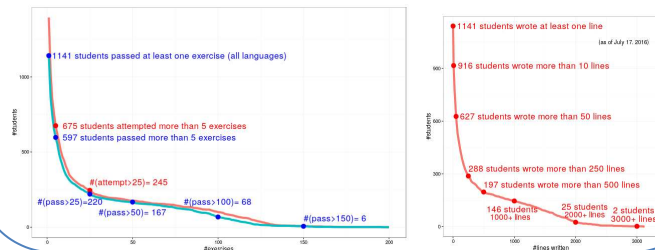
- 28 % Compilation errors
- 47 % Failed tests (result != expectation)
- 24 % Passed exercises



- Most usage in Scala (our students)
- Some Students' Feedback included
- And counting

Large Learning Traces

- 597 learners passed 5 exercises (57 final lines)
- 167 learners passed 50 exercises (775 final lines)
- 68 learners passed 100 exercises (1665 final lines)
- 6 learners passed 150 exercises (2400 final lines)



Possible Uses

- Characterize Students
Caterpillar or Butterfly ? Future failers ?
- Characterize/Debug Exercises
- Measure student /exercise fit

This needs YOUR love

- Our dataset is (mostly) public
- We are practitioners, not data scientists
- Please contact us !

Possible Extensions

- Teacher's Dashboard
- Aided diagnostic of fragile learners
- Intelligent Tutoring System
- A/B testing of exercises

<http://people.irisa.fr/Martin.Quinson/Teaching/PLM/>