CMPT 473
Software Quality Assurance

Data Flow Criteria

Nick Sumner

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- Programs manipulate data
  - Focus on testing the ways that data moves/*flows*

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```
x = ...
```

Definition (Def)

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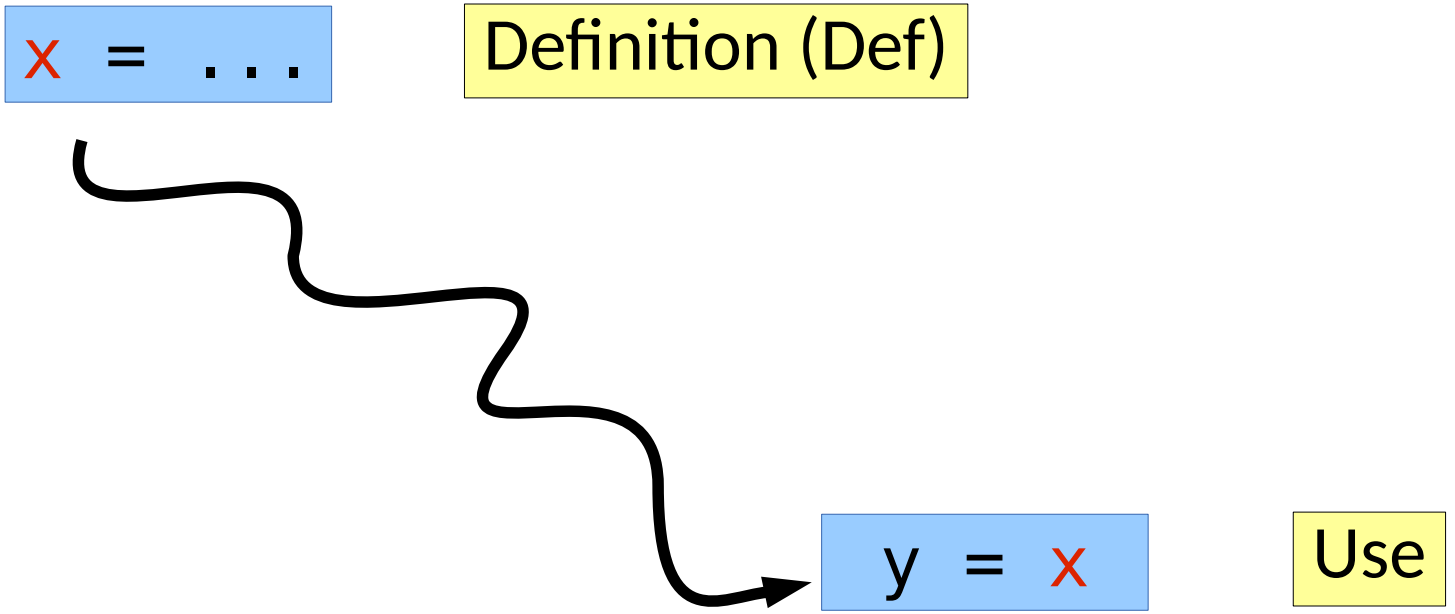

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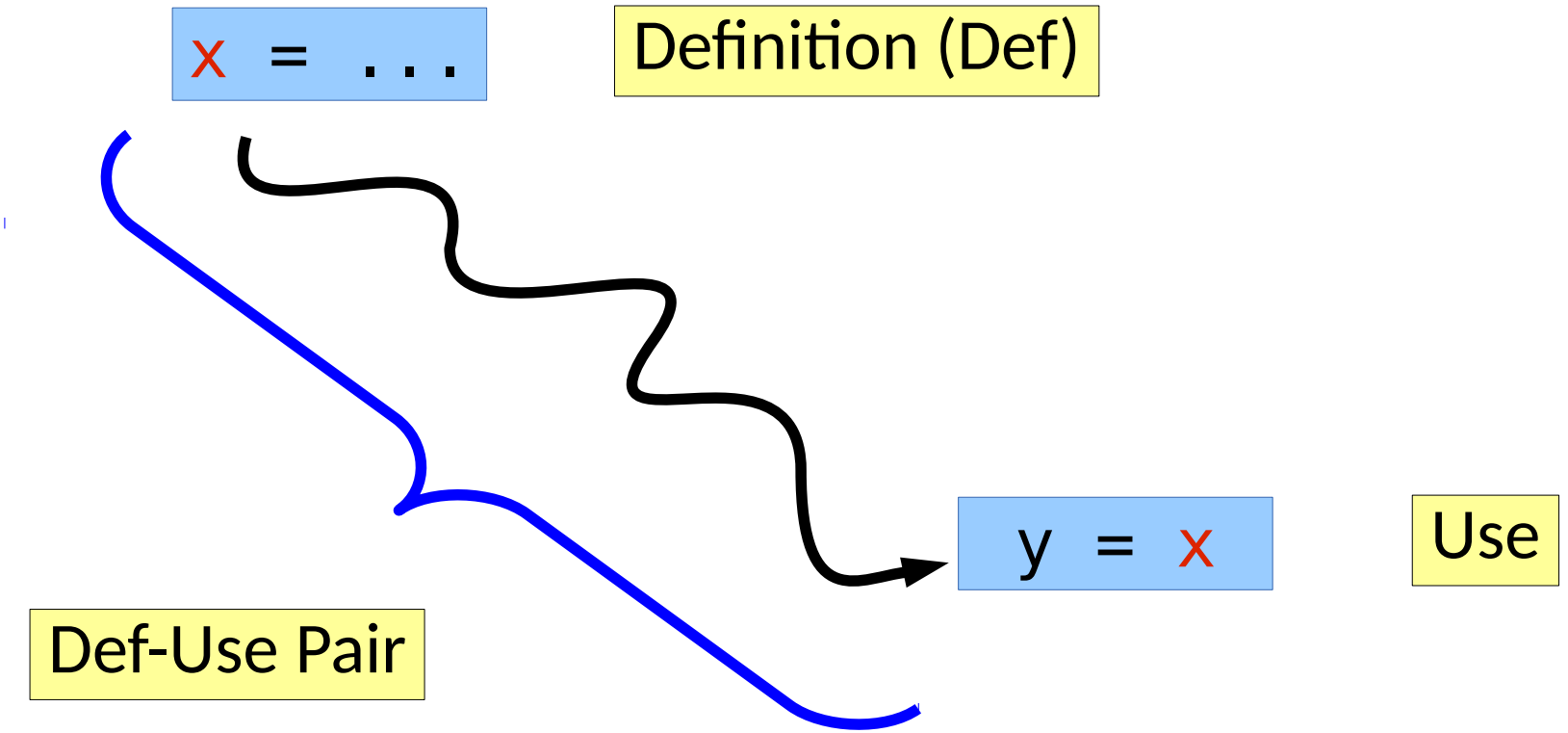

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