Mental Models

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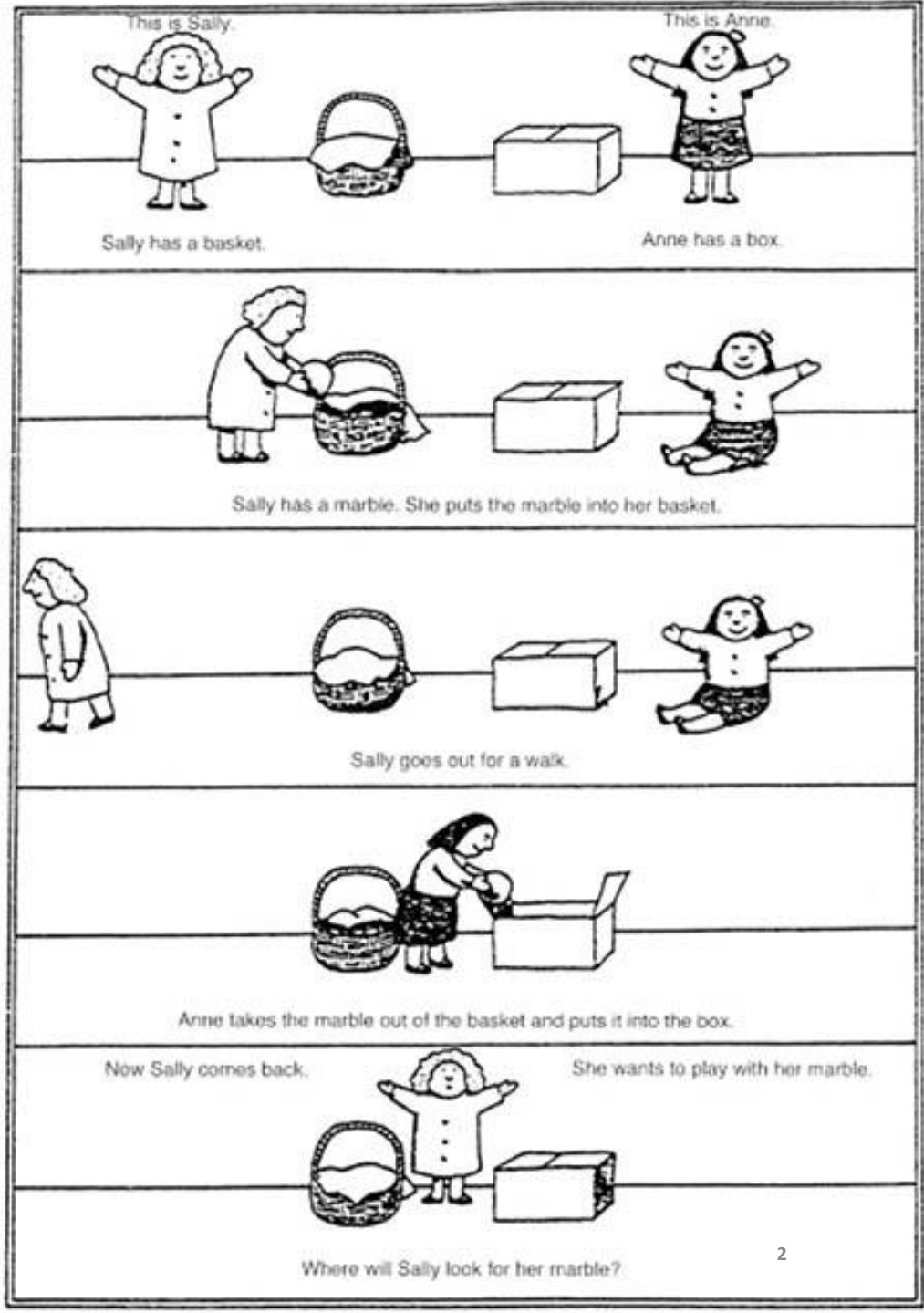
November 19, 2017

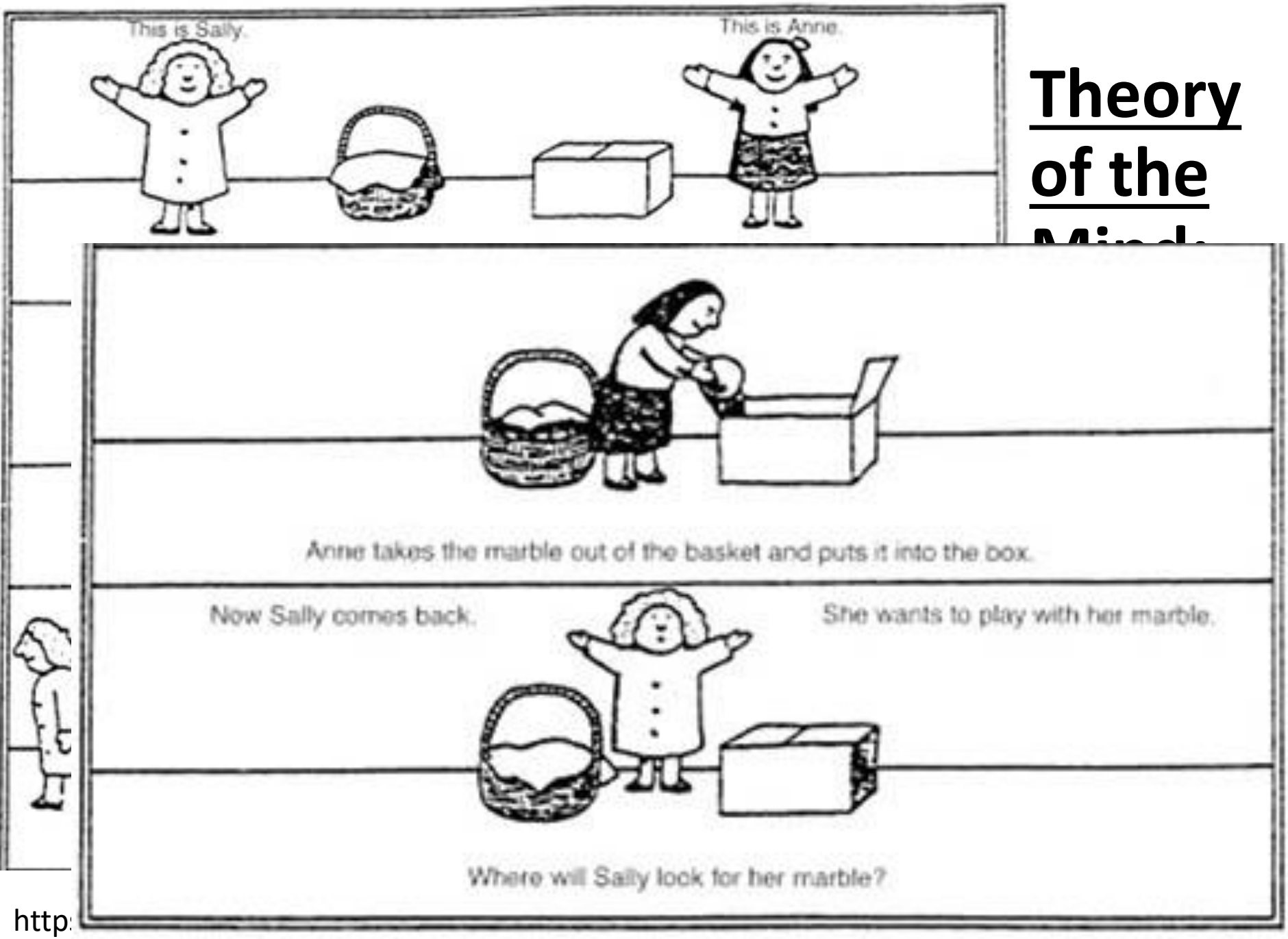
Theory of the Mind:

