Design of Everyday Things

ID 405: Human-Computer Interaction
Spring 2015

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http://info-design-lab.github.io/ID405-HCI/

Design is about harmonizing form

Design is about harmonizing form

Prof. Ravi Poovaiah, IDC, IIT Bombay, 2002

Design is about harmonizing form

Harsha Kagod

Design is about harmonizing form

IDC Vani

A Malayalam
Typeface
by Anand Nair
VC 2002-2004

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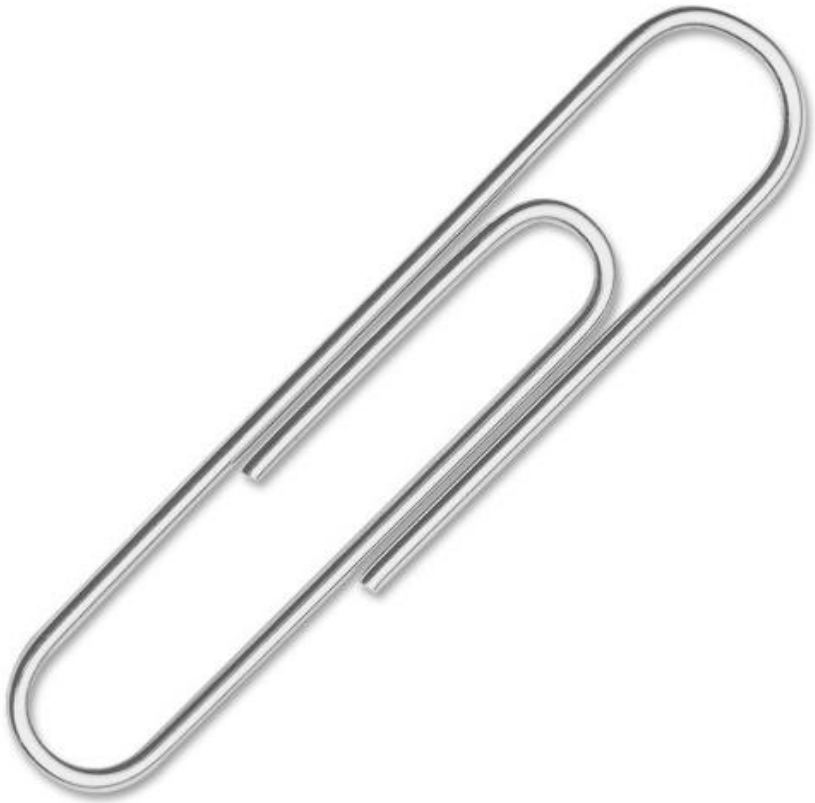
Design is about harmonizing form