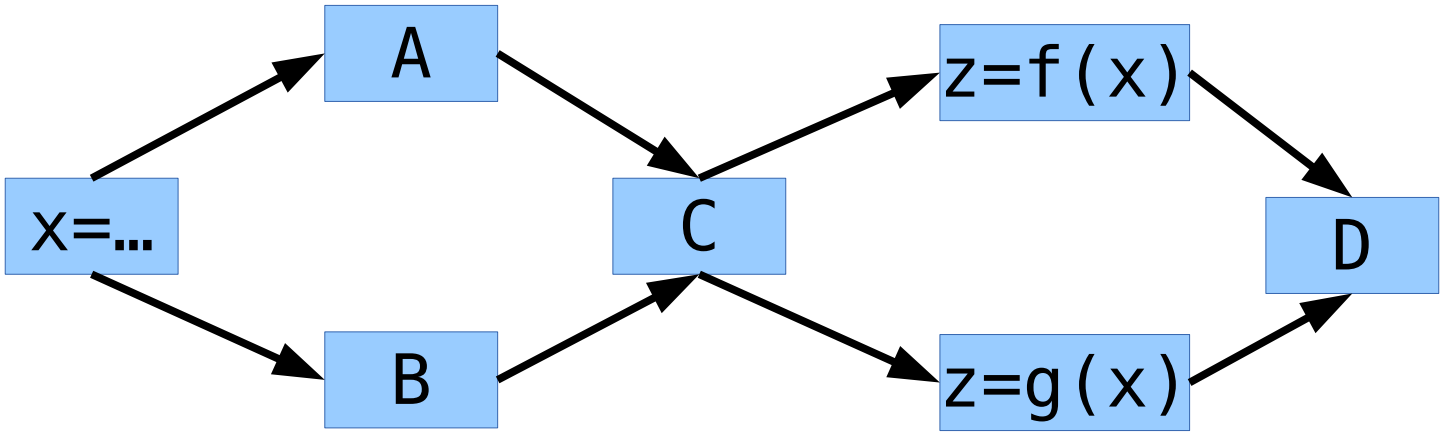

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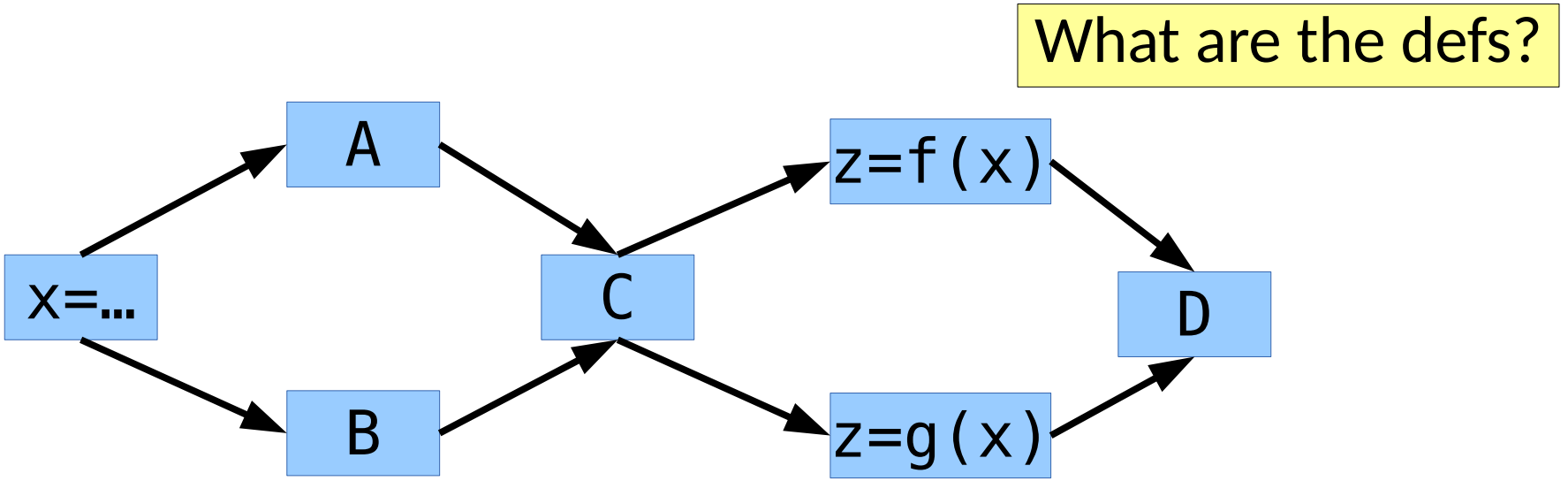

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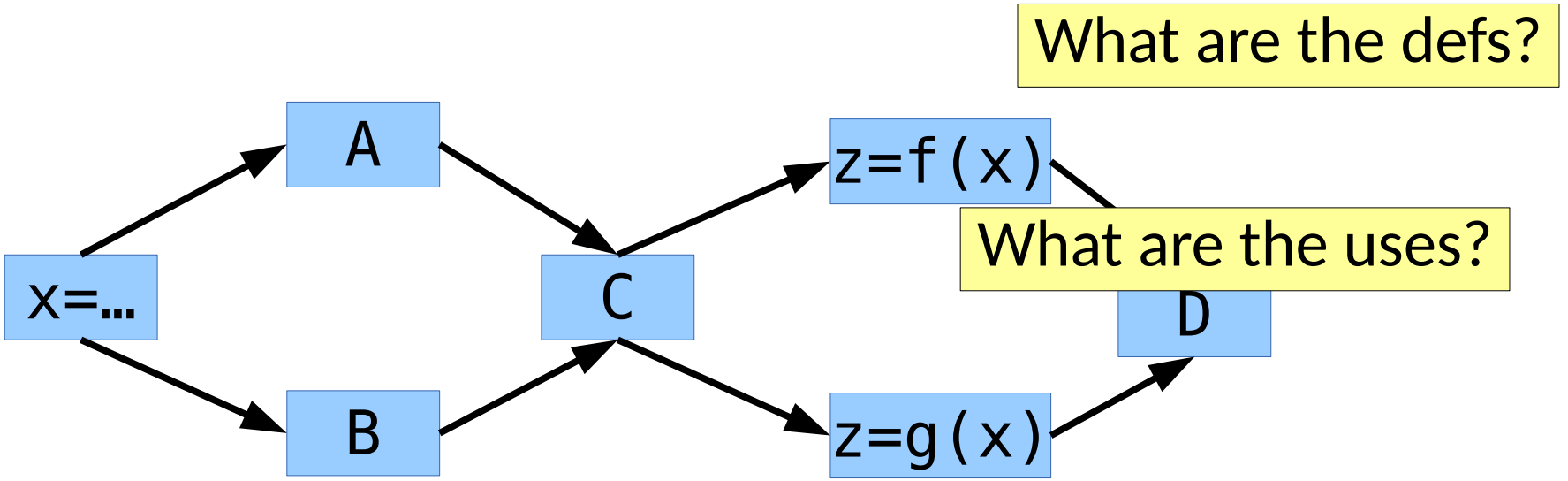

