CMPT 473
Software Testing, Reliability and Security

Debugging

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  - Submitting effective bug reports
  - Bug triage and management

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Anecdotally, the people I see who are best at debugging are also the best programmers.

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Good debugging involves *investigation*.

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How can you identify the possible causes?
Can you write code to help?

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This should sound very familiar. Why?

The scientific method

- Understanding bugs is a *scientific* investigation

Ask a question

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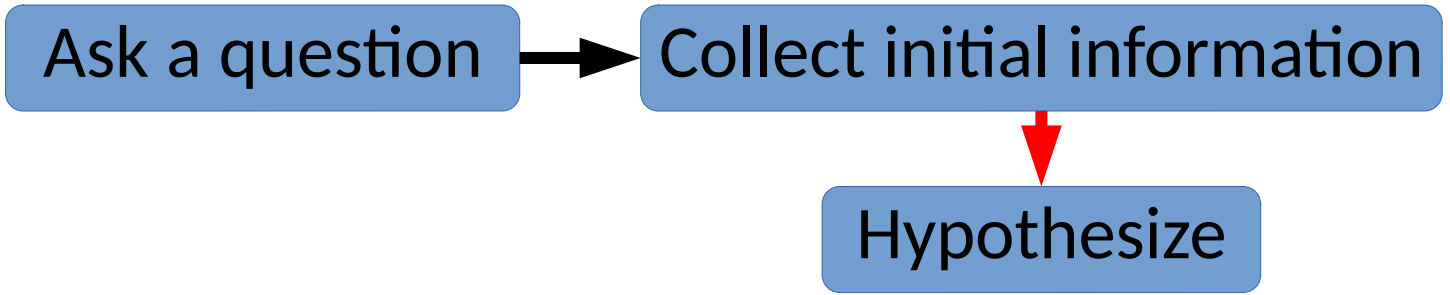

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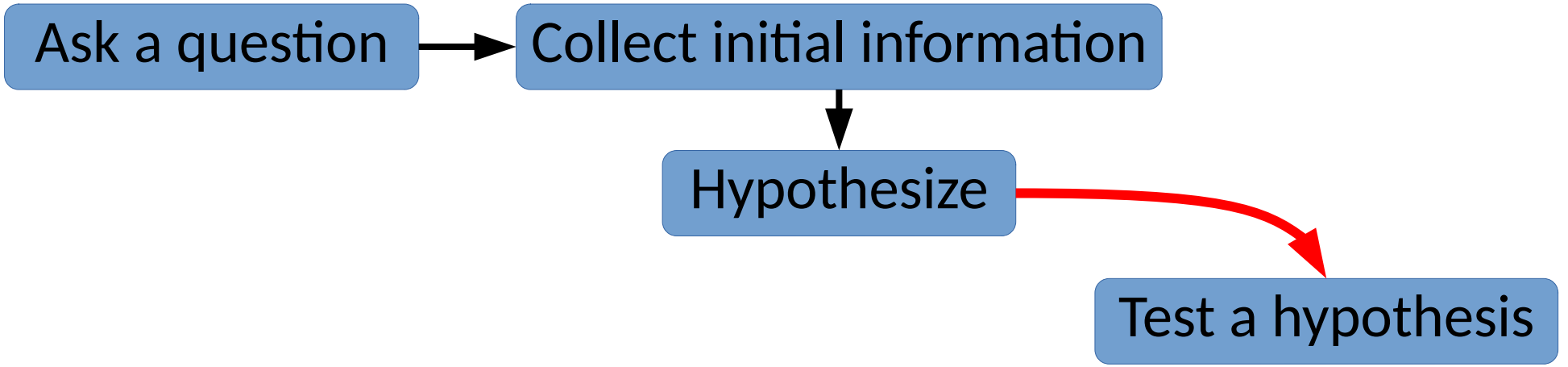