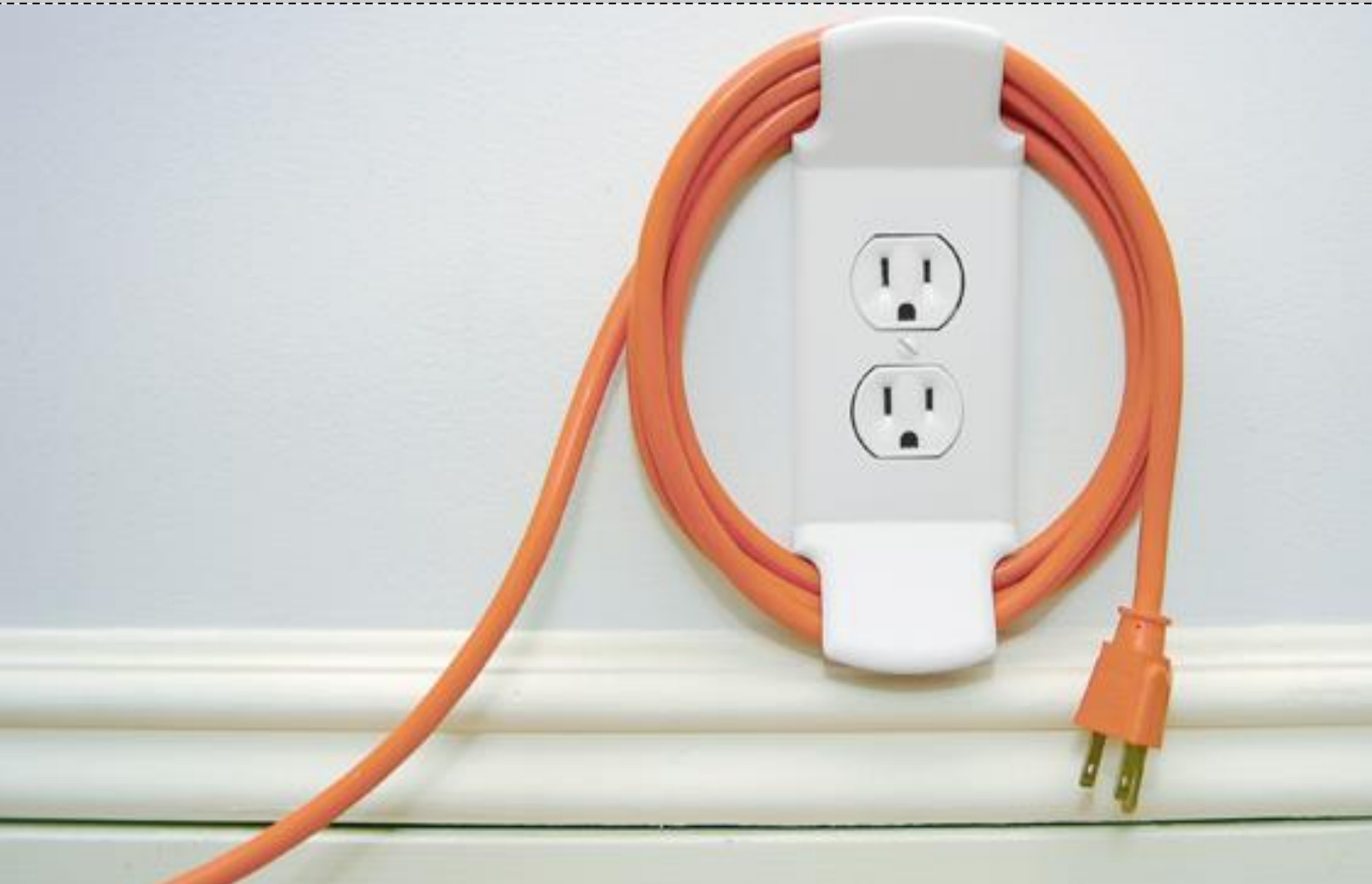
Prof R. K Joshi
IDC
IIT Bombay
1988

Harmonizing form & function

Harmonizing form & function



Harmonizing form & function



Harmonizing form & function

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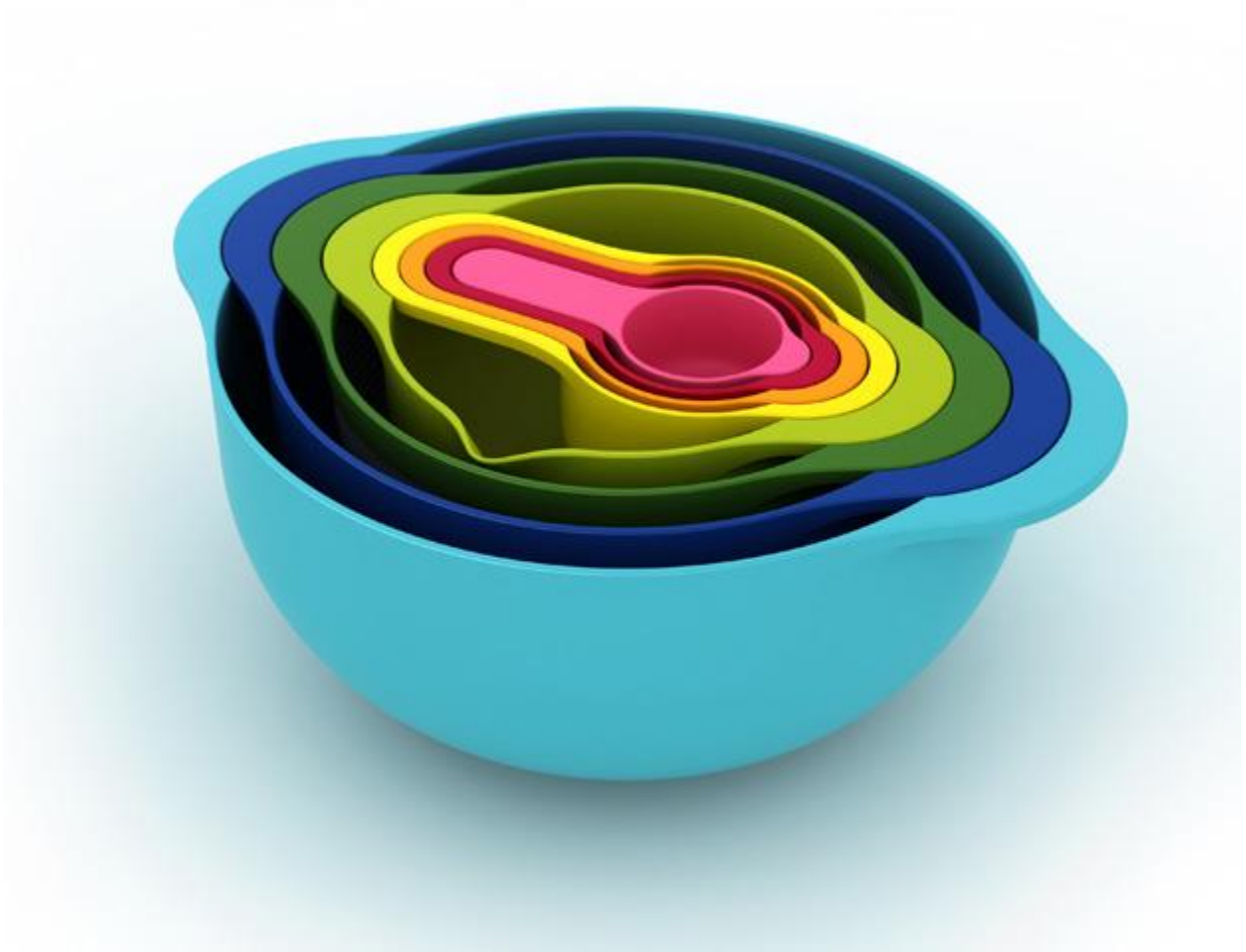

Harmonizing form & function

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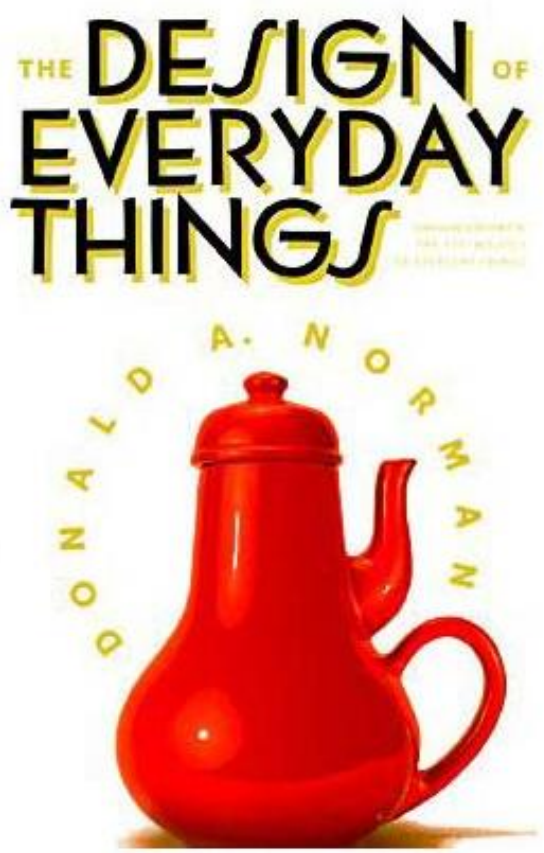
Harmonizing form & function

Harmonizing form & function

Harmonizing form & behaviour

Harmonizing form & behaviour

Design of everyday things



Design of everyday things

Donald Norman lists four properties of everyday things:

1. Affordances
2. Constraints
3. Mapping
4. Conceptual models

1. Affordances

Affordances are perceived or actual properties of objects that determine how one would use the object

Affordances suggest a range of possible uses of an object
By choosing the right affordance, you can direct the user of your product to use it in the desired manner

A small user interface set from Braun products made during the 60's mostly.
Deiter Rams

1. Affordances

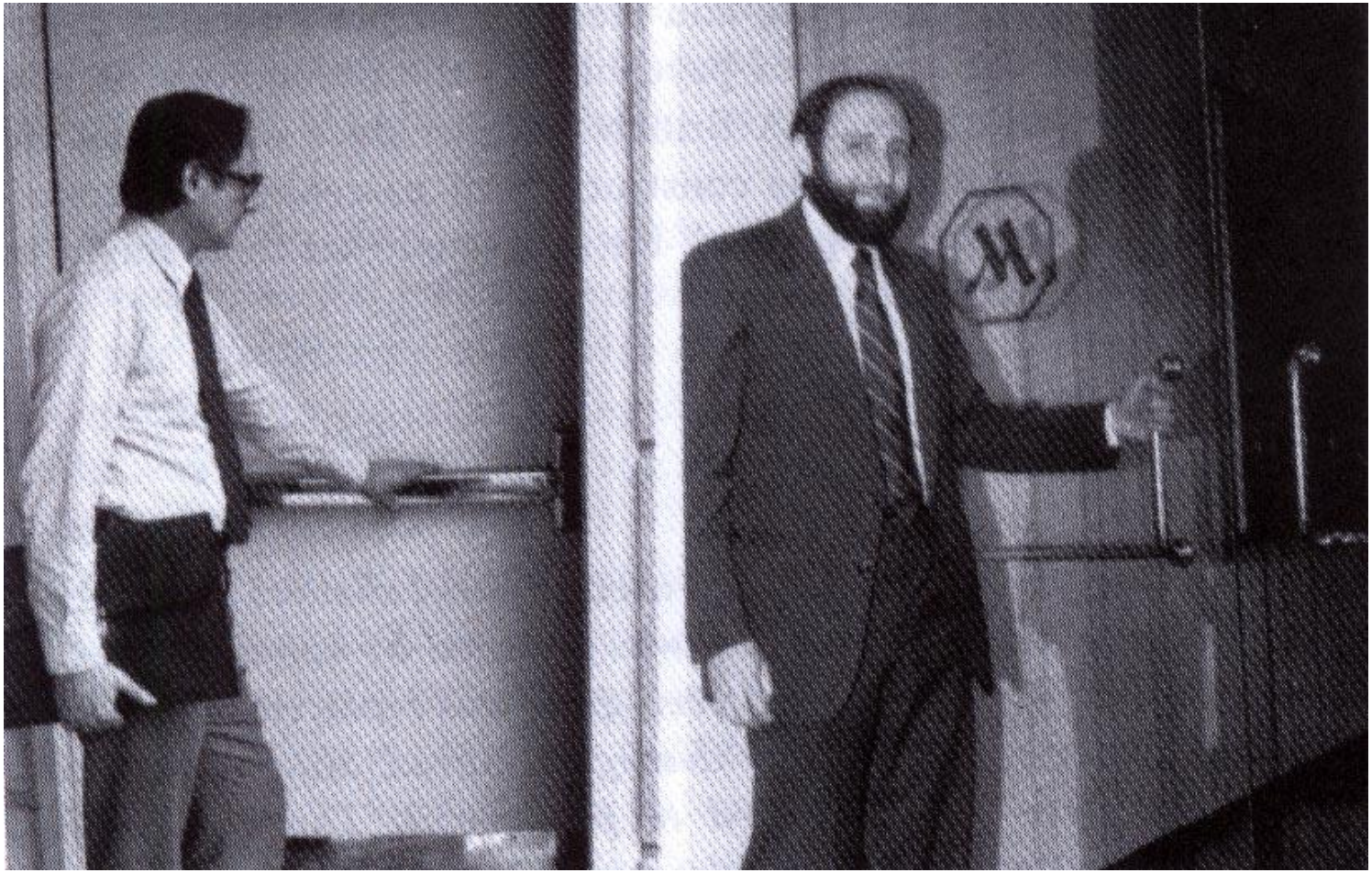
Knobs afford turning (this door knob can be turned in both directions – clockwise & anticlockwise, because of its shape, size and texture)

1. Affordances

Knobs afford turning (this handle affords a different kind of turning)

1. Affordances

One door affords pushing, the other pulling



1. Affordances

Different handles indicating different ways to manipulate them

1. Affordances

Some chairs are portable; some are fixed

1. Affordances

Different materials afford different forms and uses

2. Constraints

While affordances suggest a range of possible ways to use an object; constraints limit them to direct a user to the ideal way to use it

