GitSEED: A Git-backed Automated Assessment Tool for Software Engineering and Programming Education

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- The nature of **this feedback varies significantly**, contingent on the subject and the chosen evaluation method;
- However, **tailoring current Automated Assessment Tools (AATs)** to integrate other program analysis tools **is not straightforward**.

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4. **are challenging or impractical to adapt** to integrate other program analysis tools.

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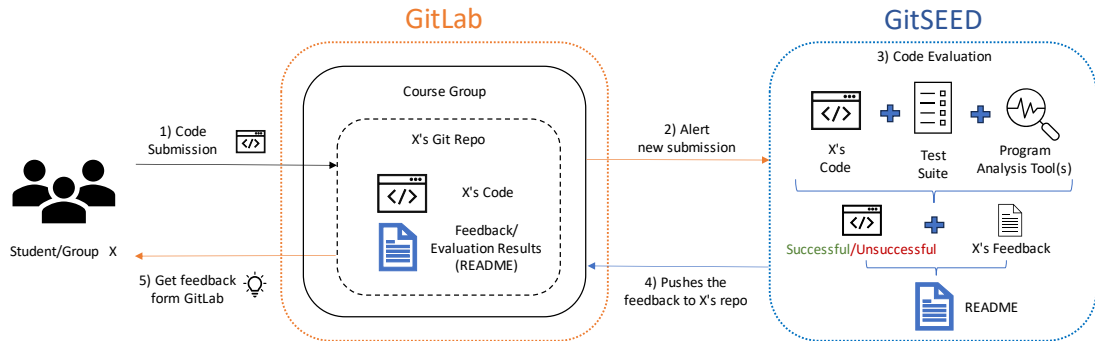
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- has two different categories of assessments: **labs and projects**;
- **its pipeline can be easily tailored** enhancing the quality of feedback provided to the students aligned with the needs of each course;

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- Projects:
    - Faculty **can easily restrict/give the students' access** to write into their repos;
    - Possible to have an **unlimited number of projects**.

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- keep track of each student/group's:
  - number of **successful/unsuccessful tests**;
  - their **number of submissions**;
  - the **number of days** since the beginning of the project/lab assignment.

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- **Memory Limit** (default: 8 GB): memory limit for each test case.

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GITSEED was used in three different course executions:

1. Undergraduate Course (Spring 2023) - Introduction to programming in C;
2. Graduate Course (Fall 2023) - Automated Reasoning Course;
3. Undergraduate Course (Spring 2024) - Introduction to programming in C.

Impact Discussion

- Undergraduate Course - Introduction to programming in C (Spring 2023):
  - 528 students;
  - GITSEED was used to assess this course's **labs and projects**.
  - GITSEED was tailored to run VALGRIND to **detect memory leaks** in the students' code.

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- Graduate Course (Fall 2023) - Automated Reasoning Course:
  - 38 students;
  - GITSEED was used to assess this course's **projects**.
  - GITSEED was tailored to give students **feedback about the satisfiability and optimality of their projects'** solutions.

Impact Discussion

- Undergraduate Course - Introduction to programming in C (Spring 2024):
  - 509 students;
  - GITSEED was used to assess this course's **labs and projects**.
  - GITSEED was tailored to run: VALGRIND, CFAULTS, CPPCHECK, CLANG-TIDY, and Lizard.
  - These analyzers' **results were presented to students as "Hints"**, strategically guiding them towards potential problematic statements within their programs.

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- **Valgrind**: 90.4% found valgrind's feedback to be beneficial;
- **Lizard**: 75.3% appreciated the insights offered by lizard, particularly its analysis of code complexity and length.

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- GITSEED adopts educational assessment within a **professional version control platform rather than a dedicated website**, like so many other AATs;
- Students interact with GITSEED through GITLAB, **learning the fundamentals of git while receiving personalized feedback on their assignments**;
- Faculty members **can easily adapt GitSEED by integrating other code analysis tools** to offer personalized feedback that aligns with the needs of each CS/SE course.

Demo

GitSEED

Thank you!

https://gitlab.inesc-id.pt/u020557/GitSEED