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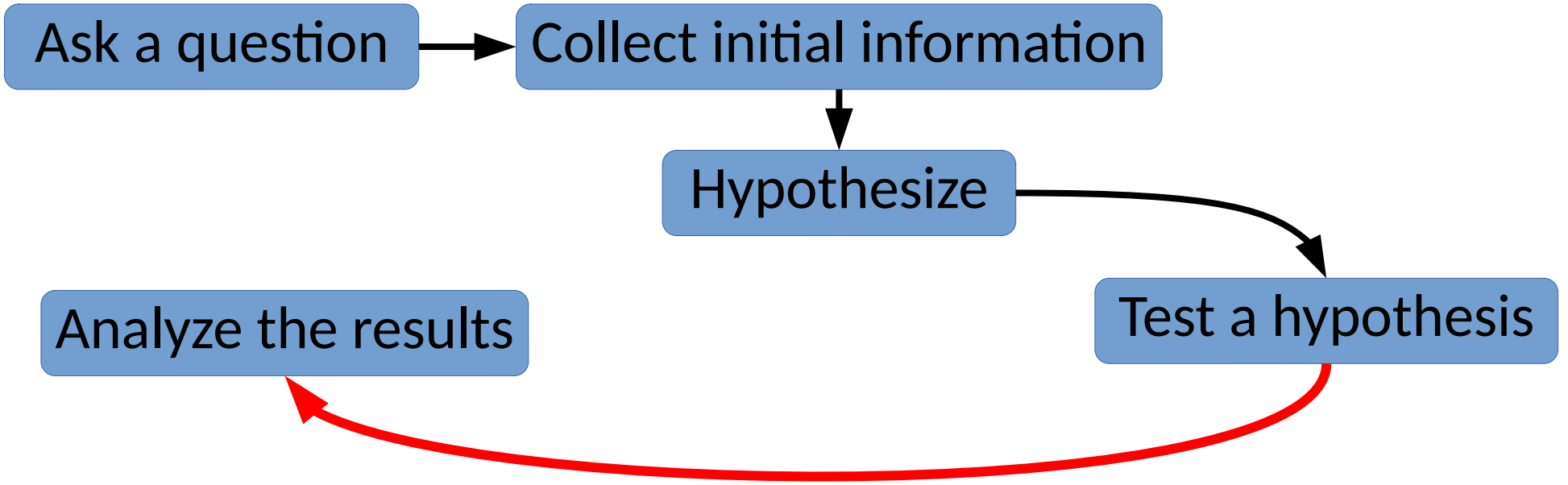

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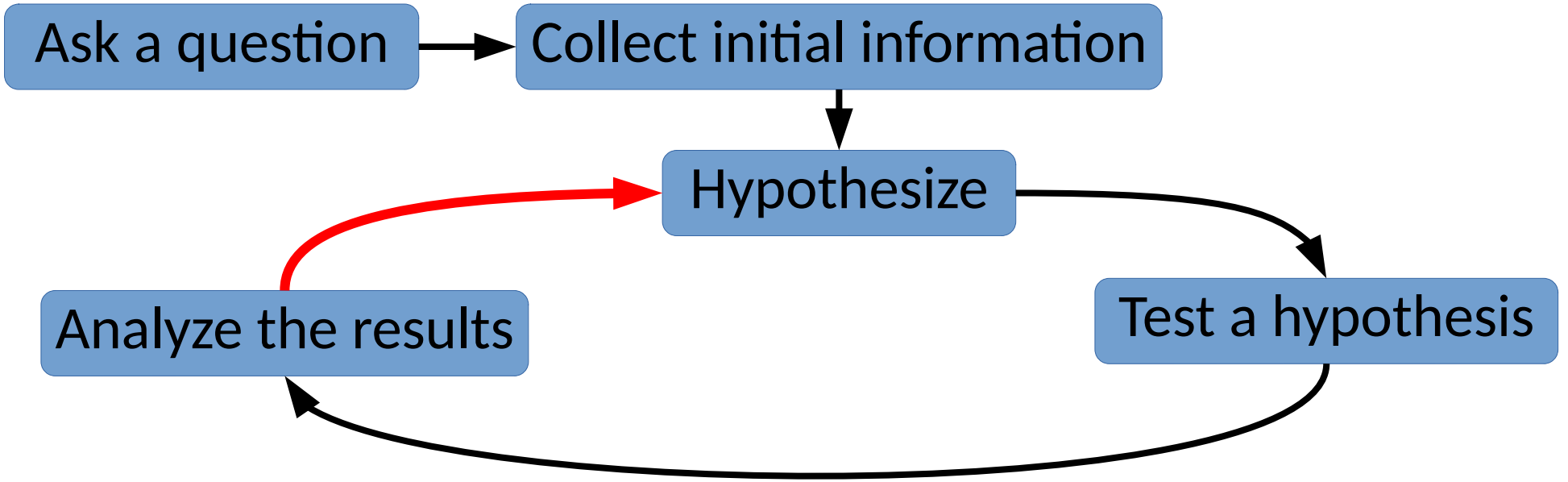