Sally-Anne Test



https://en.wikipedia.org/wiki/Sally%E2%80%93Anne_test

Theory of the Mind



http
%93Anne_test

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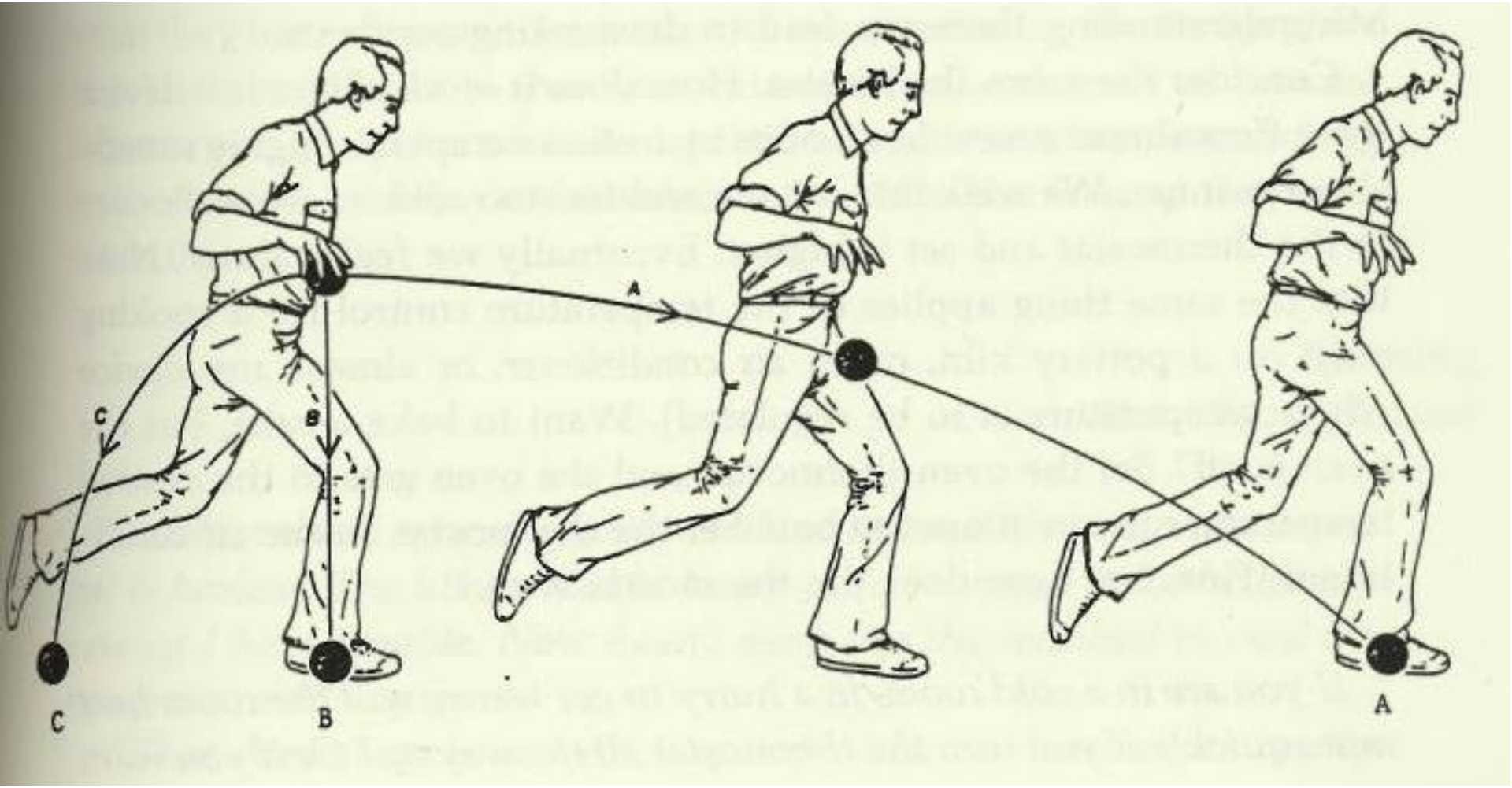
“A mental model is what the user believes about the system at hand.”

-- Jacob Nielsen

Mental Model

- Psychological representations of real, hypothetical, or imaginary situations
- Kenneth Craik (1943)
  - “The mind constructs ‘small-scale models’ of reality to anticipate events, to reason, and to underlie explanation”
- Users build mental models by:
  - Interaction
  - Explanation

If the man drops the ball while running, what path will it take?



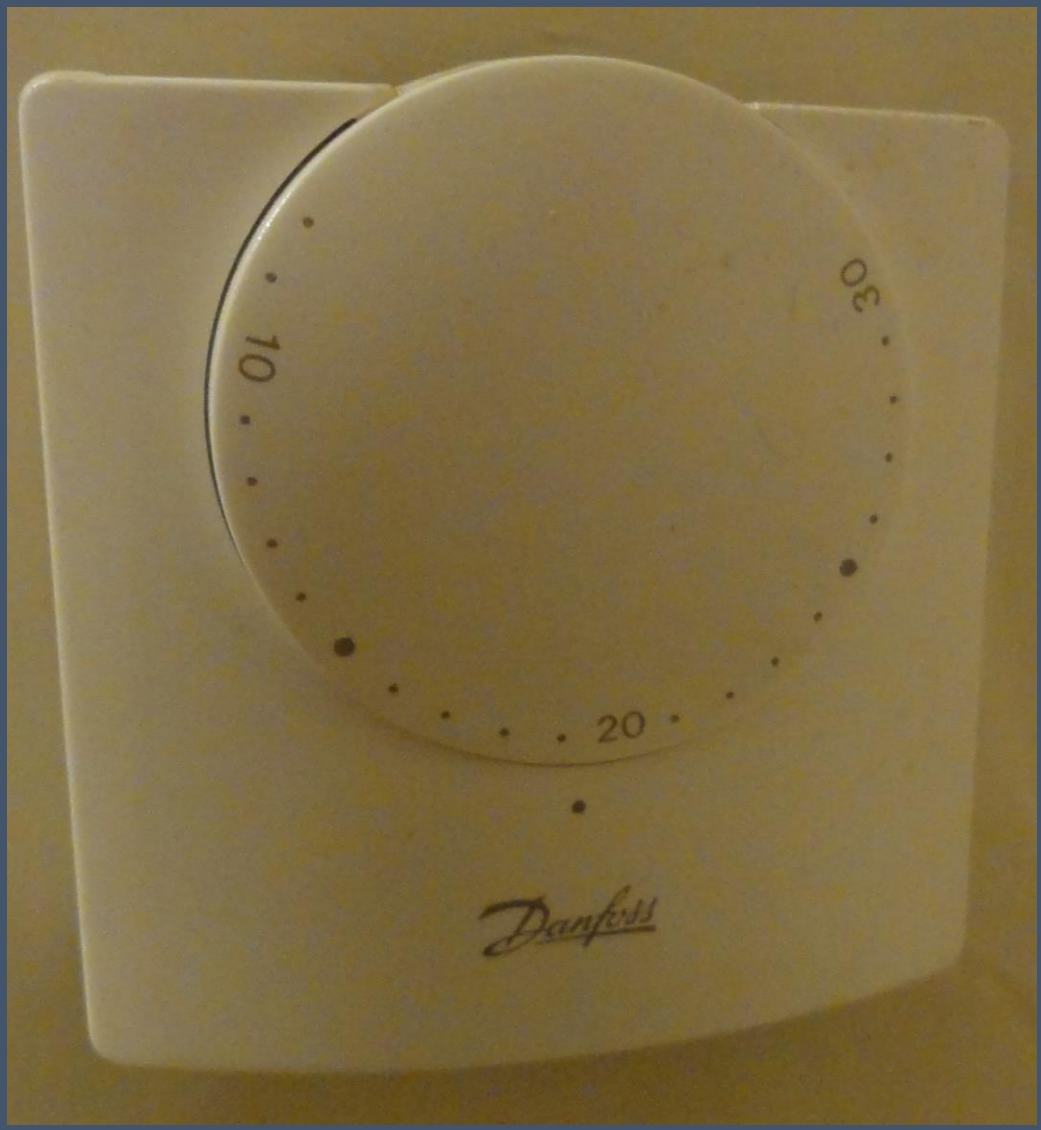
“A user interface is well designed when the program behaves just as the user thought it would.”