By constraining a use of object, we can actually force user to use an object in the most efficient manner

2. Constraints

You can hold this pair of scissors only in a certain position because it is most effective to use it in this position

2. Constraints

Diskettes are designed such that they can be inserted only in certain position

Constraint is used here to avoid errors

2. Constraints

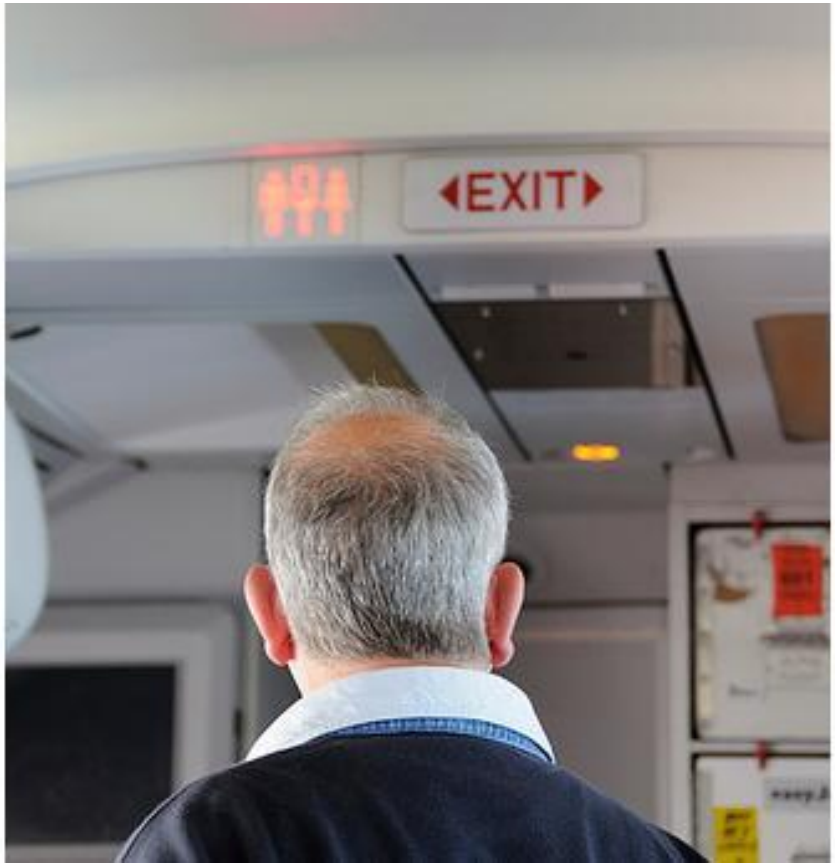
The shape of plugs ensure that they are plugged into the right spot and position

2. Constraints

Constraints work by forcing functions
In this example, you cannot take out the car keys without switching off the ignition

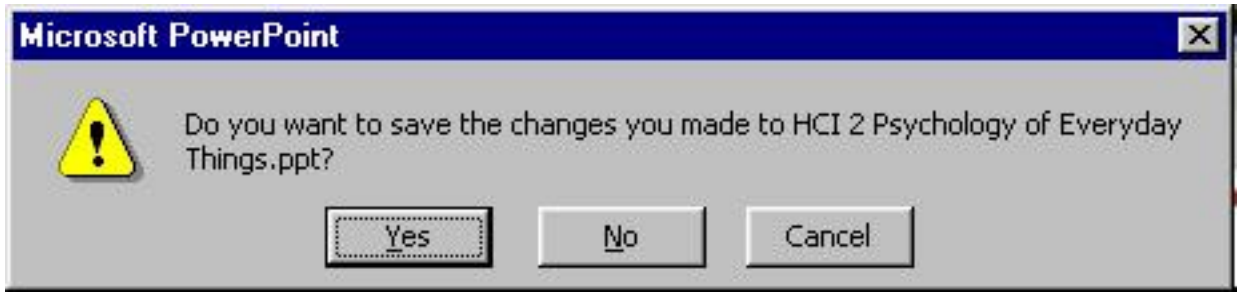
2. Constraints

They also work by interlocking functions
In airplane toilets, locking the door switches on both the toilet interior light and the “Toilet Occupied” sign



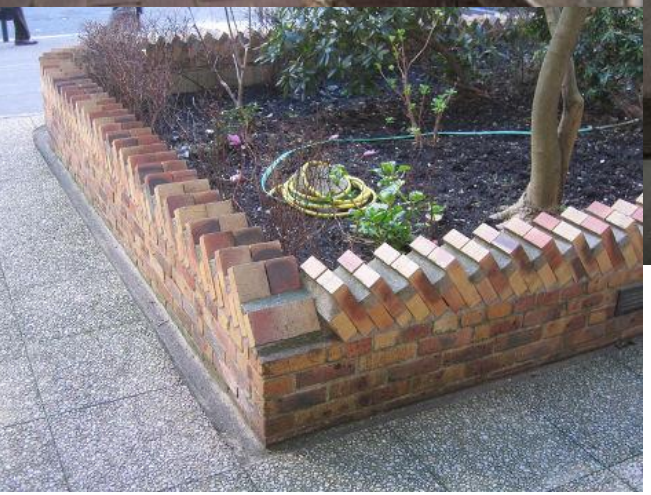
2. Constraints

This software interface forces user to save before closing a file



2. Constraints

What do you think of these constraints?



3. Mappings

Mapping is the relationship between the controls and their effects

Natural mappings take advantage of physical analogies and cultural standards

Example - Turn the steering wheel clockwise to turn a car right

3. Mappings

In this picture, it is easy to guess which knob maps to which burner

3. Mappings

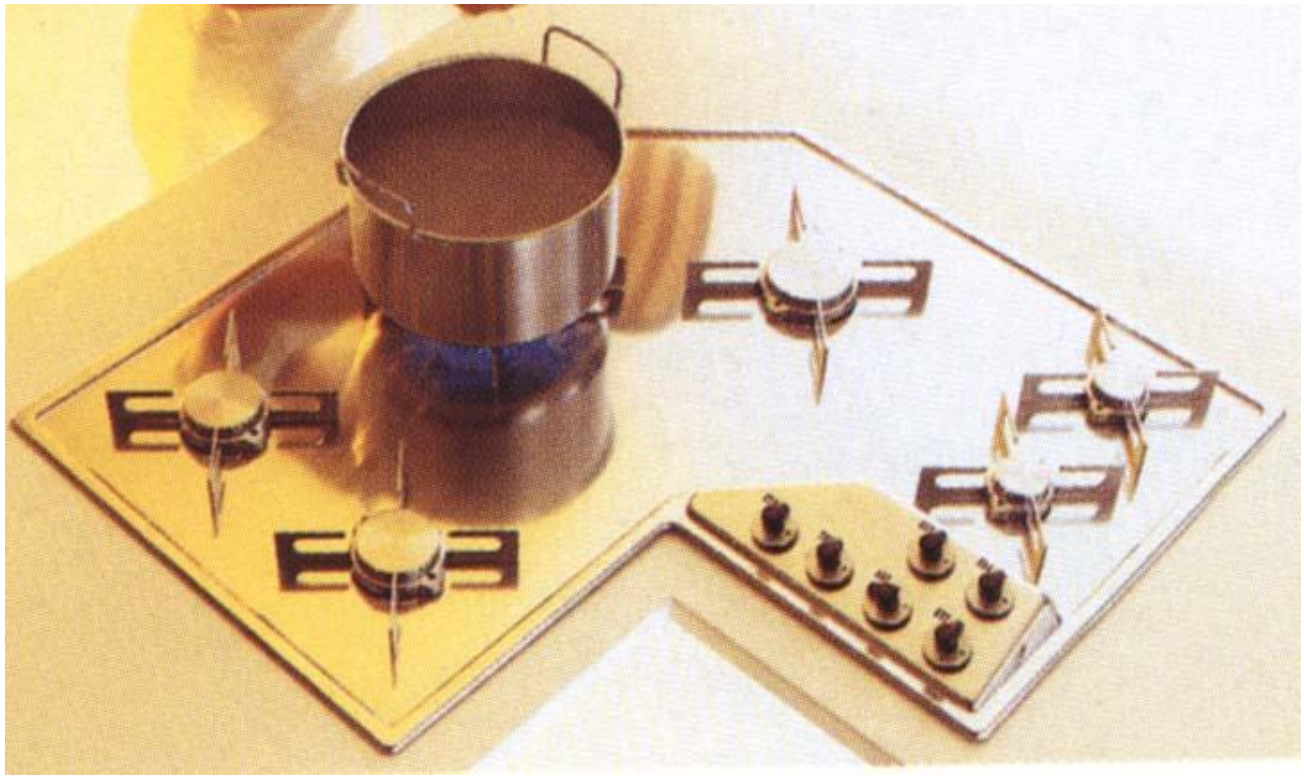
But here, which knob maps to which burner?