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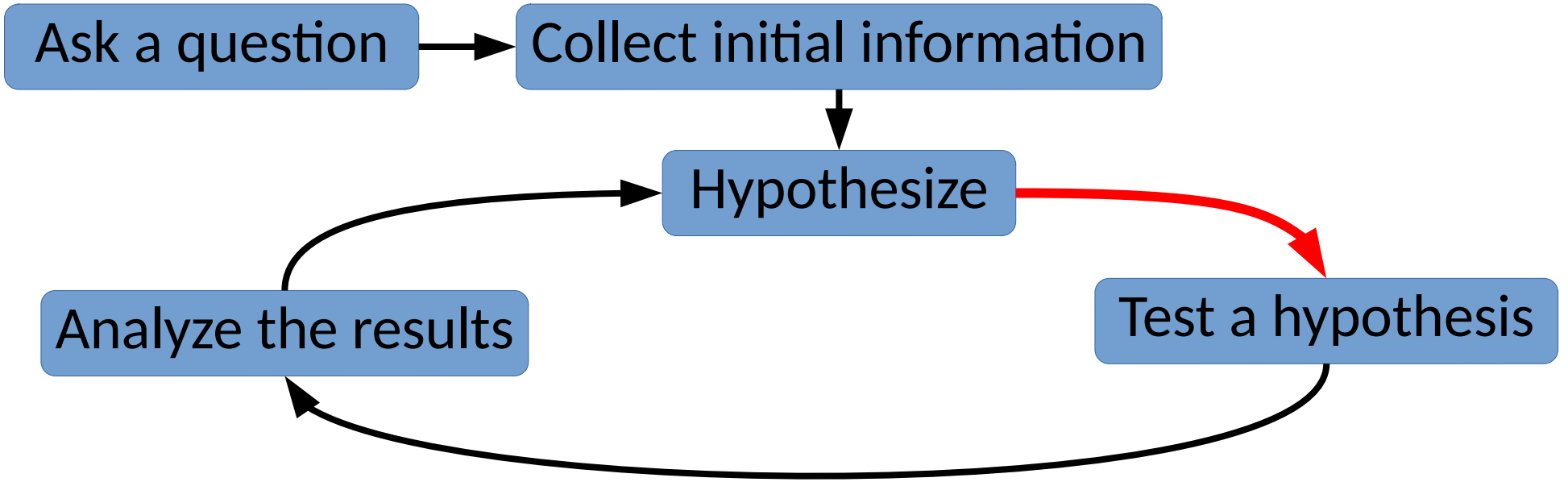

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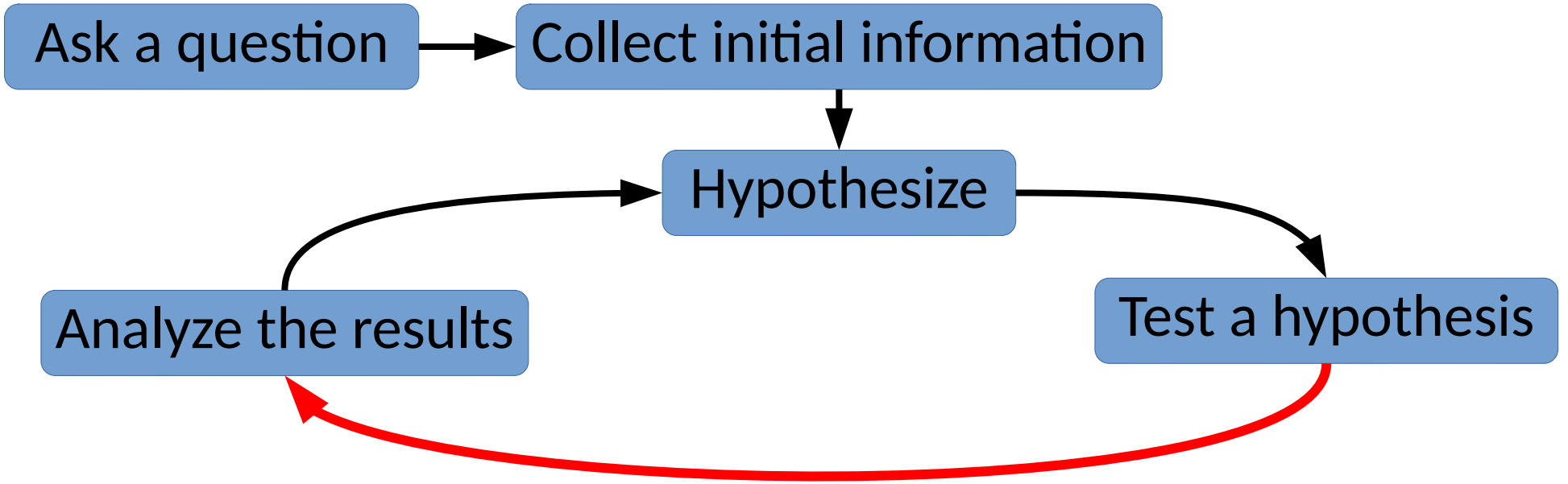