-- Joel Spolsky

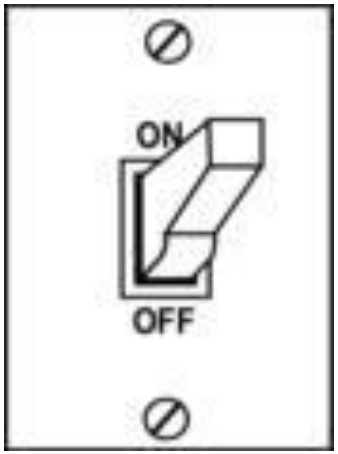
The heating has just come on but the room is cold. The room thermostat is set where you normally have it (higher than the current room temperature).

Do you…

1. Turn it up so the room heats faster
2. Leave it where it is and just wait?



Do room thermostats work like taps or switches?



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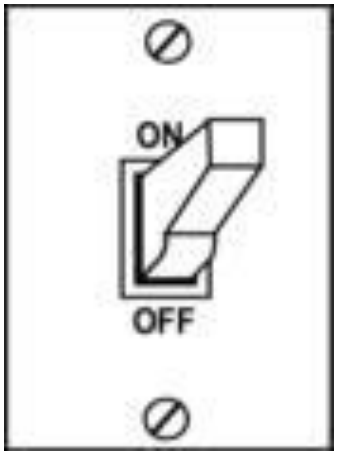
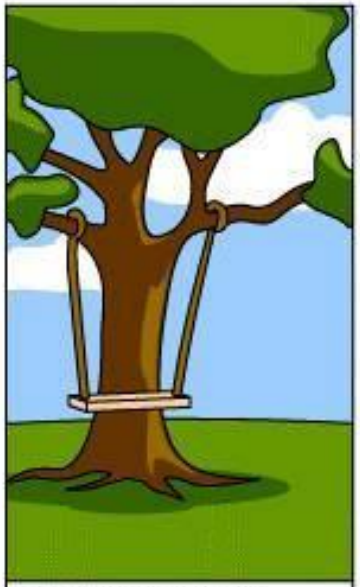


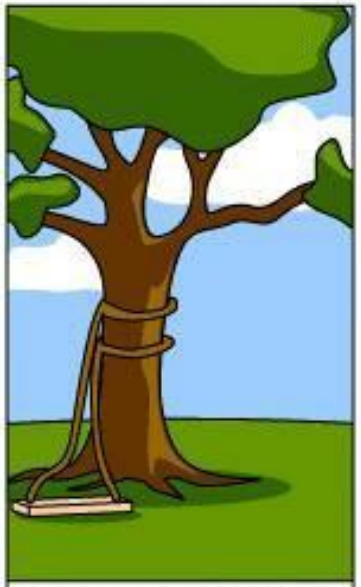
Different people have different mental models of how the does or should system work.