3. Mappings

Or here?

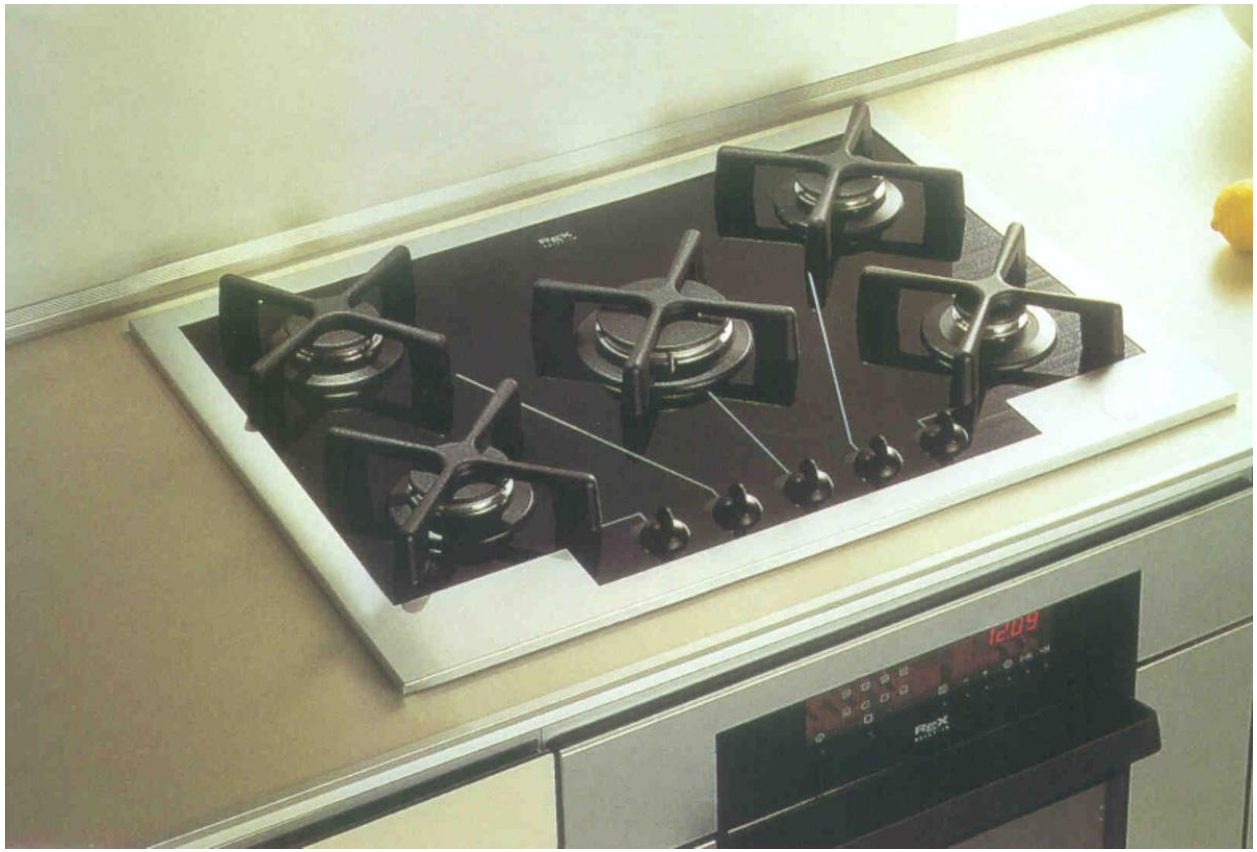
3. Mappings

The fancier it is, the more difficult it gets…



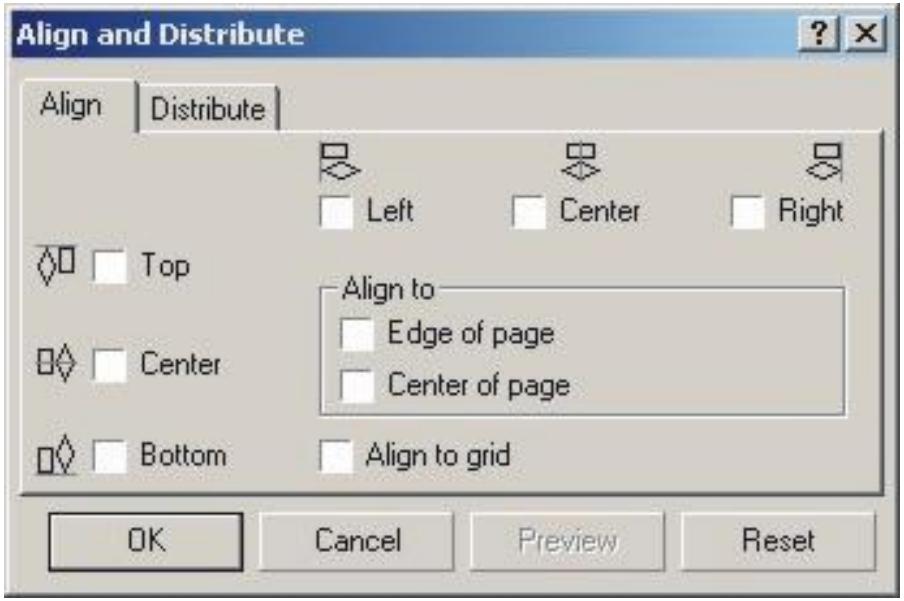
3. Mappings

Here is a possible solution…



3. Mappings

An example of good mapping in interface design



4. Mental Models

People form mental models of how things work, based on observation and experience with using them

These mental models help them to anticipate how to use the product and overcome if they encounter difficulties