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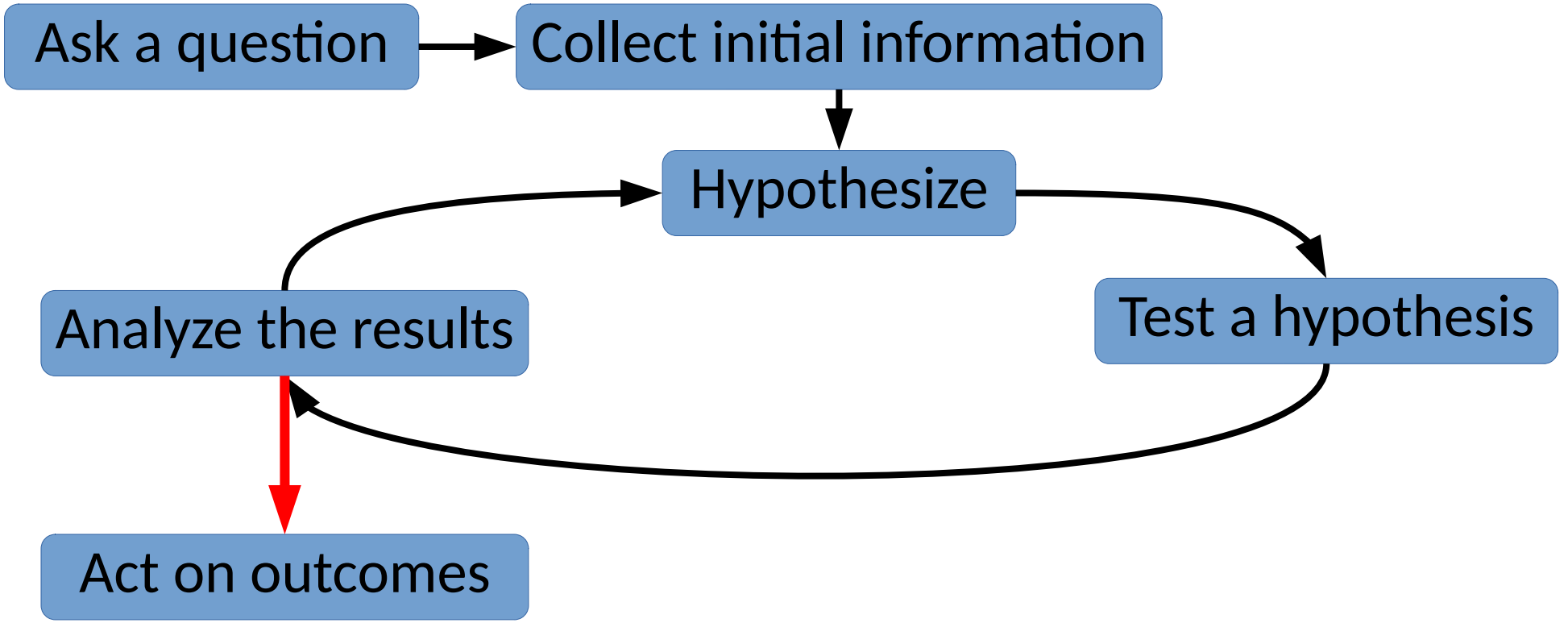