How the customer explained it



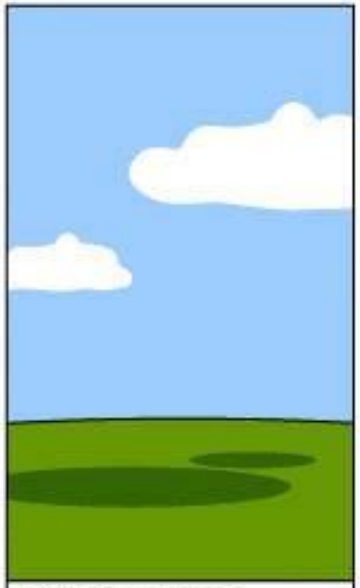
How the Project Leader understood it

How the Analyst designed it

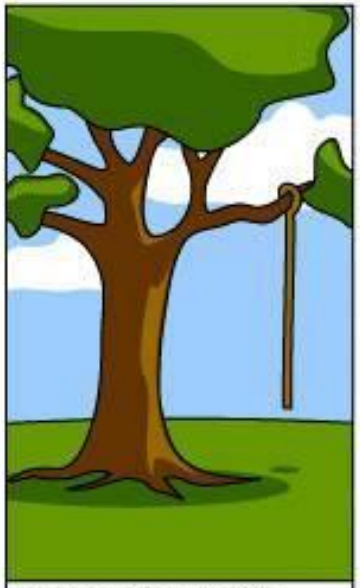


How the Programmer wrote it

How the Business Consultant described it

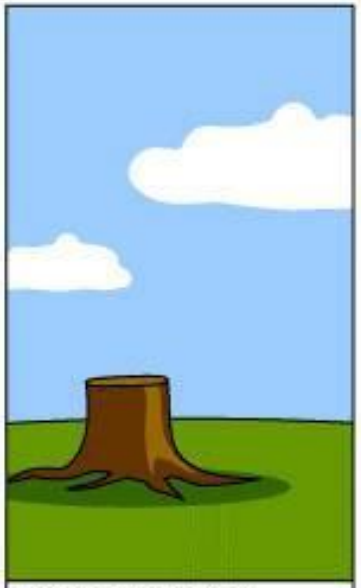


How the project was documented



What operations installed

How the customer was billed



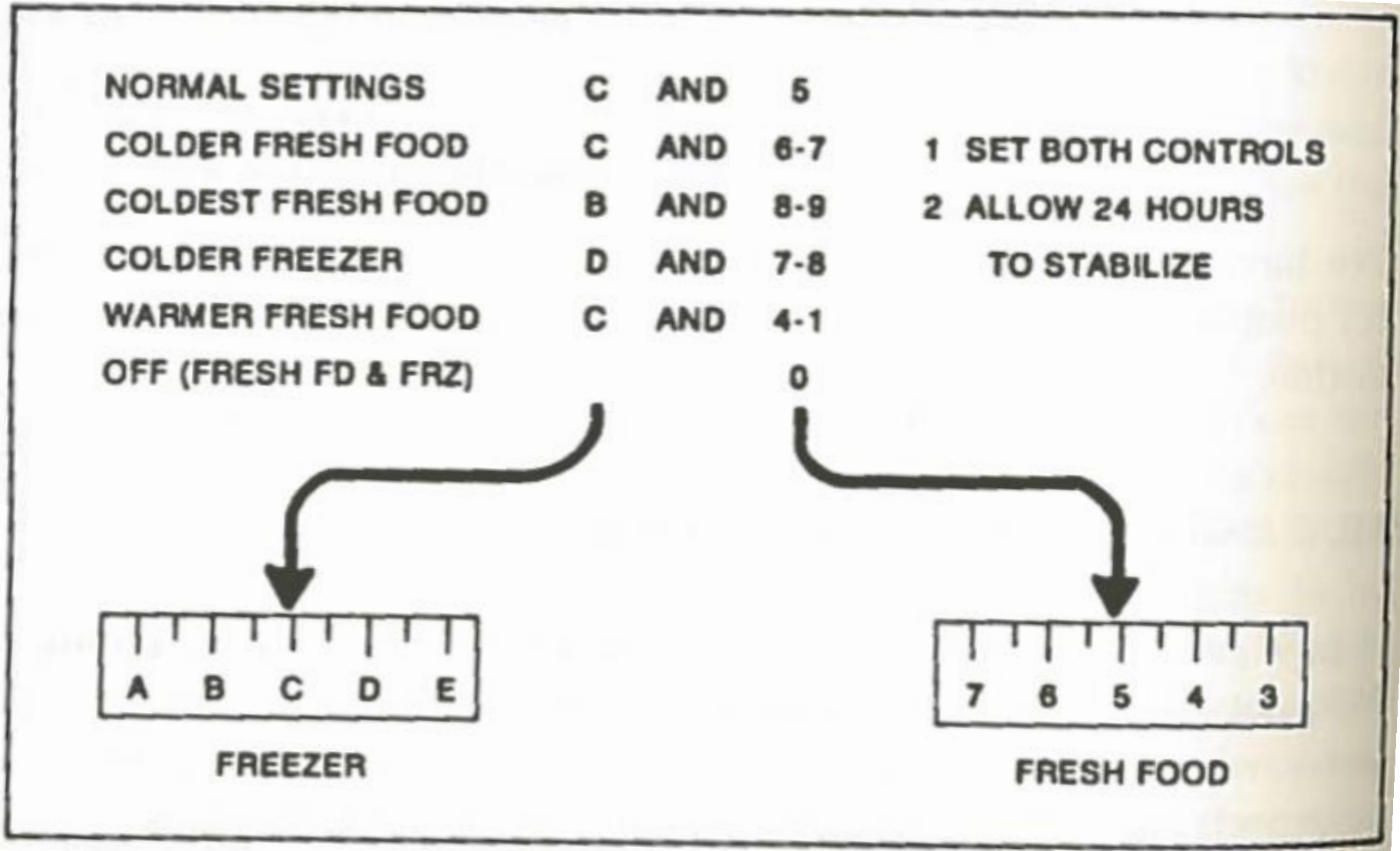
How it was supported

What the customer really needed

There are three models of the system

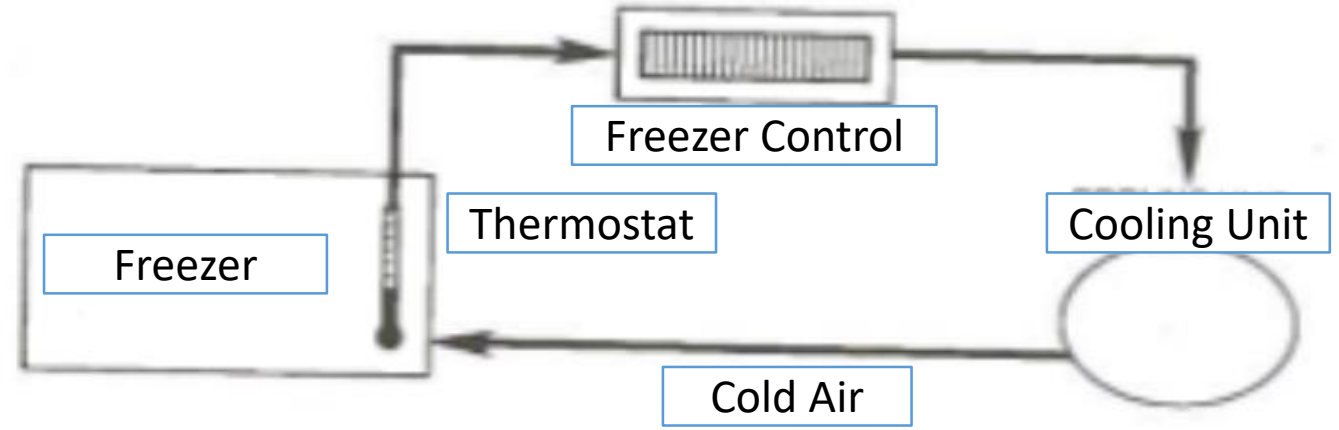
- User Model – How the user thinks the product works.
- UI Model – How the product is presented to the user in the user interface.
- Implementation Model – How the product is actually implemented.

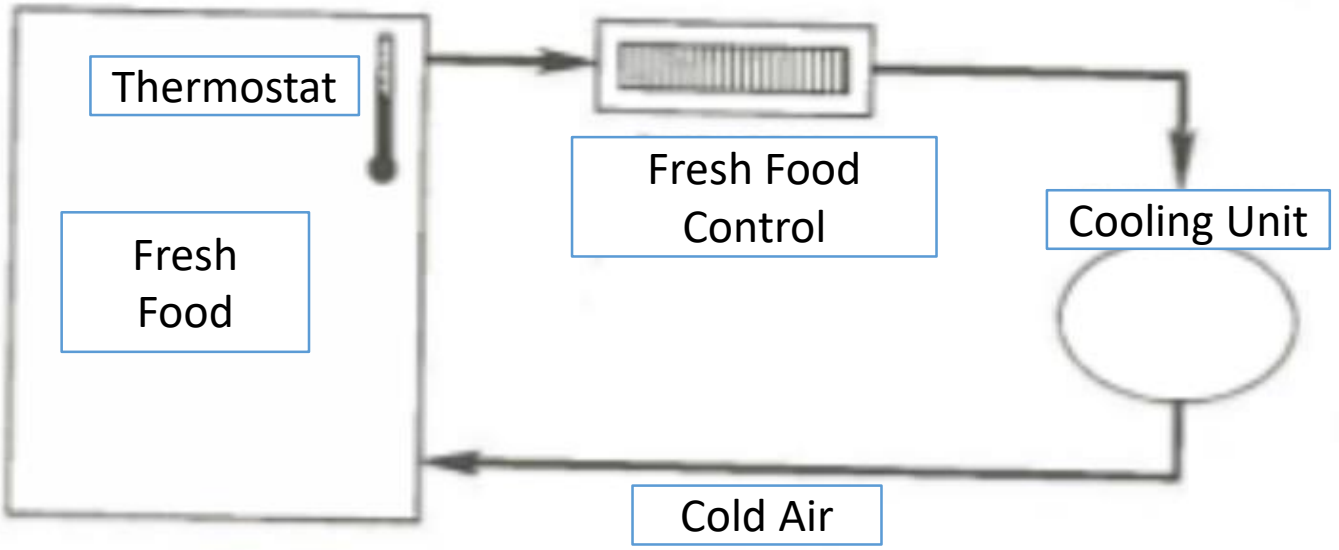
UI Model (refrigerator temperature)



