



Expertise and Memory

How are experts different?

Experts:

1. Can jump directly from problem to solution
2. Can have expert *blind spot*
3. Can switch between representations
4. Better at diagnosis

Local driving around city:

Driving to grocery store on 'autopilot', can revise journey plan

BEWARE...

Can use street names or landmarks for directions

Can help direct lost friends

Much blind spot!
So passive dismissive
adjective!



Very not good!
Many confusion!

THE J WORD

Concept Maps

- Start with some concepts...

Concept Maps

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```
for ch in "abc":  
    print(2*ch)
```

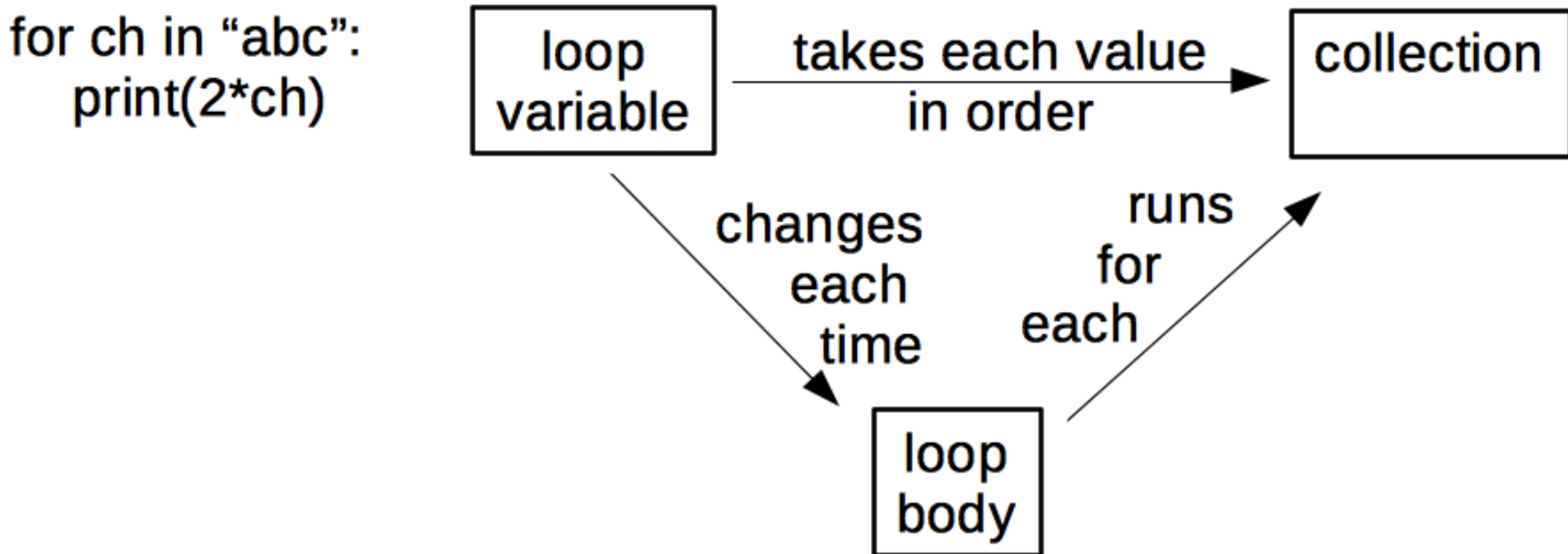
loop
variable

collection

loop
body

Concept Maps

- Add key relationships...

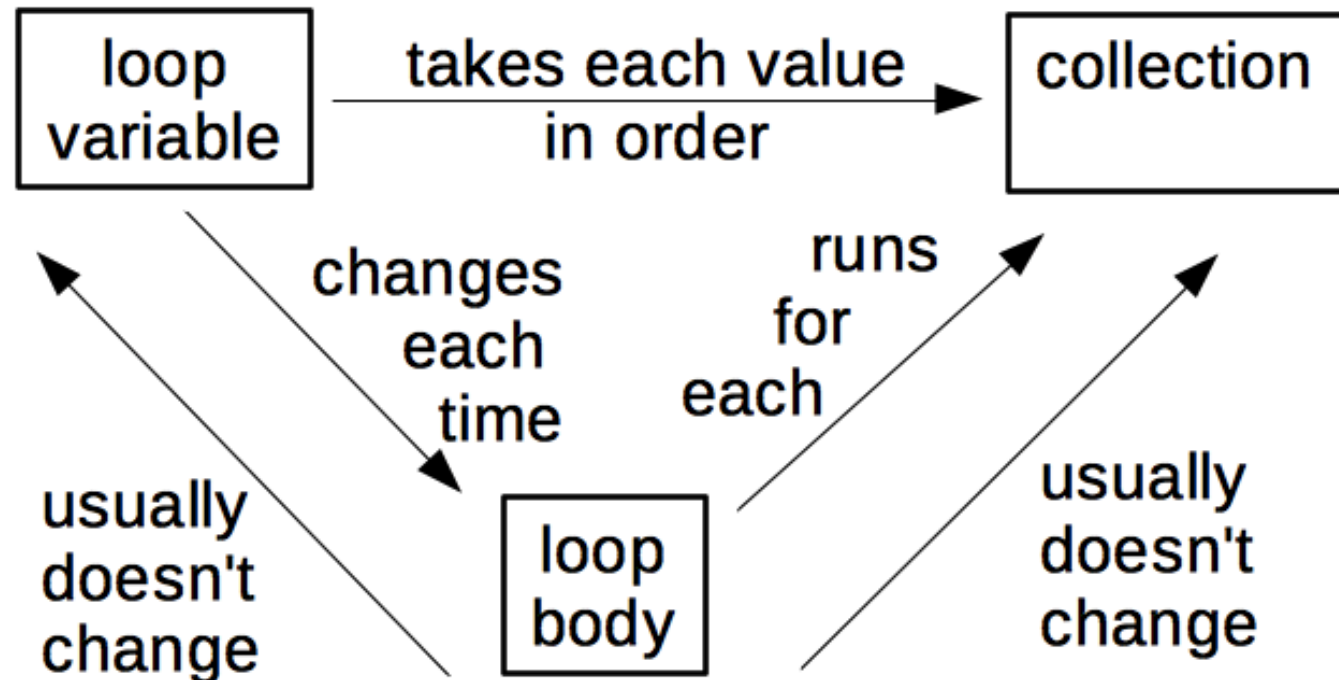


- There are 6 things here, not 3!

Concept Maps

- Add 2 facts to show what is usually true...

for ch in "abc":
print(2*ch)



- That's 8 things – good size for teaching episode!

Other Examples

- [Array Math](#)
- [Conditionals](#)
- [Input and Output](#)
- [Lists and Loops](#)

Exercise

***Create** a hand-drawn concept map for something you would teach in 5 minutes*

- *Same subject you used for your MCQ?*

***Swap** with partner, review each other's maps*

- *Do they present concepts or surface detail?*
- *Which relationships in partner's map do you consider concepts and vice versa?*

The Wonderful World of Concept Maps



- Can be used for many lesson-related things
 - Help solo design of lessons
 - Aid communication with fellow lesson designers
 - Communication with learners
- And other things!
 - Sketching out concepts for presentations or papers
 - Project team meeting!

Concept maps externalise cognition

Seven Plus or Minus Two

Read the following list and try to memorise it:

*Cat, apple, ball, tree, square, head, house, door,
box, car, king, hammer, milk, fish, book, tape,
arrow, flower, key, shoe*

Memory Test

- Which ones can we remember?

Memory

- Two layers to human memory
 - **Long-term or persistent memory** – unbounded, slow
 - **Short-term or working memory** – faster, small

Memory can hold 7 ± 2 items for a few seconds

Important in programming

Important in teaching

This is why concept maps are so useful