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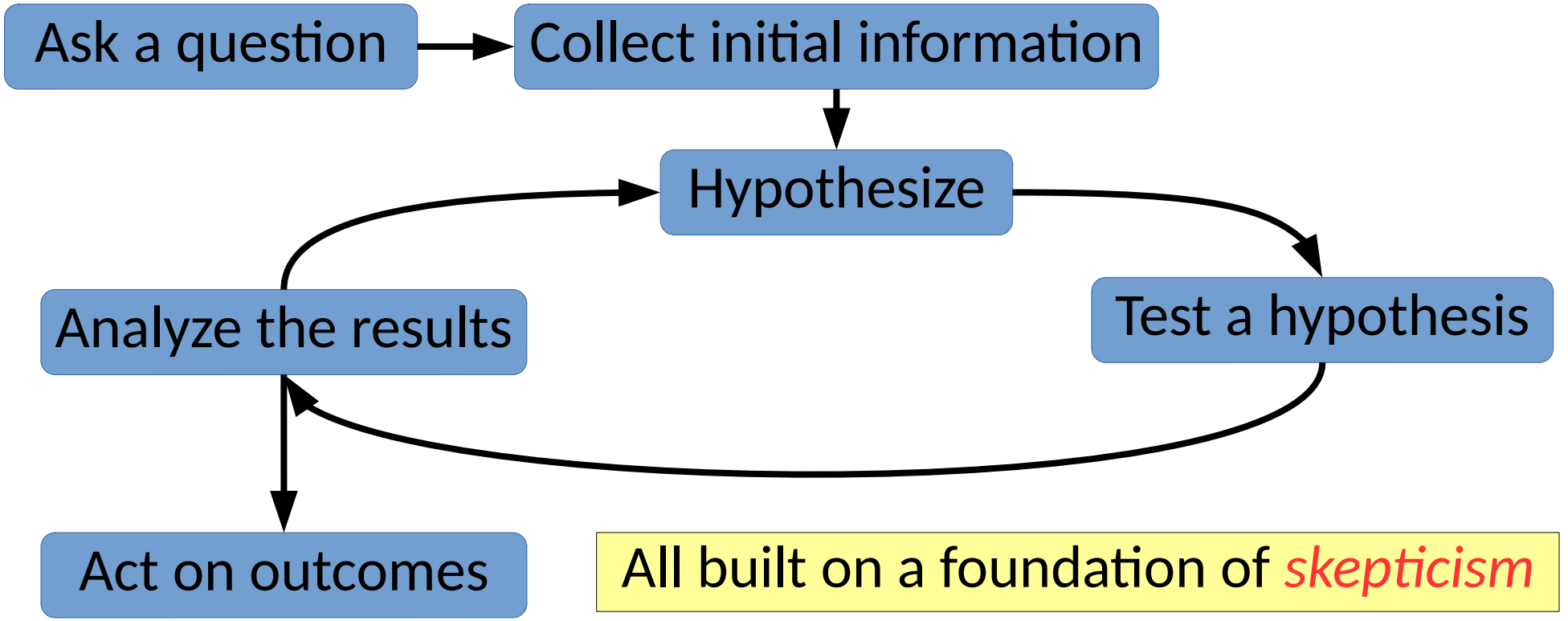

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- We will use GDB as a driving example