Good interface design helps people to build clear conceptual models

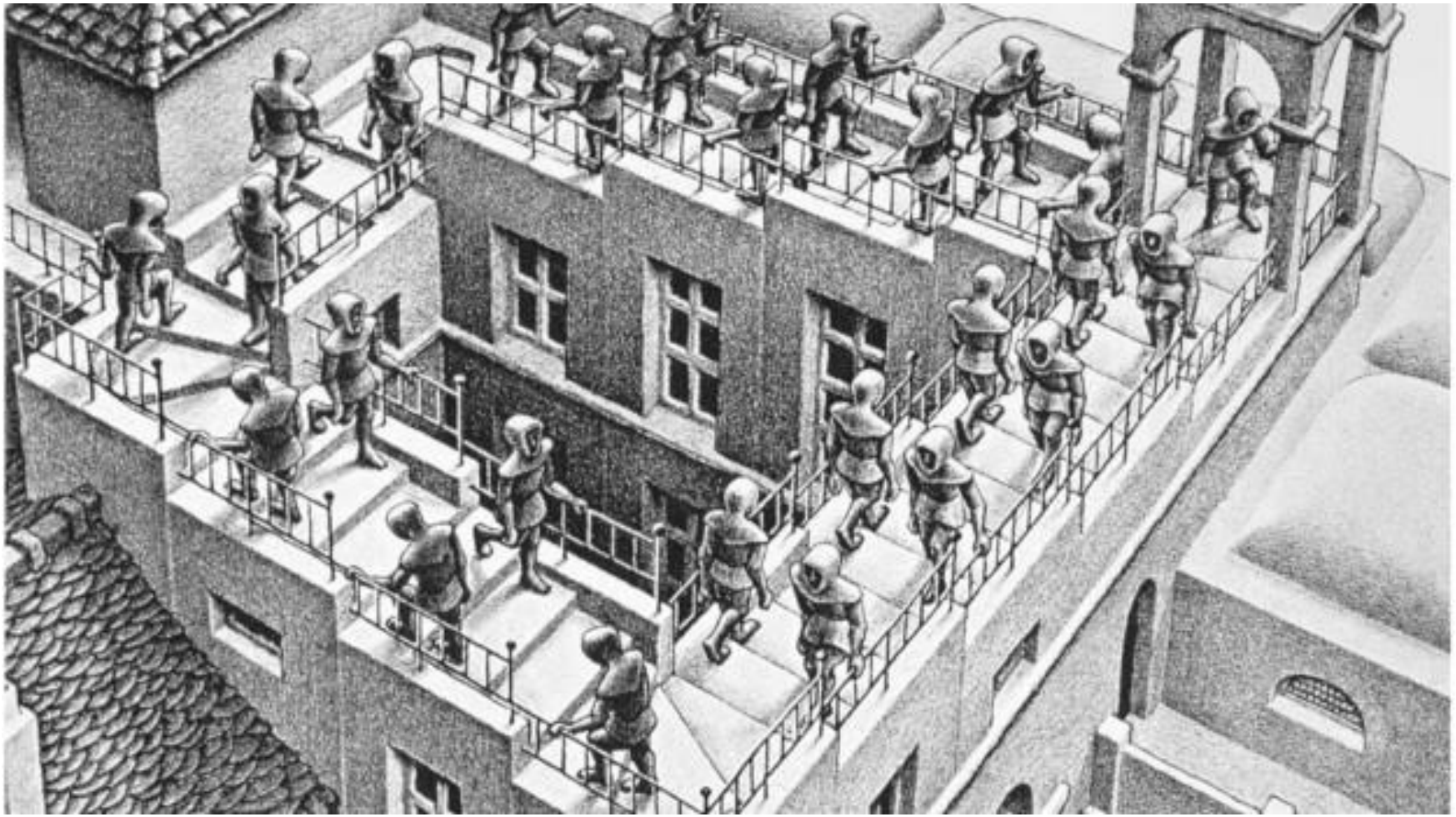
4. Mental Models

The bicycle below goes against the mental model that we have of how bicycles work

1.7 Carelman's Tandem "Convergent Bicycle (Model for Fiancés)." Jacques Carelman: "Convergent Bicycle" Copyright © 1969–76–80 by Jacques Carelman and A. D. A. G. P. Paris. From Jacques Carelman, *Catalog of Unfindable Objects,* Balland, éditeur, Paris-France. Used by permission of the artist.

4. Mental Models

Or this staircase against the mental model that we have of how stairs work



Ascending and Descending By M. C. Escher 1960

4. Mental Models

This digital wrist watch has too many button and functions, it is virtually impossible to form a clear mental model of how it works

4. Mental Models

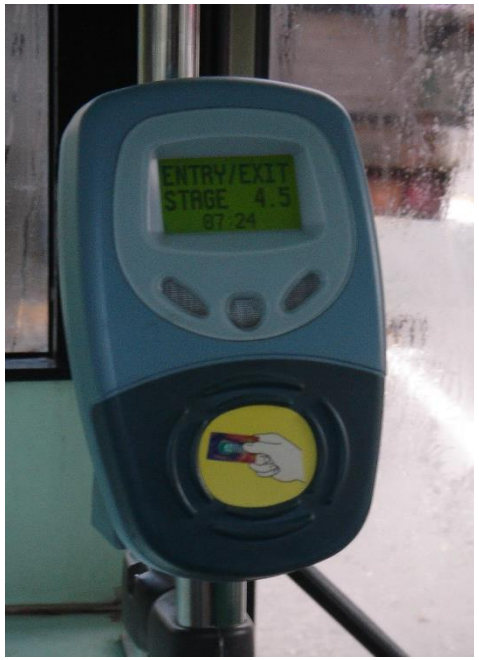
The two pictures are from the ez-link website

How is the user supposed to know? They have no prior experience

The problems with ez-link system are in large part due to poor mental models that users have

4. Mental Models

Iterative design improvements



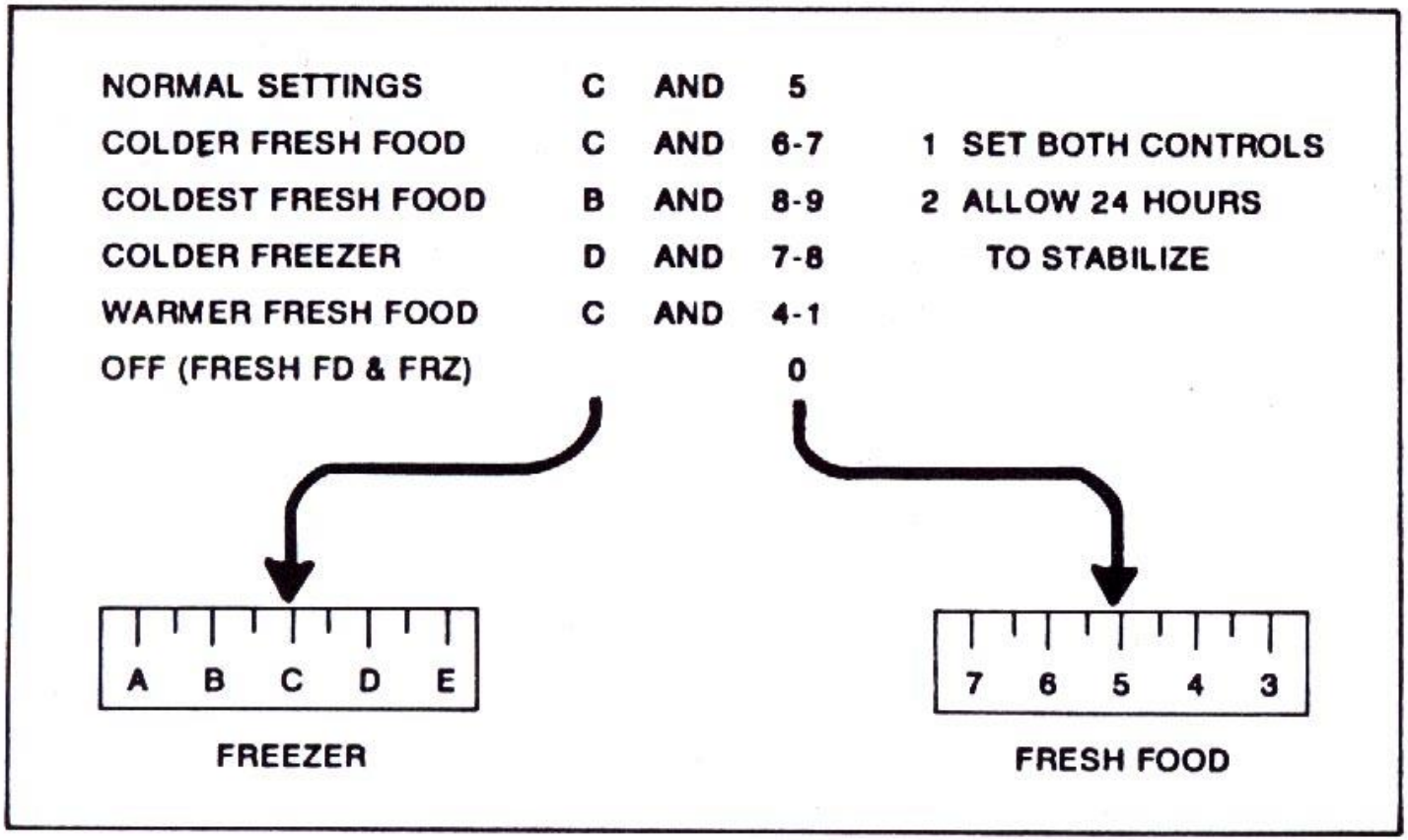
4. Mental Models

If your room is warm and you want the room to cool faster, you turn the thermostat down lower, don't you?

We do that because we all have this mental model of thermostats that's organized around "achievement" -- we believe if we just ask our AC to do a little more than we want, then the AC will get us to what we want, faster.