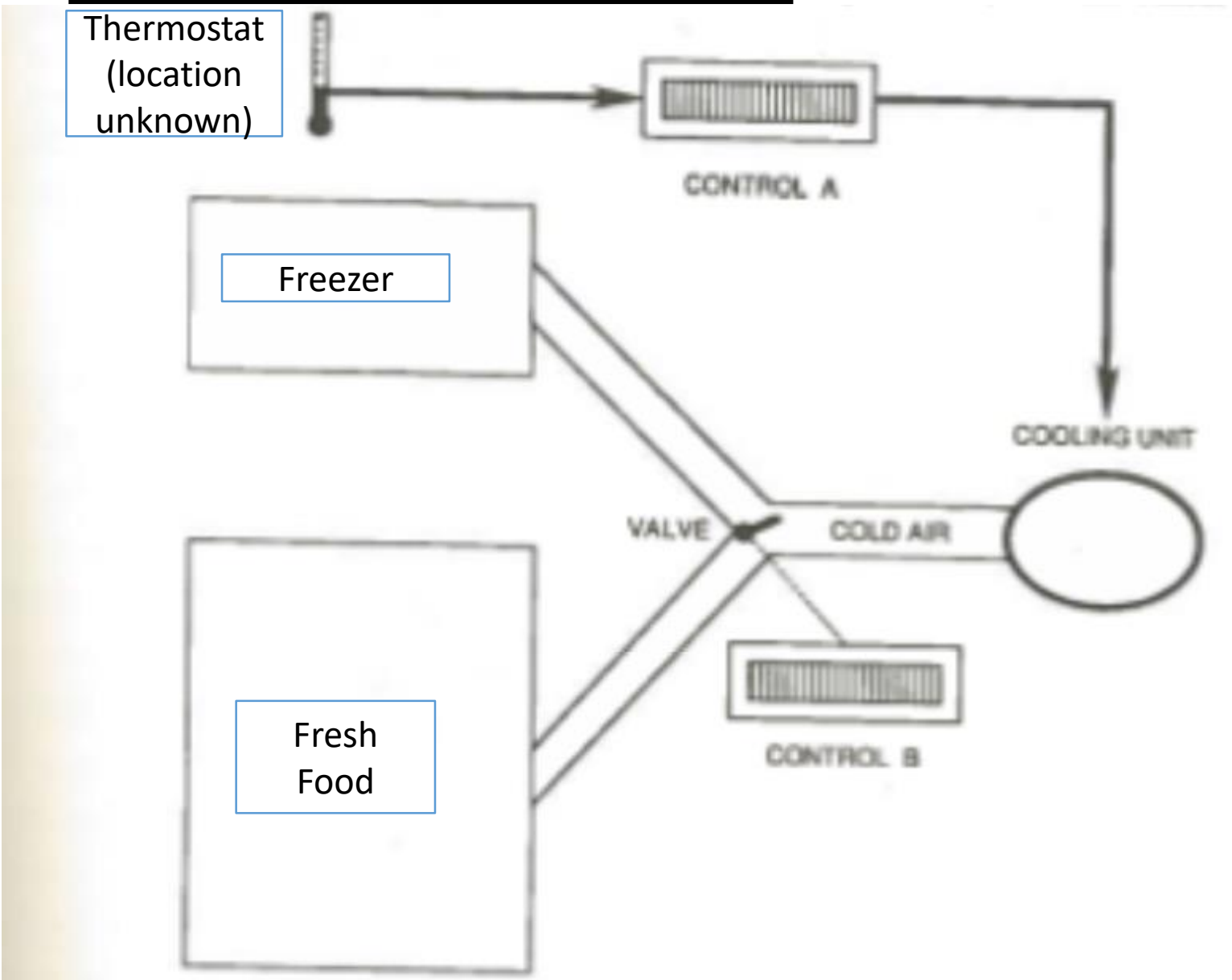
The design of Everyday Things by Donald Norman

User mental model





Implemented model



Good user interfaces help the user develop a good mental model of the system

One way to help the user build a mental model is through explanation and analogy (a is like b).

What is a computer Virus? (Folk Models)

- Viruses are bad software
  - Viruses are bad, but not much more is known about them
- Viruses are buggy software
  - Viruses are just mistakes in software that can cause you trouble
- Viruses cause mischief
  - Viruses are there to intentionally annoy users
- Viruses support crime
  - Viruses steal information like credit card data

VIRUS ALERT!

Is your antivirus on watch?

An antivirus is software that prevents, detects, and removes malicious software like computer viruses, worms, trojan horses, spyware, adware, and other types of malware.

Virus Detection Methods

SIGNATURE BASED DETECTION

An antivirus works with a database of known viruses. Each virus is identified by its uniquely recognized coded sequences, called the virus fingerprint.

The database needs to be updated often so it knows what viruses to look for!

The term "virus" commonly refers to many different kinds of malware.

SUSPICIOUS BEHAVIOUR BASED DETECTION

An antivirus can also recognize new viruses based on heuristics derived from virus behaviours previously seen.

This method can be effective for detecting new viruses that are not yet stored in the database.

PREMISE PROTECTED
ANTIVIRUS ON WATCH

Tips to Stay Vigilant

When in doubt, always err on the side of caution. Be cautious when opening, downloading, or executing any files or email attachments.

Maintain an updated antivirus.
To protect yourself from getting infected, keep your antivirus software up-to-date.

Myth: Multiple antivirus programs are beneficial.
Fact: Having ONE updated antivirus software is better than installing multiple incompatible programs.

Myth: Having an antivirus is enough.
Fact: Take a multi-layered approach to computer security that includes protection such as an antivirus program, and being cautious online.

Practice safe internet habits.
Download files from reliable sources, and avoid insecure file-sharing programs.

Myth: I don't use the internet so I can't get a virus.
Fact: Even if you don't use the internet, inserting infected external drives like USBs can transfer viruses onto your computer.

Myth: I don't visit "shady" sites so I can't get a virus.
Fact: You could still get infected through legitimate websites that have been compromised, and through phishing sites, which are malicious clones of popular or trusted websites.

Install the latest system security updates.
Reduce the vulnerability of your OS by keeping it updated to the latest version.

Myth: Macs are far more secure than PCs.
Fact: The market share of Windows is higher than Apple's OS, making PCs bigger targets. As Macs become more popular, they are also becoming attractive targets for hackers.

Myth: Viruses damage your computer's hardware.
Fact: Viruses cannot physically damage hardware, but might indirectly affect how hardware behaves.

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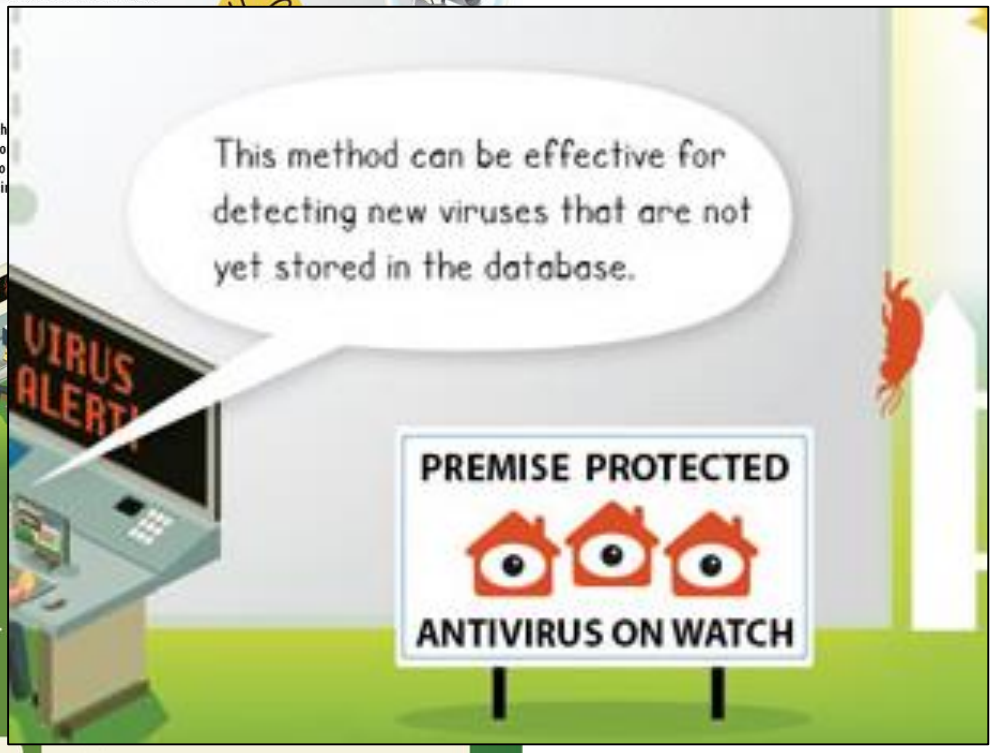

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ANTIVIRUS SOFTWARE

Boosting Computers' Immune System

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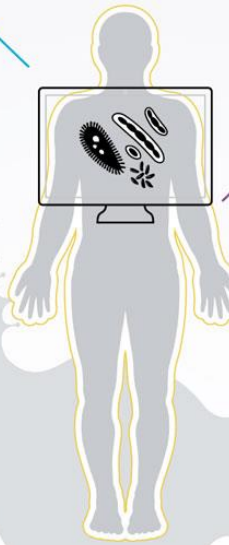

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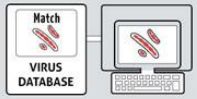