Common Features

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```
bt
bt 5
bt -5
bt full 2
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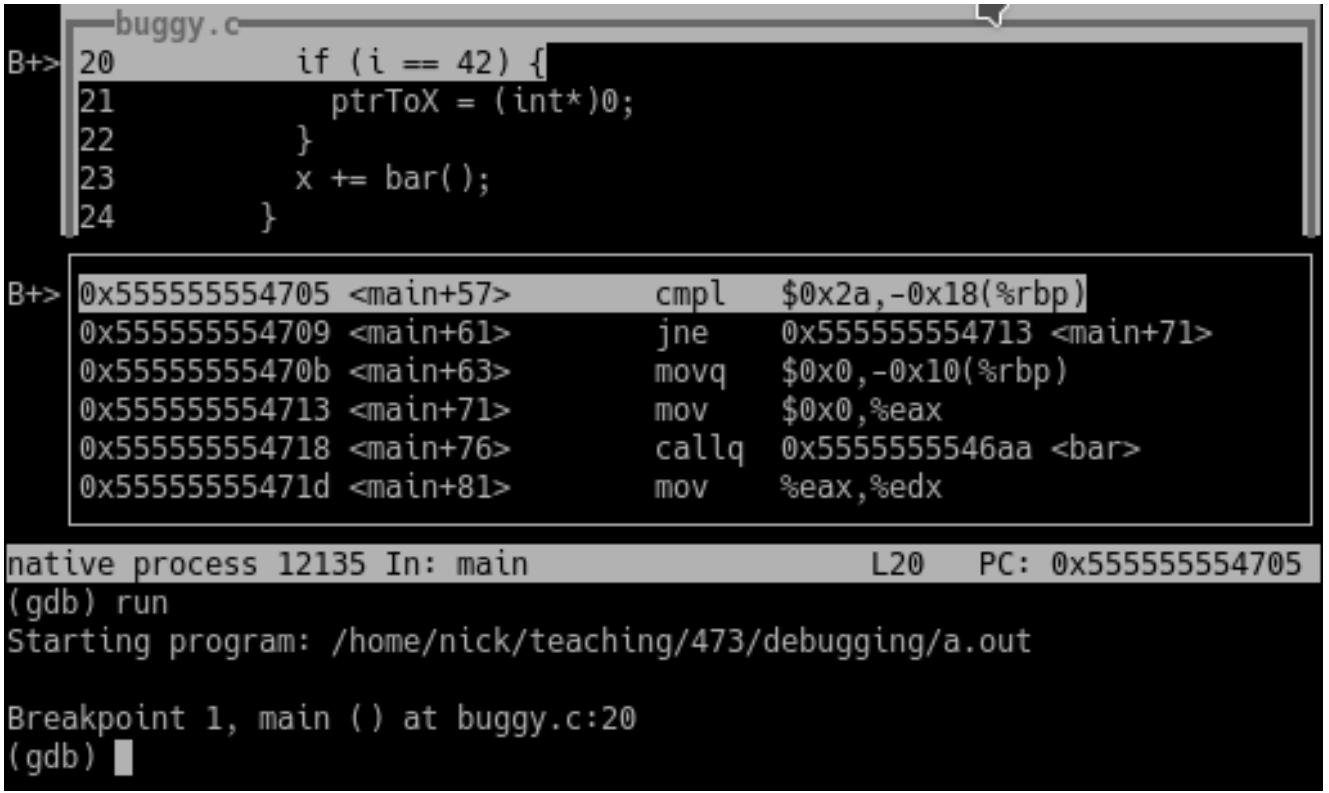
- Watchpoints (breakpoints for data)

```
watch x
```

GDB Specifics

- TUI Mode



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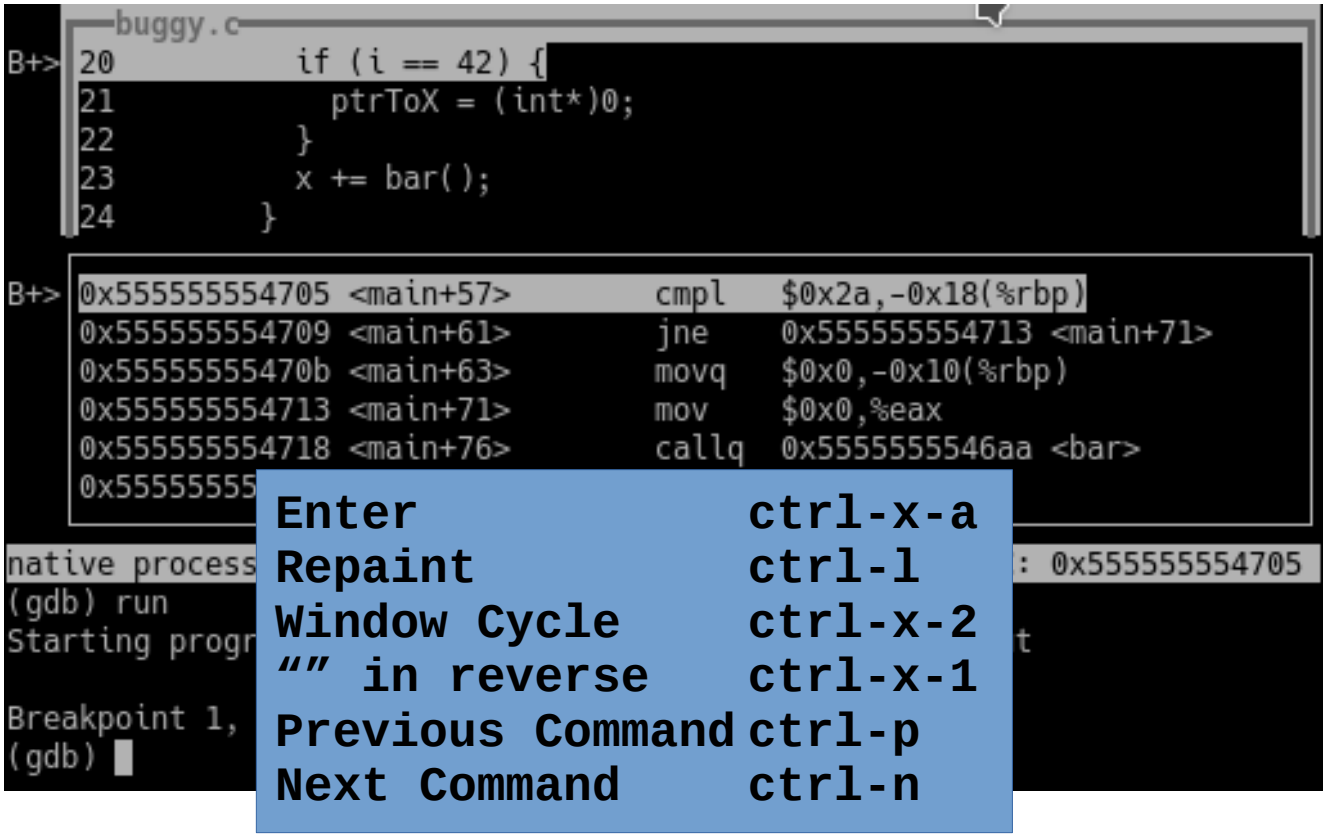

