Systematic monkey and how fMBT helps implementing it

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Systematic monkey

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Systematic monkey

> *"If a monkey keeps randomly typing infinitely long time, it almost surely will write any given text."*

Monkey testing (stochastic testing) is automatic random testing.

- Computer acts like a "monkey" giving random inputs.
- The longer the test runs, the more likely it will give inputs that break the system.

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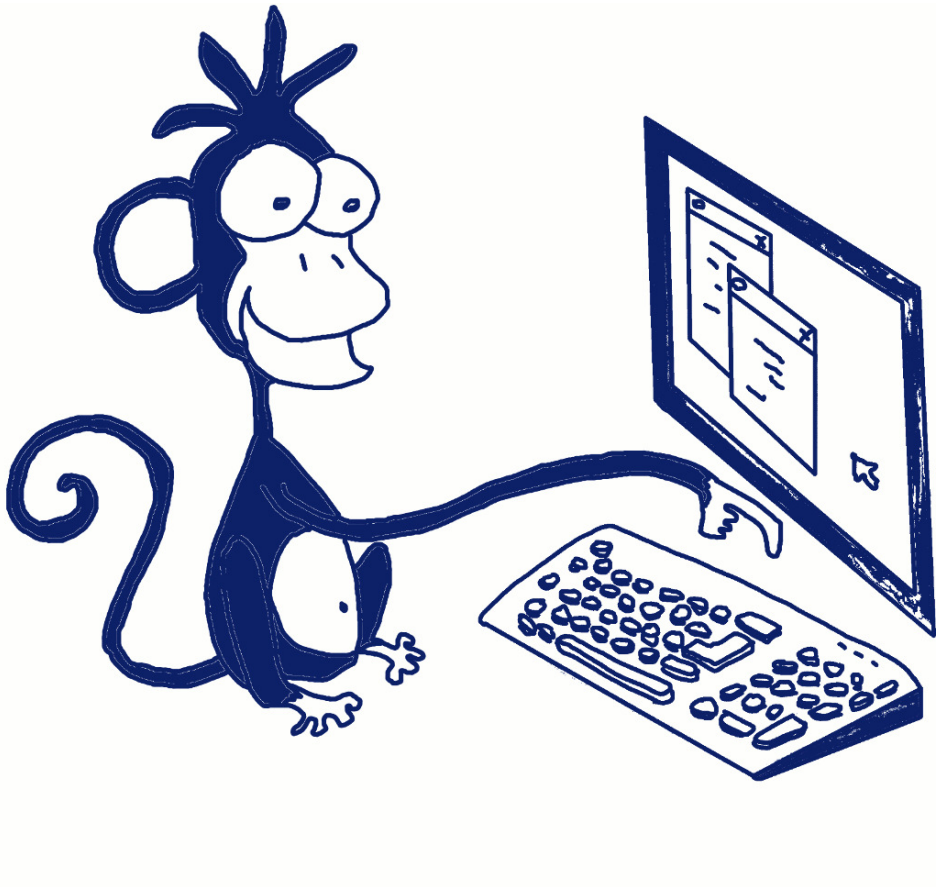
How to do monkey testing in practice?



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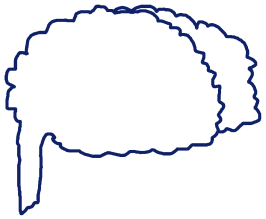
How to do monkey testing in practice?

We'll need...



logic

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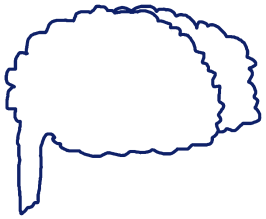

logic, adaptation

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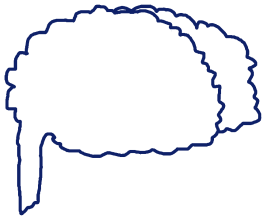

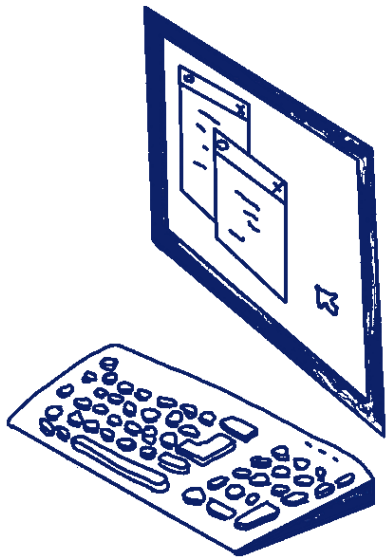

logic, adaptation and something to test.