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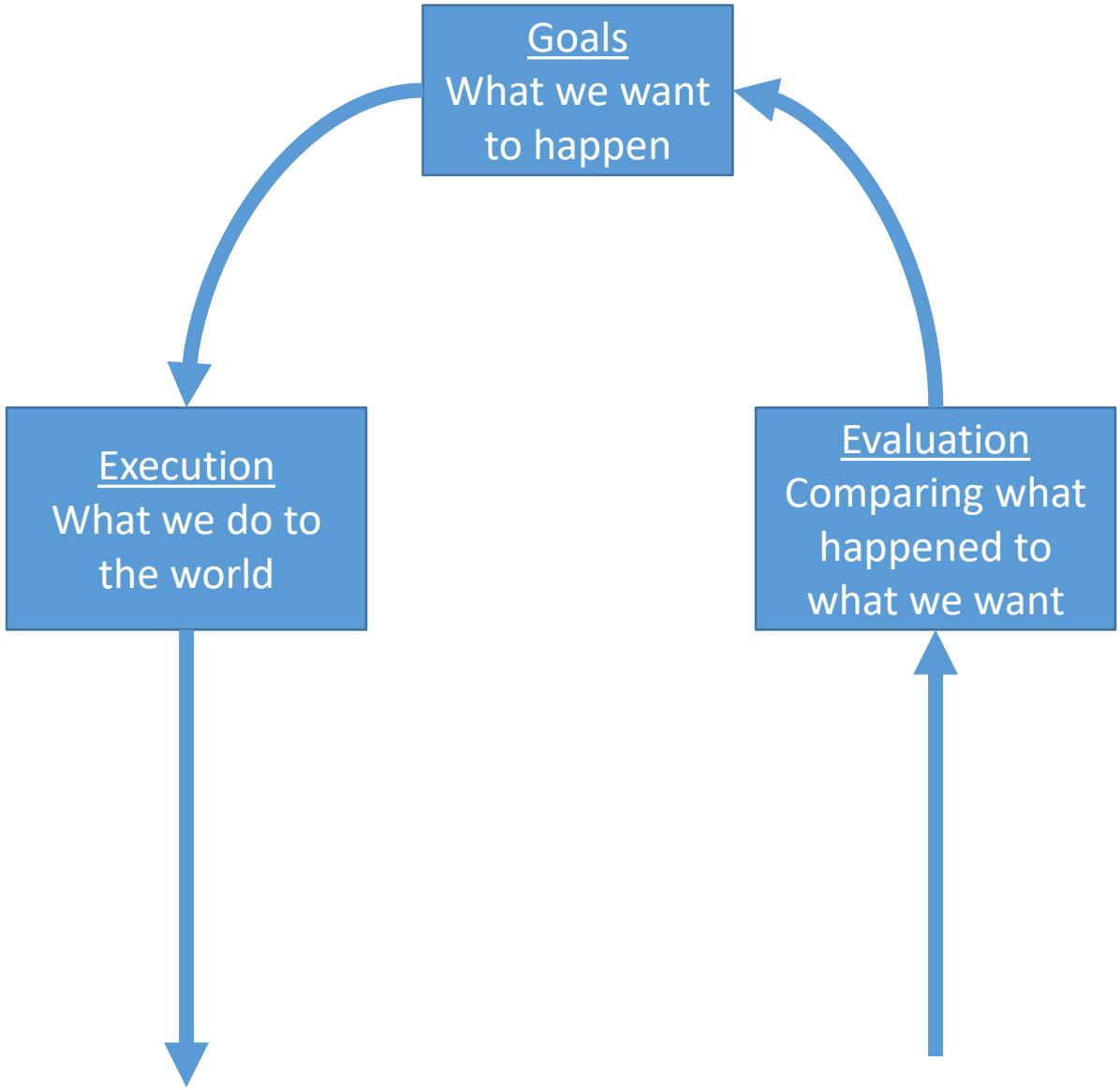
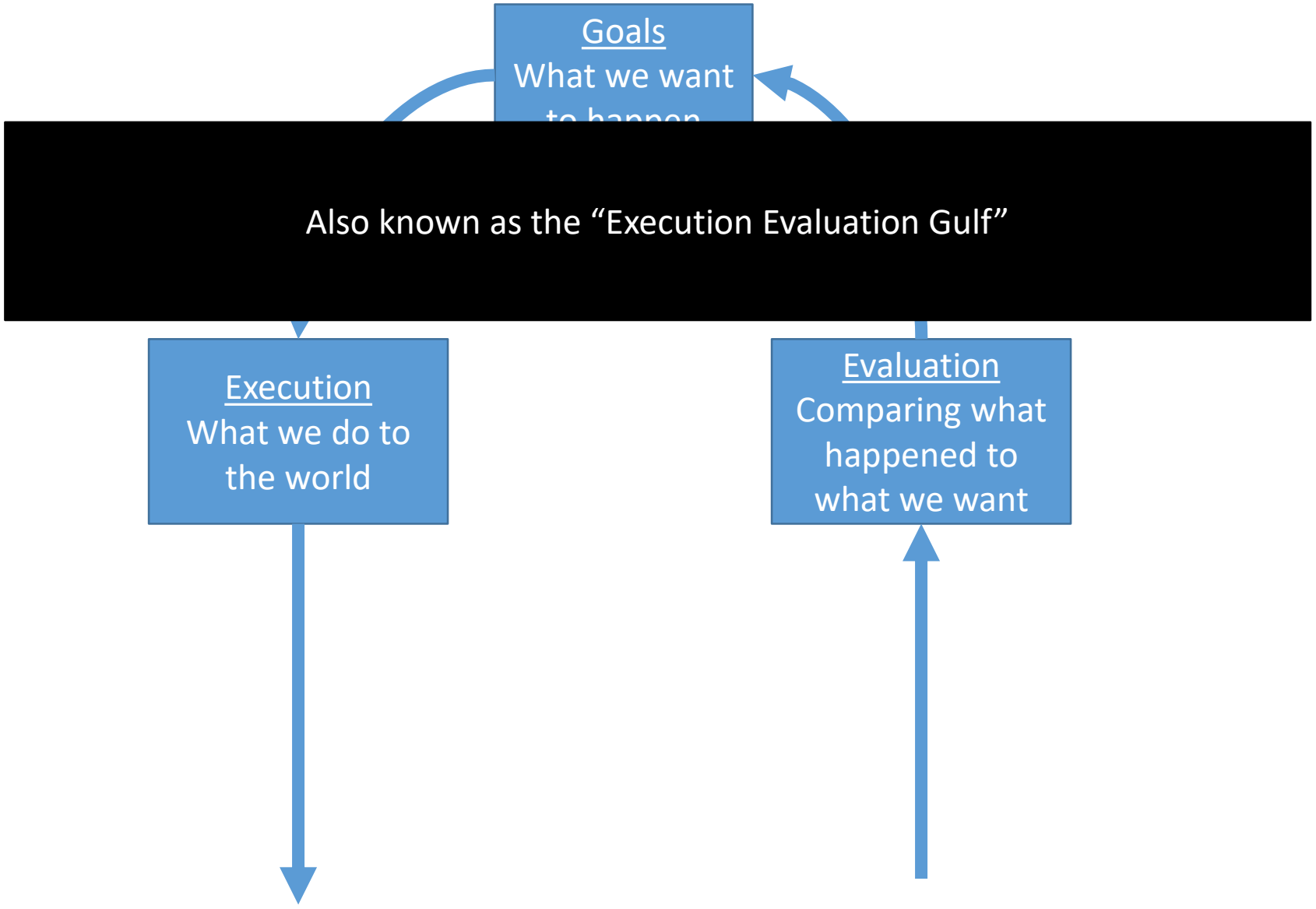
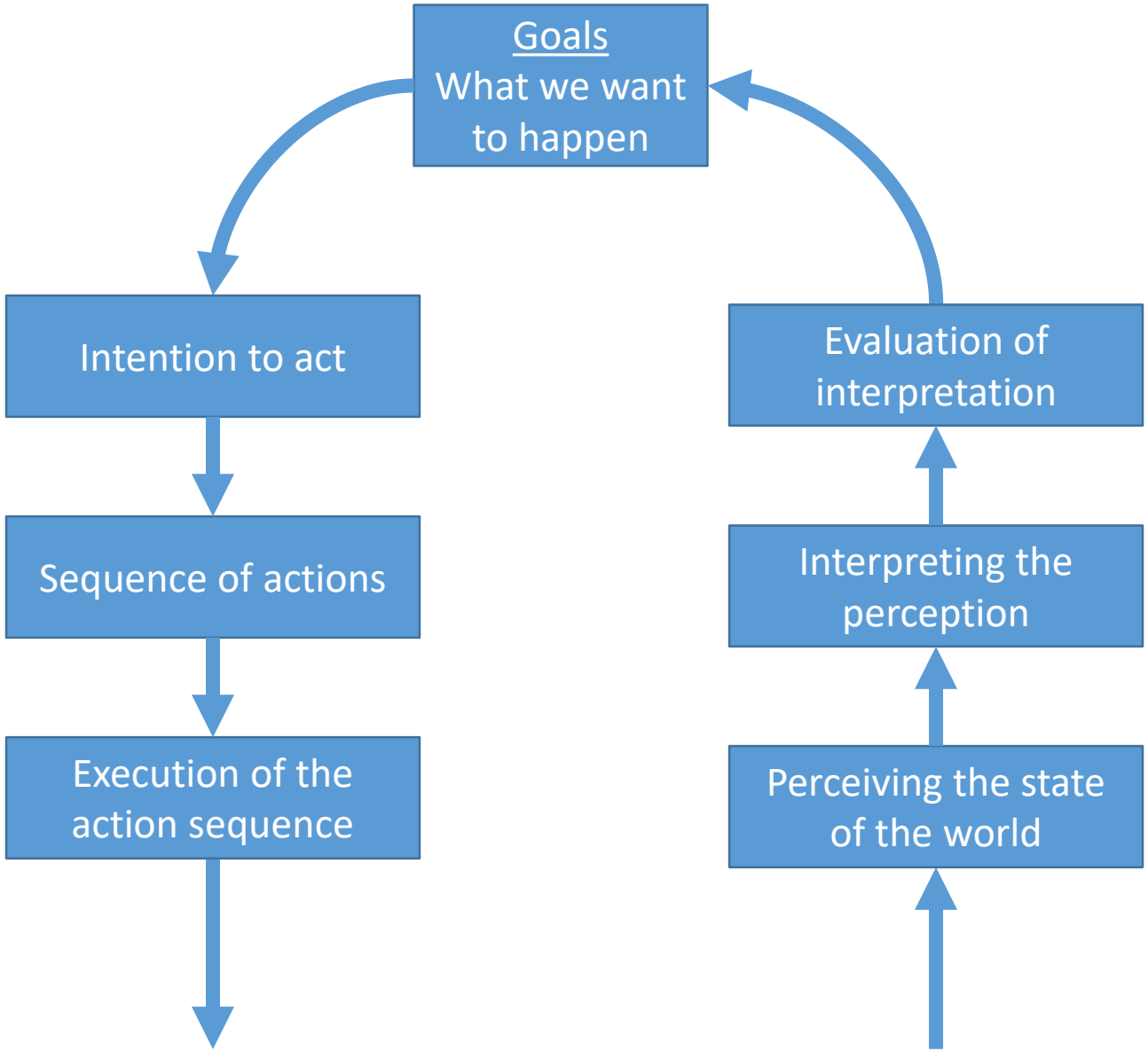
Humans learn models by interacting with the world.