GDB Specifics

- Built in Python interpreter
  - Defining your own GDB commands
  - Programmatic breakpoint manipulation

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```
rr record /path/to/my/program --args
rr replay
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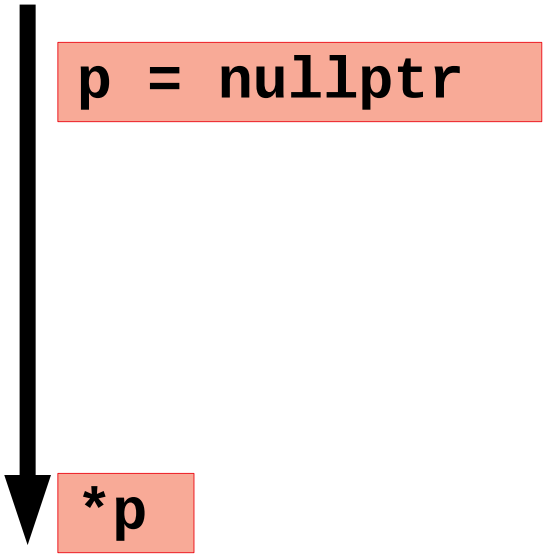

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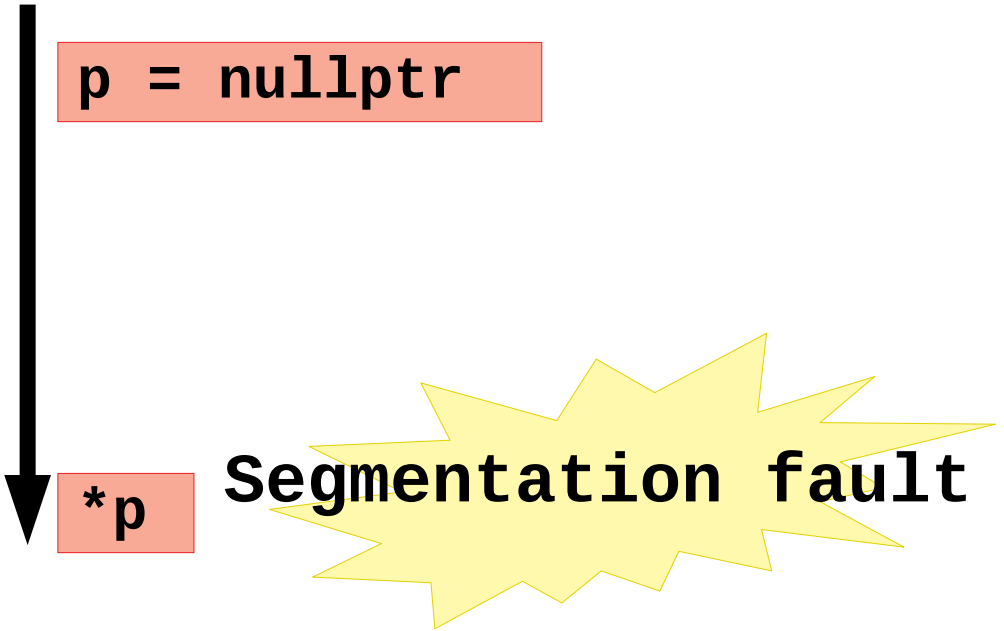