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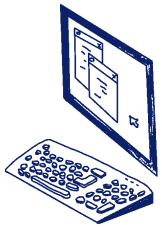
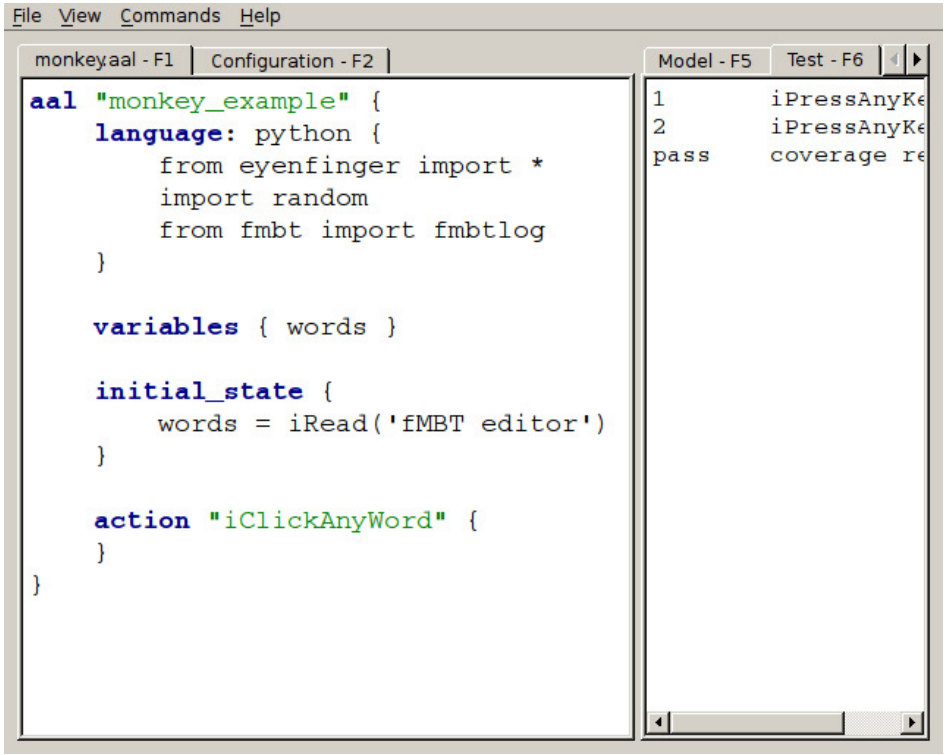


Let's take an example. First, something to test.

We'll test this kind of GUI software:



It suffices to know that one can type on it and click on it here and there.

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Let's consider the adaptation next.

We'll use fMBT's `eyenfinger` library:

`iRead()`	The eye reads all words on the display.
`iClickWord()`	The finger clicks given word using mouse.
`iType()`	The finger hits given keys on the keyboard.
`iVerifyWord()`	Library verifies if given word resembles any of read words.

This is all in place, we've done nothing yet.

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Finally, the logic.

We'll write it in fMBT's AAL language. The structure is

Action 1: if condition 1, can do instructions 1.
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For instance,

- Action: Click any word.
- Condition: There's at least one word on the display
- Instructions:
  1. Randomly pick a word on the display.
  2. Click the word.
  3. Re-read the contents of the display.

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The same in AAL/Python using the eyenfinger library:

```
action "iClickAnyWord" {
    guard() {
        return words != []
    }
    adapter() {
        word = random.choice(words)
        iClickWord(word)
        words = iRead()
    }
}
```

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This is all the logic that we need to implement a simple monkey. This is enough, because...

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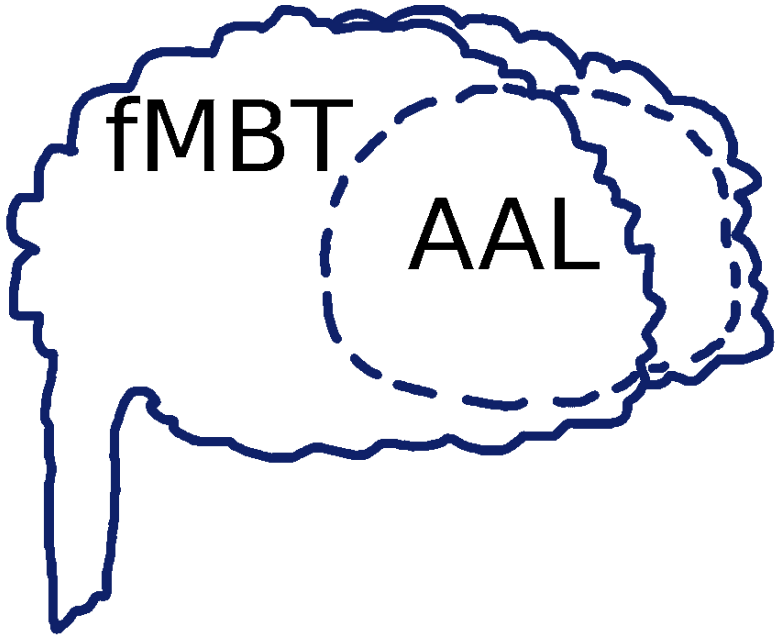
. . . fMBT will take care of the rest.



fMBT finds out which of all the actions are enabled and makes the decision which to test next.

