PRTest: A plain random tester

Test-Comp 2021
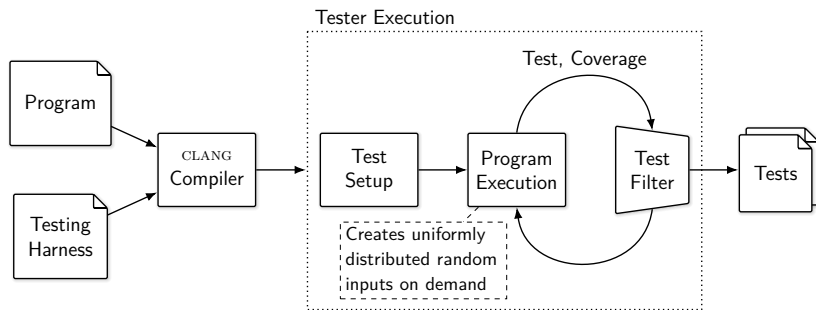
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PRtest

- ▶ Evaluation of new testing techniques through comparison to. . .
  - ▶ predecessors
  - ▶ other tools (with different strengths/weaknesses)
  - ▶ but: no comparison to naive approach
- ⇒ PRtest is this naive approach

Architecture

- ▶ Compile program against input-generating input methods
- ▶ Execute program indefinitely, remember generated inputs
- ▶ Monitor branch coverage to decide which
  input vectors (= tests) to keep

```
if (input() == 1) {
  // interesting code
}
```

▶ Probability to create fitting test: $\frac{1}{2^{32}} = 0.000000002\%$
▶ No full program reset between rapid executions: C heap is not reset
  $\Rightarrow$ may produce invalid tests

Strengths of PRTEST

- Usually very fast (millions of runs per second)
- Supports all language constructs and features of C
- Simple and easy to understand ⇒ good **base**line

Test-Comp'21

15 Categories in which PRTEST was not last place.
Most notably:

- ▶ Coverage-Error:
    - ▶ Floats (7th/11)
    - ▶ Loops (4th/11)
- ▶ Coverage-Branches:
    - ▶ BitVectors (9th/11)
    - ▶ ControlFlow (9th/11)
    - ▶ Sequentialized (9th/11)
    - ▶ XCSP (9th/11)
    - ▶ BusyBox (8th/11)
    - ▶ DeviceDriversLinux (9th/11)

Repository

https://gitlab.com/sosy-lab/software/prtest