Goals
What we want to happen
Execution
What we do to the world
Evaluation
Comparing what happened to what we want
The World


Goals
What we want
Also known as the “Execution Evaluation Gulf”
Execution
What we do to the world
Evaluation
Comparing what happened to what we want
The World


Goals
What we want to happen
Intention to act
Sequence of actions
Execution of the action sequence
Evaluation of interpretation
Interpreting the perception
Perceiving the state of the world
The World

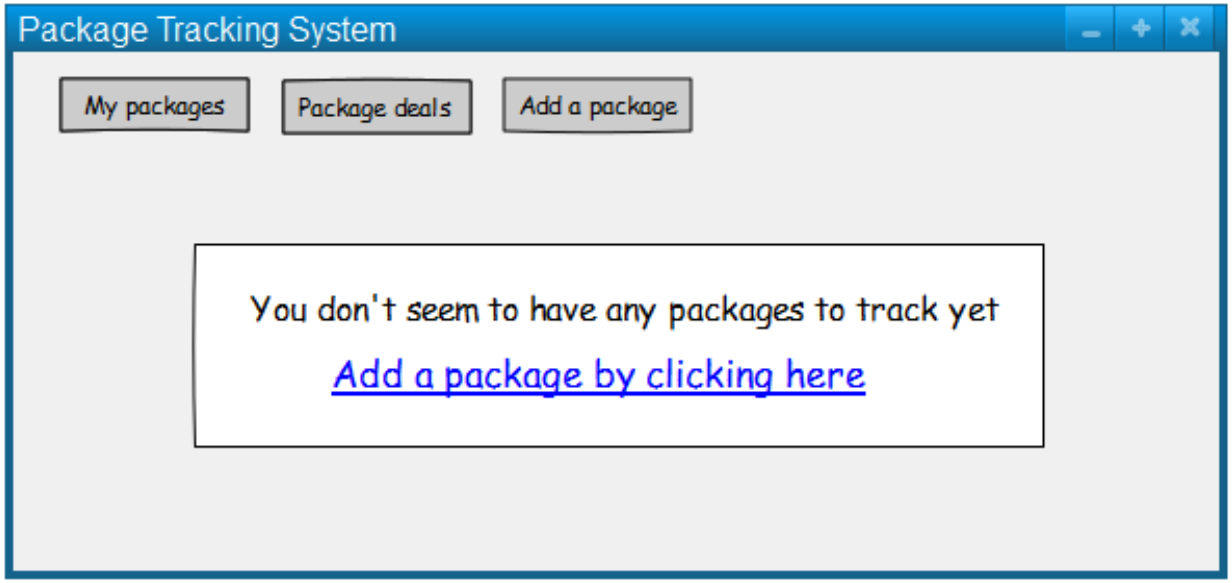
Classic example:

I walk up to my car in a parking lot and try the key, but the door will not open. So I wiggle the key, then try taking it out and putting it back in. Still locked. Hm, something bigger might be wrong, look up and realize this isn't my car.

Good user interfaces help the user develop a good mental model of the system

Another way is to support the construction of a mental model.