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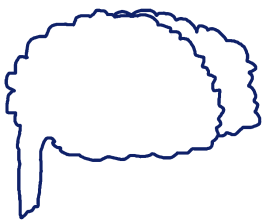
This is where we are now:



fMBT & AAL logic

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eyenfinger adaptation

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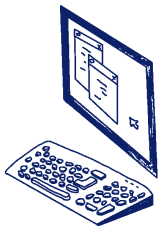

GUI to test

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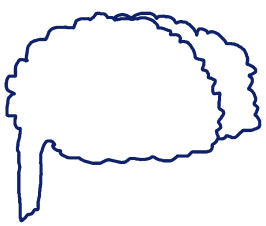

fMBT & AAL

logic

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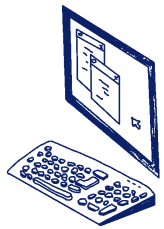
eyenfinger

adaptation

+



GUI

to test

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But could we make this monkey any smarter? Could it “understand” even a bit what the software could do?

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We can add more logic to monkey's brain in AAL. For instance,

- Action: Open a file.
- Condition: There's no "Open" word on the display.
- Instructions:
  1. Click word "File".
  2. Read words again.
  3. Click word "Open".
  4. Type any of the following: "monkey.aal", "emptyfile.aal", "unreadablefile.aal" or "readonlyfile.aal".
  5. Press Return.
  6. Read words again.
  7. If "monkey.aal" was chosen, verify that there is "monkey_example" on the display.

Now our monkey will test clicking random words on the display *and* opening any of the three files at any point – unless the File menu or Open file dialog is already open due to random clicking.

Systematic monkey

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AAL enables combining monkey testing and model-based testing!

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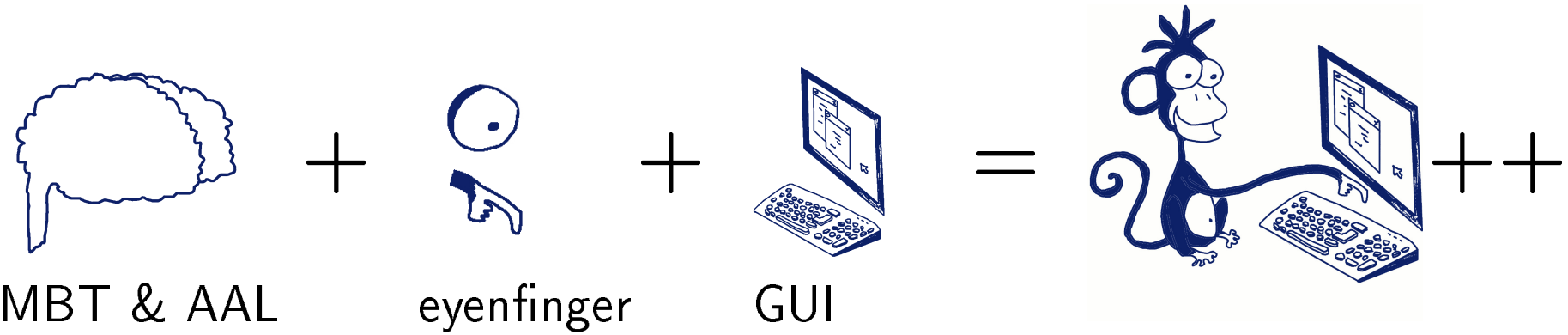
After words:

- Dumb monkeys are extremely easy to implement, but they can't test requirements and don't recognize most errors.
- Model-based testing requires more effort, tests requirements and detects errors, but leaves unexpected behaviors untested.
- In AAL actions can depend on from *both* observations on the real system *and* understanding what is testable.

⇒ With AAL one can do monkey testing, model-based testing and what falls between these two.

- fMBT tests enabled actions in both random and systematic ways.



fMBT & AAL eyenfinger GUI

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- fMBT (including eyenfinger) is available at http://github.com/pablovirolainen/fMBT
- Open source, LGPL license