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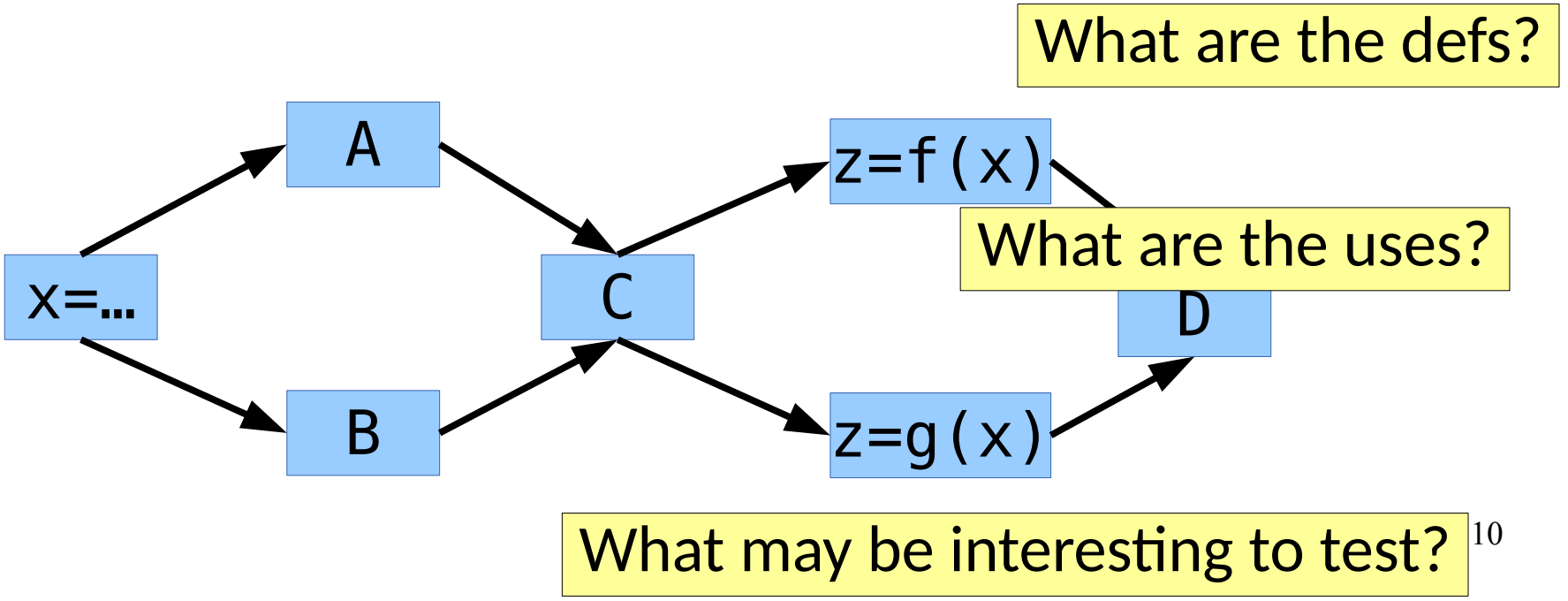
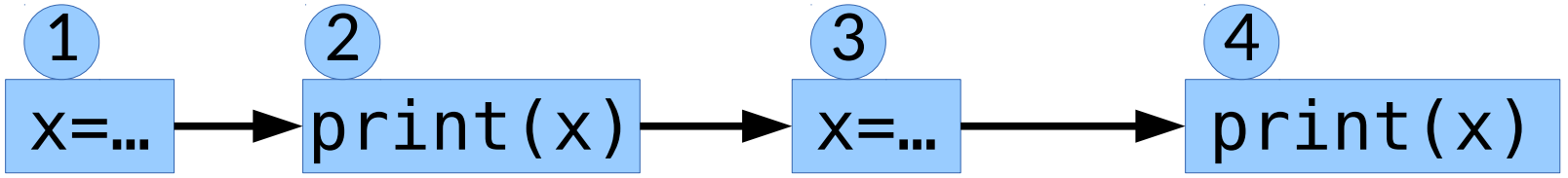


Reachability



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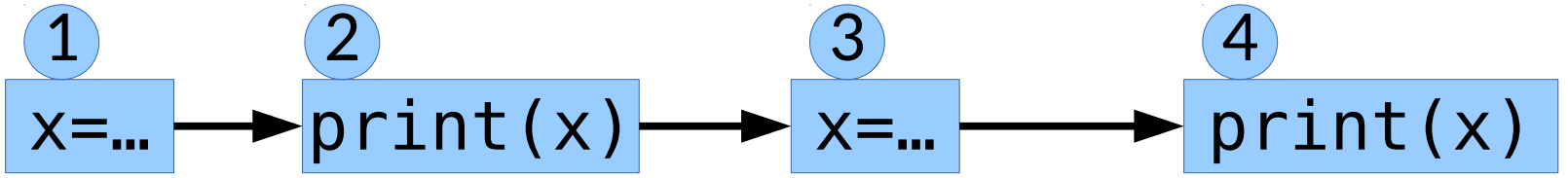

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