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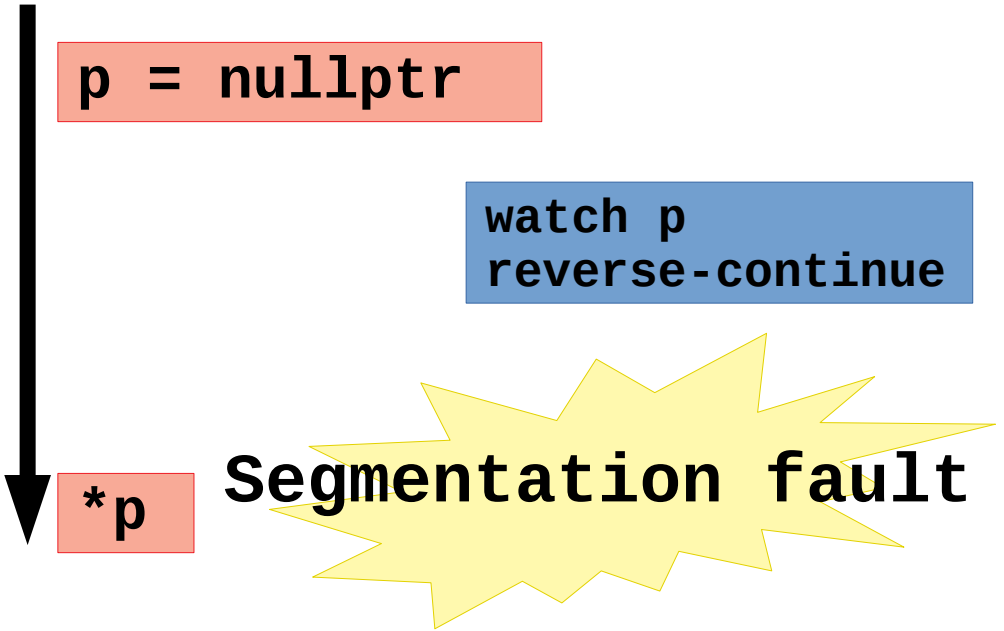

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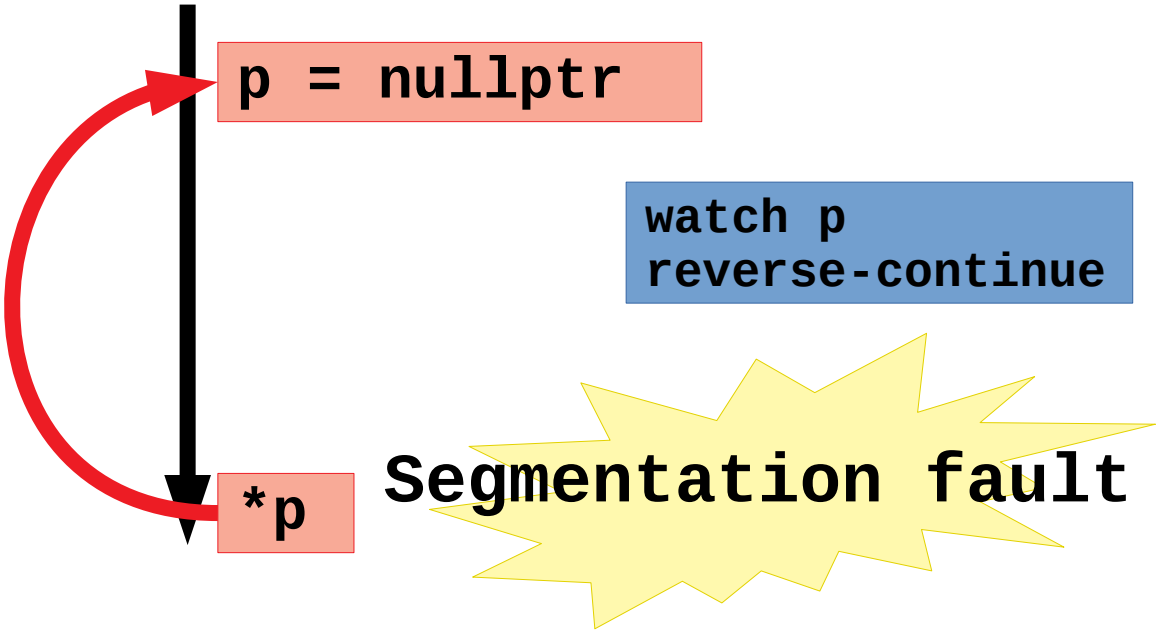

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