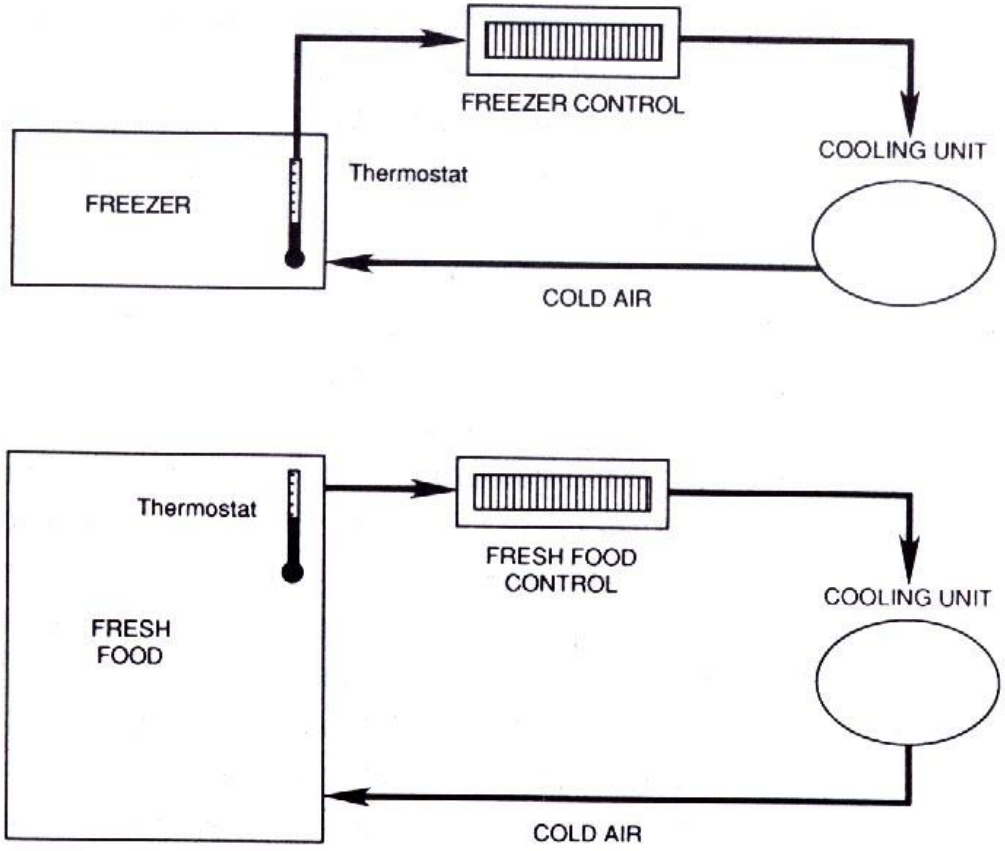
4. Mental Models

The instruction plate from the inside of an ordinary two compartment refrigerator



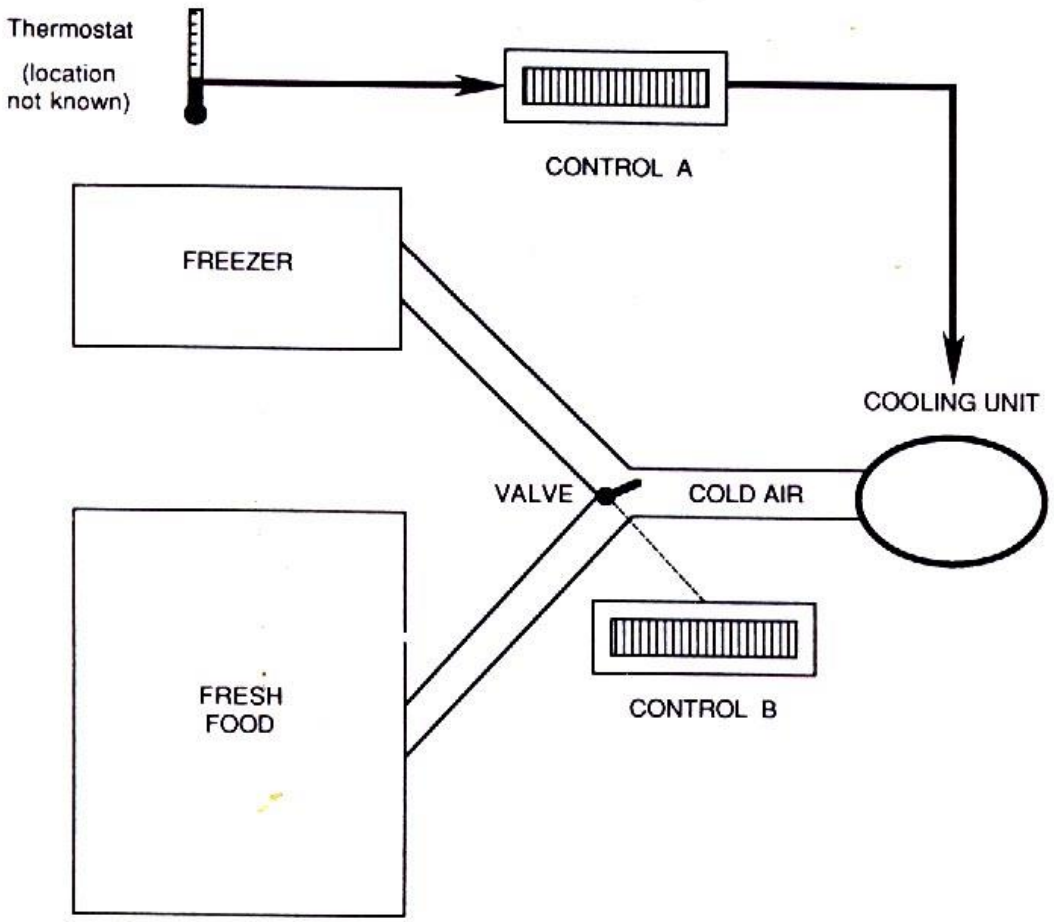
4. Mental Models

This is the user's mental model of the compartment temperature settings work



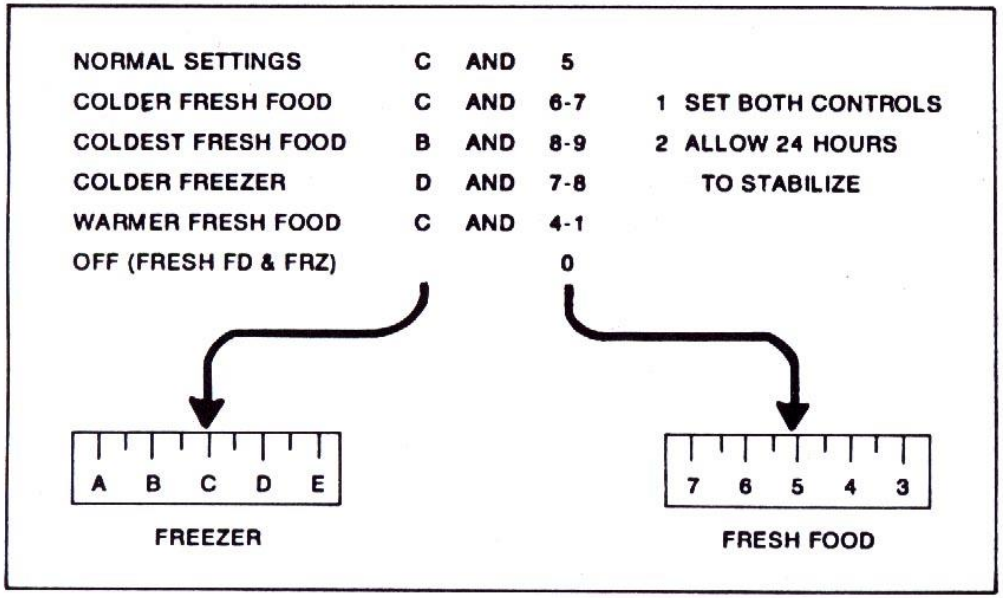
4. Mental Models

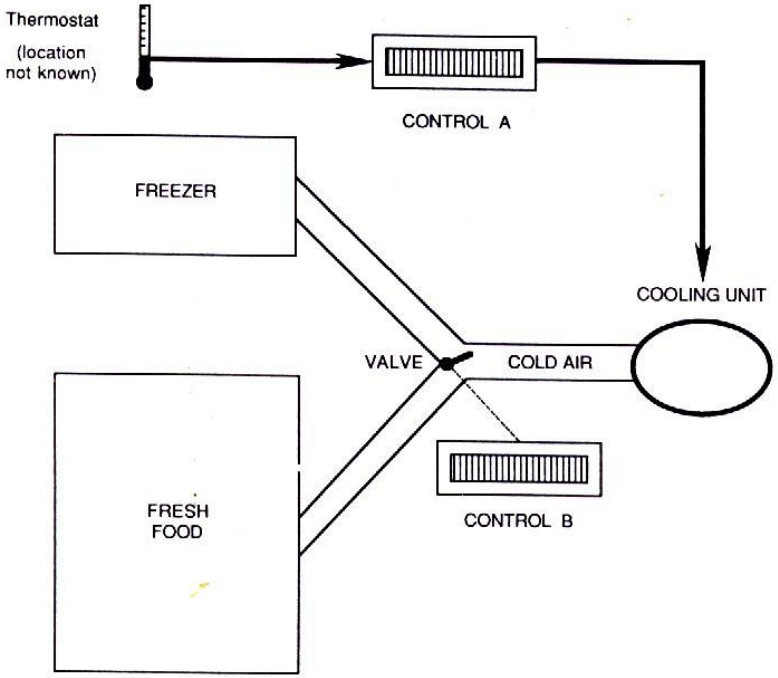
This is the conceptual model of how the compartment temperature settings actually work