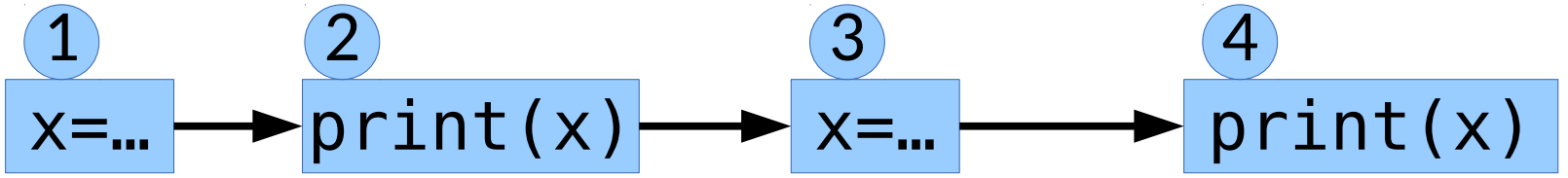

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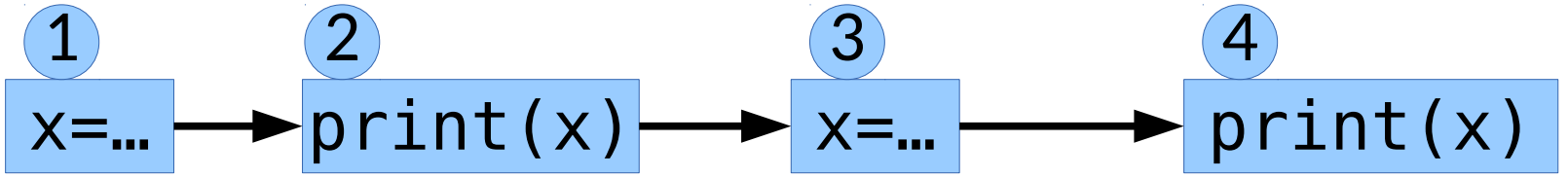

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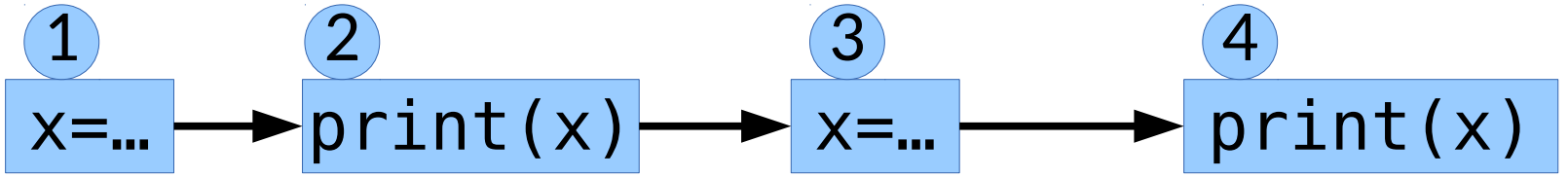

What are the use pairs?