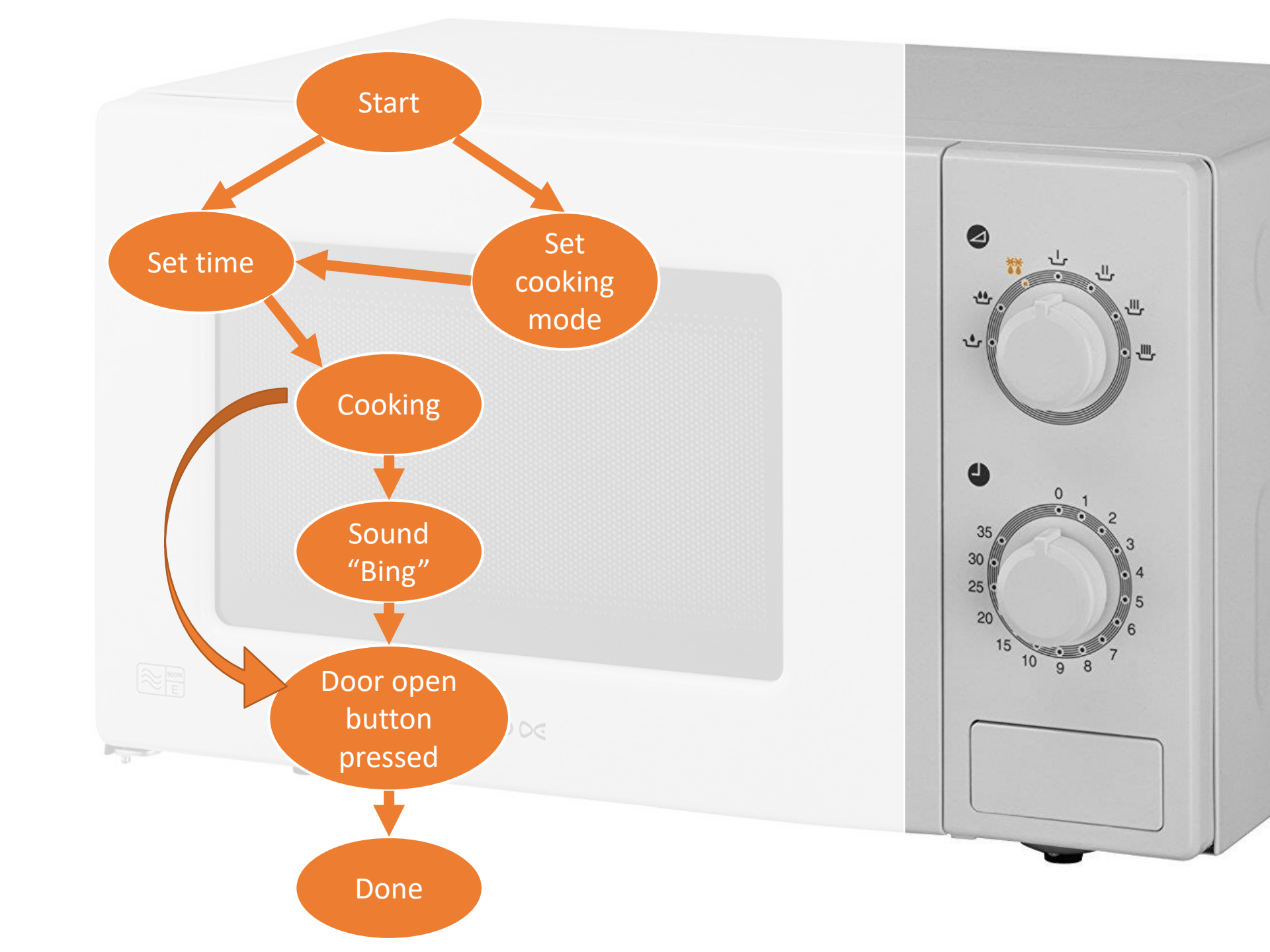
Package tracking application on first use



State diagrams

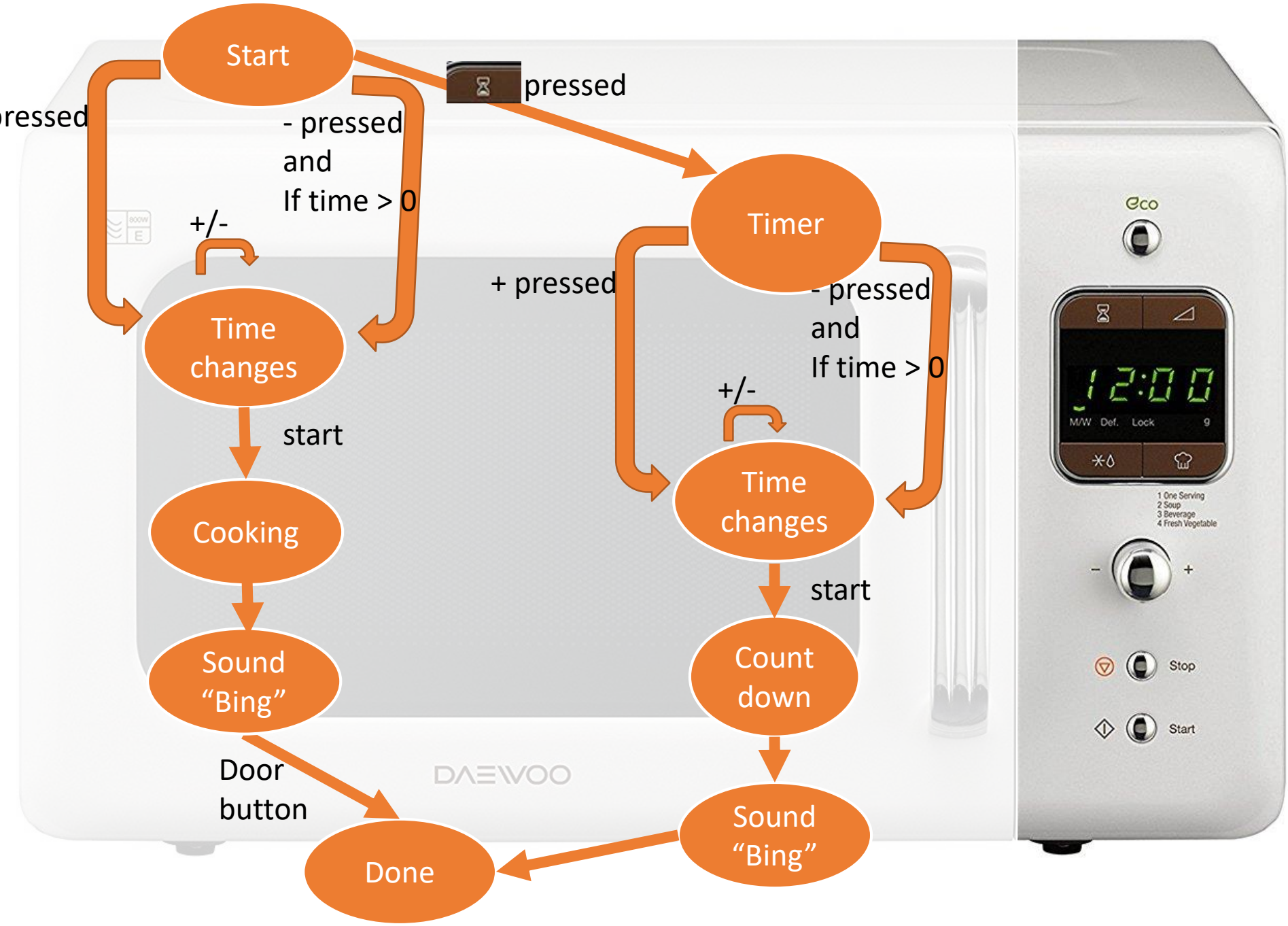
Today's challenge: Microwave app

- We are going to have a running example today of a microwave
- Start with microwaves themselves
- Move on to apps


Start
Set time
Set cooking mode
Cooking
Sound “Bing”
Door open button pressed
Done
0
1
2
3
4
5
6
7
8
9
10
15
20
25
30
35

Think-pair-share

- Draw the state diagram for this microwave from the following two start buttons
- +/- knob
- Timer button


Start
pressed
ressed
- pressed
and
If time > 0
+/-
Time
changes
start
Cooking
Sound
“Bing”
Door
button
Done
Timer
+ pressed
- pressed
and
If time > 0
+/-
Time
changes
start
Count
down
Sound
“Bing”
eco
12:00
M/W Def. Lock
1 One Serving
2 Soup
3 Beverage
4 Fresh Vegetable
Stop
Start
DAEWOO


• Auto cook menu
1.Bread
2.Soup
3.Baked Potato
4.Fresh Vegetable
5.Frozen Vegetable
AUTO COOK
Power
Defrost
Clock
Beverage
Pasta
Frozen Pizza
10 min.
1 hour
1 min.
10 min.
10 sec.
1 min.
STOP/ Clear
START/ +30 sec
KOR-6L6BD
DAEWOO
800W
E

Questions