4. Mental Models

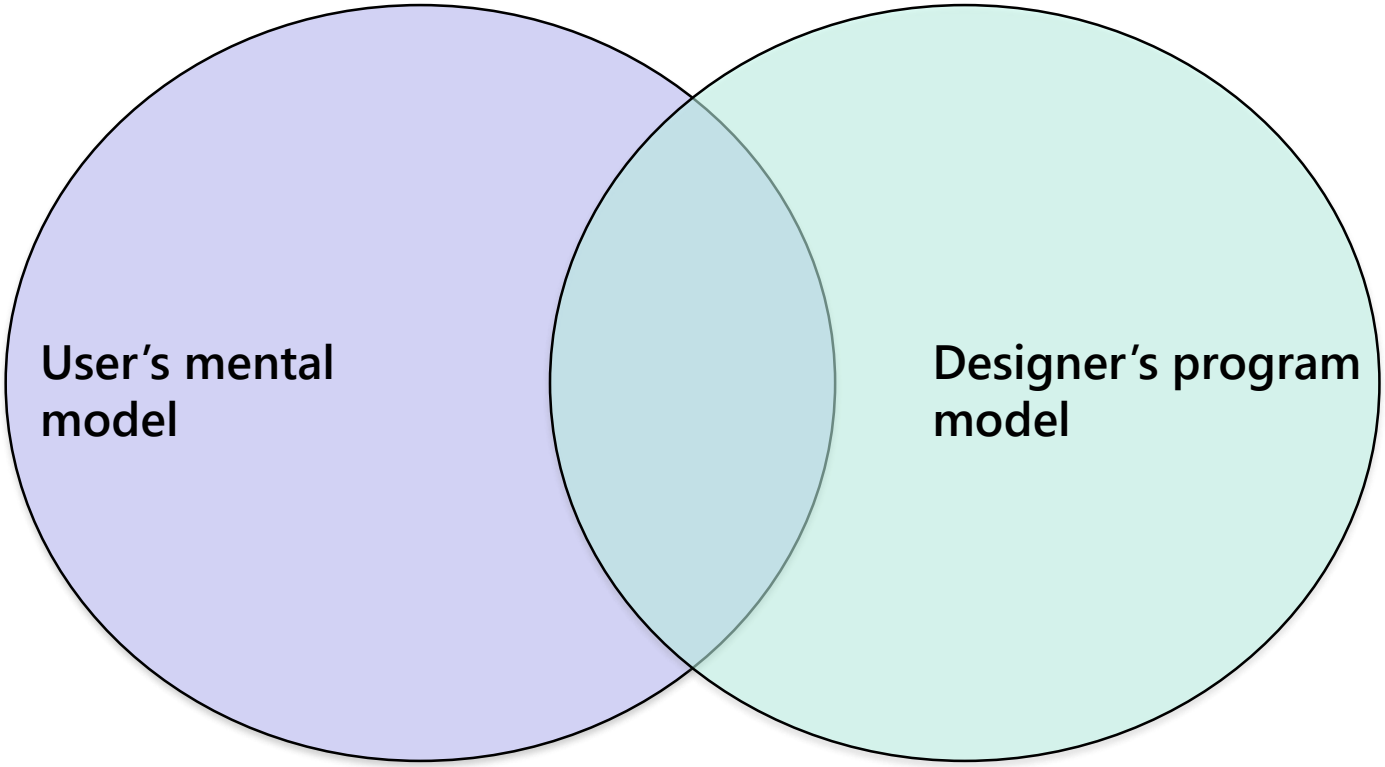
Task: With minimal changes, redesign the instruction panel of the refrigerator to reflect the correct conceptual model





4. Mental Models

Mental models versus the program/design models



4. Mental Models – what you are up against

A mental model is what the user believes about the system at hand (belief, may not be fact)

Individual users each have their own mental model (different users, different models)

Mental models are in a flux (users are bound to update models with experience)

Users suffer model inertia

Mental models are simple (if design model is nontrivial, it is probably not the user model)

4. Mental Models – some examples

The word "Google" is usually the top query at other search engines, and words like "Yahoo" and "Bing" score high on Google

Why do people search for a website if they already know its name? Why not just type, google.com into the URL field?

4. Mental Models – some examples

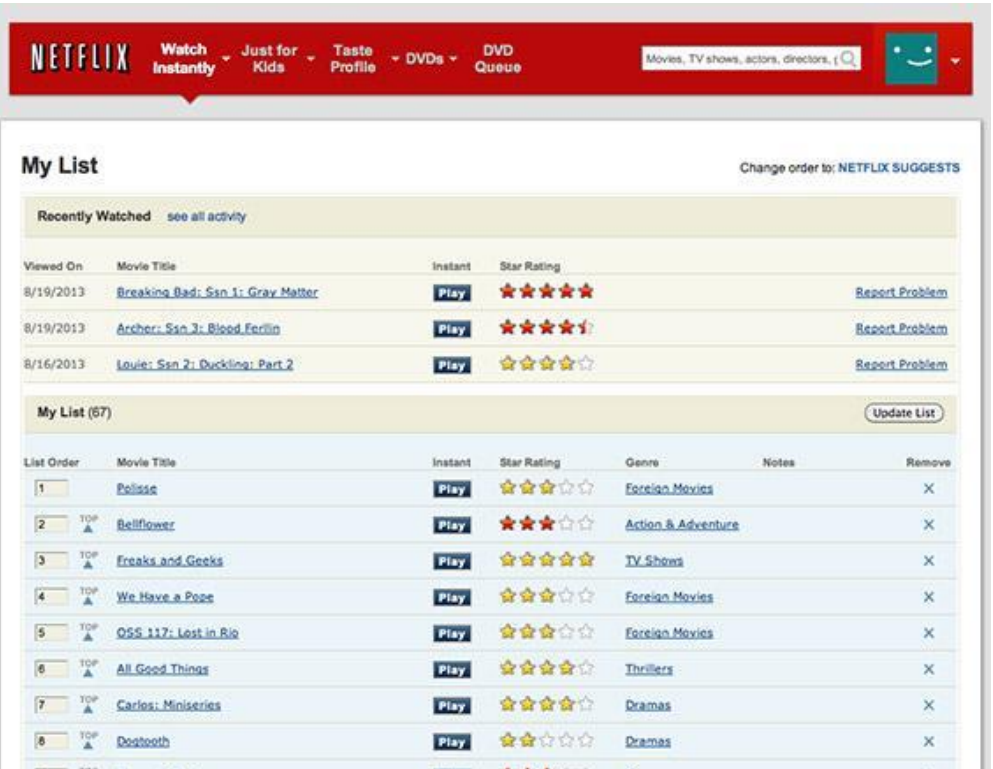
Users don't just confuse search fields; many less tech-savvy users don't understand the differences between many other common features:

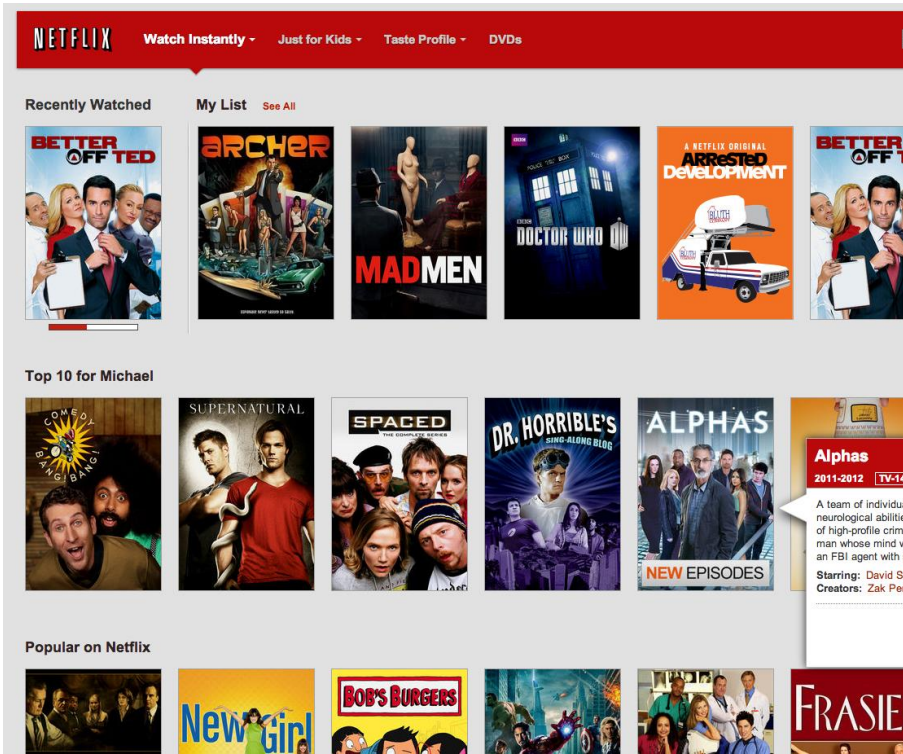
- Operating-system windows vs. browser windows
- A window vs. an application
- Icons vs. applications
- Collapsible/expandable views
- Single-clicks vs. double-clicks
- Local vs. remote info
- …

4. Mental Models – some examples

Netflix queue vs. shopping cart

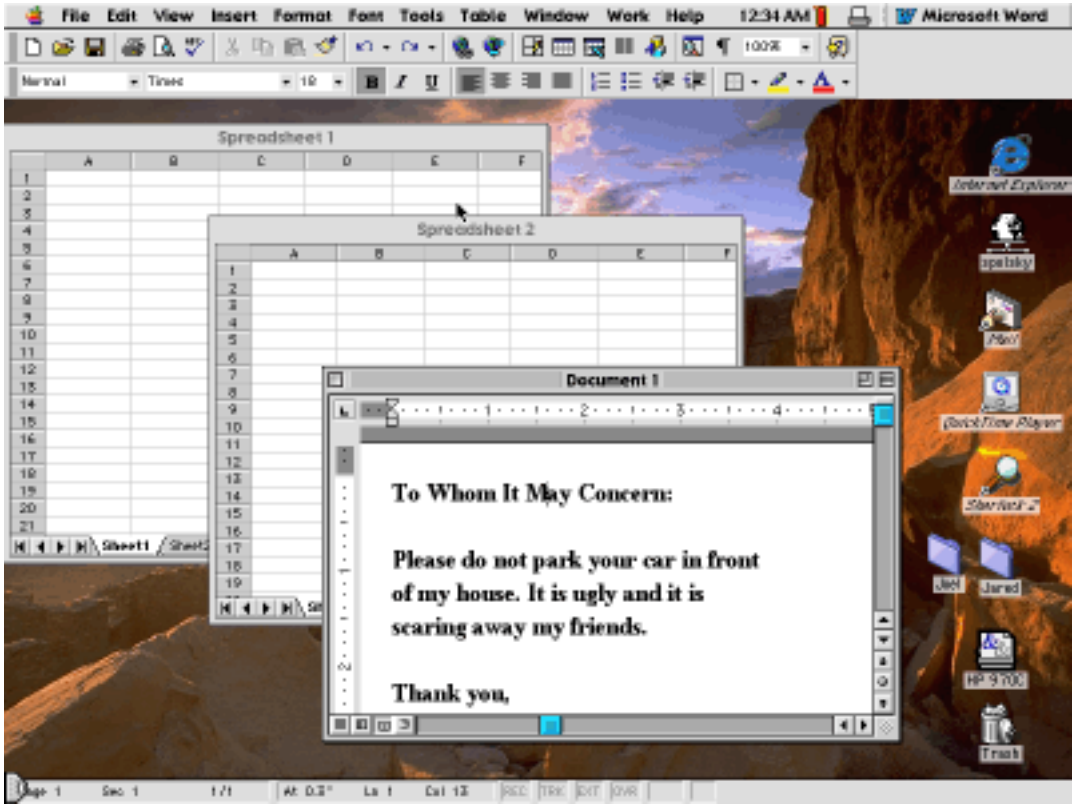
Picture embedding in a word processor vs. WYSWYG HTML editor





4. Mental Models – some examples

When people have to guess how a program is going to work, they tend to guess simple things, rather than complicated things



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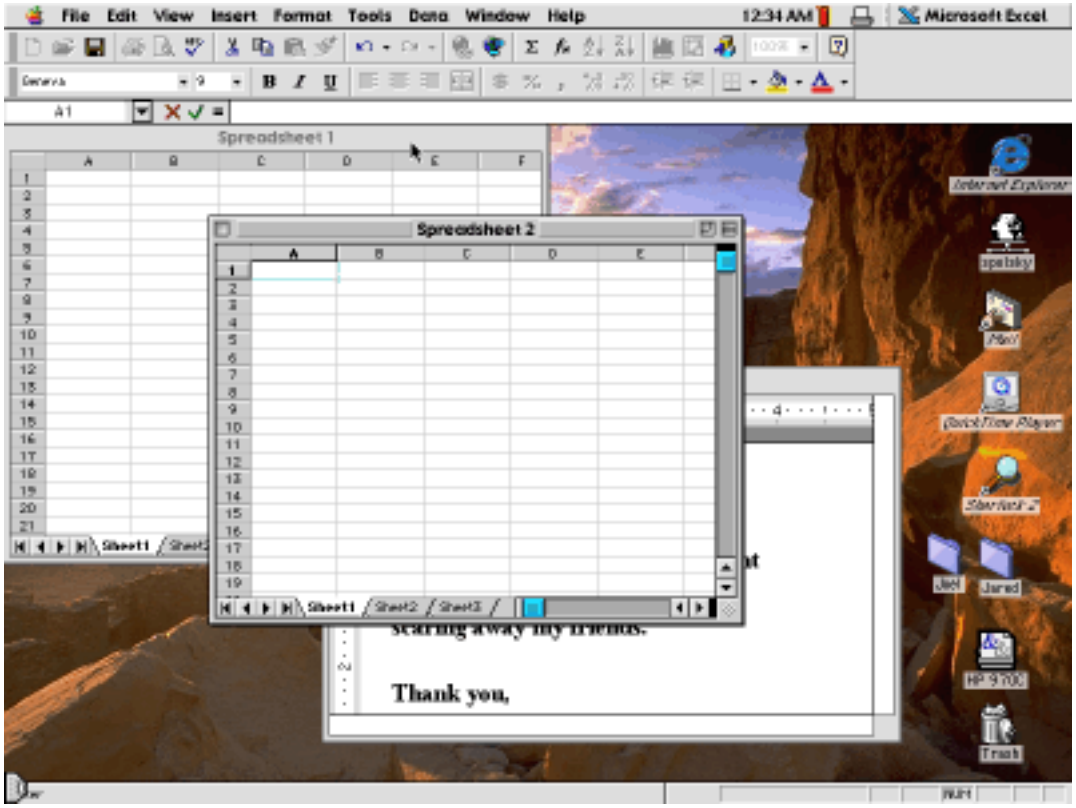

4. Mental Models – some examples

- In Microsoft Windows the Alt+Tab key combination switches to the "next" window
- Most users would probably assume that it simply rotates among all available windows
- If you have window A, B, and C, with A active, Alt+Tab should take you to B. Alt+Tab again would take you to C
- Actually, what happens is that the second Alt+Tab takes you back to A. The only way to get to C is to hold down Alt and press Tab twice
- It's a nice way to toggle between two applications, but almost nobody figures it out, because it's a slightly more complicated model than the rotate-among-available-windows model

4. Mental Models – so what do we do?

In case of a mental model mismatch, you basically have two options:

- Make the system conform to users' mental models
- Improve users' mental models so that they more accurately reflect the system

Assignment 3

Draw conceptual models of the following videos:

- How to Set the Alarm on Samsung GALAXY Tab (https://www.youtube.com/watch?v=s94JxnVwJtI)
- How to Change Windows 8 Start Screen Background Wallpaper Image – Easily (https://www.youtube.com/watch?v=gedIiuKzgY4)

Submit your models in two A4 sheets, either drawn neatly by hand or drawn using a software tool and printed out. The drawings should be comprehensively labelled and annotated so as to be self-explanatory.

Due: 30 Jan 2015