What is interesting to test?

- The def at 1 is killed by the def at 3, so it does not *reach* 4

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- All Defs Coverage
  - Every Def is covered by at least one test of a use

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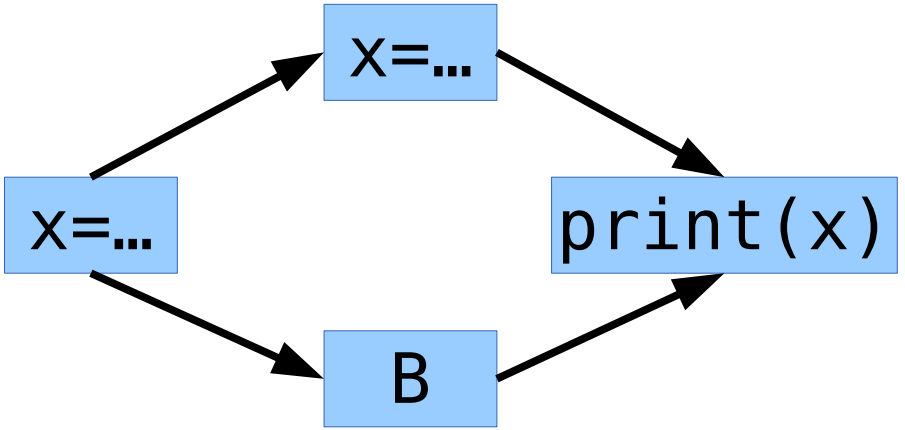
How do these compare to edge coverage?

How do these compare to prime paths?

A Brief Example

- What should be tested for the different criteria?



Another Example

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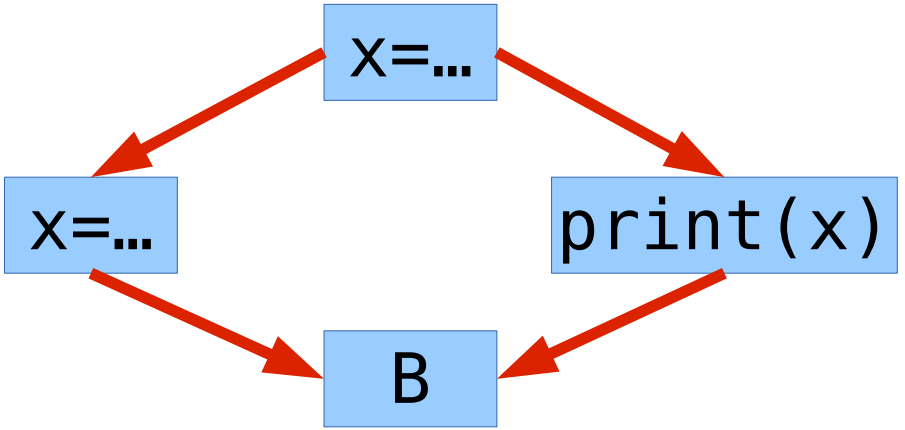

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Graph coverage is a powerful & general concept.
You can apply it to many varied features of programs.

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- Is there a case where input space partitioning is weaker than CFG coverage?
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- Using just one approach may not be enough
  - But maybe there are other ways to evaluate adequacy…