

**ECSE 424/681**

**Human-Computer Interaction (HCI)**

**[www.cim.mcgill.ca/~jer/courses/hci](http://www.cim.mcgill.ca/~jer/courses/hci)**

# Exercise

- pretend it's 1970: draw a computer
- back to 2014: draw a computer

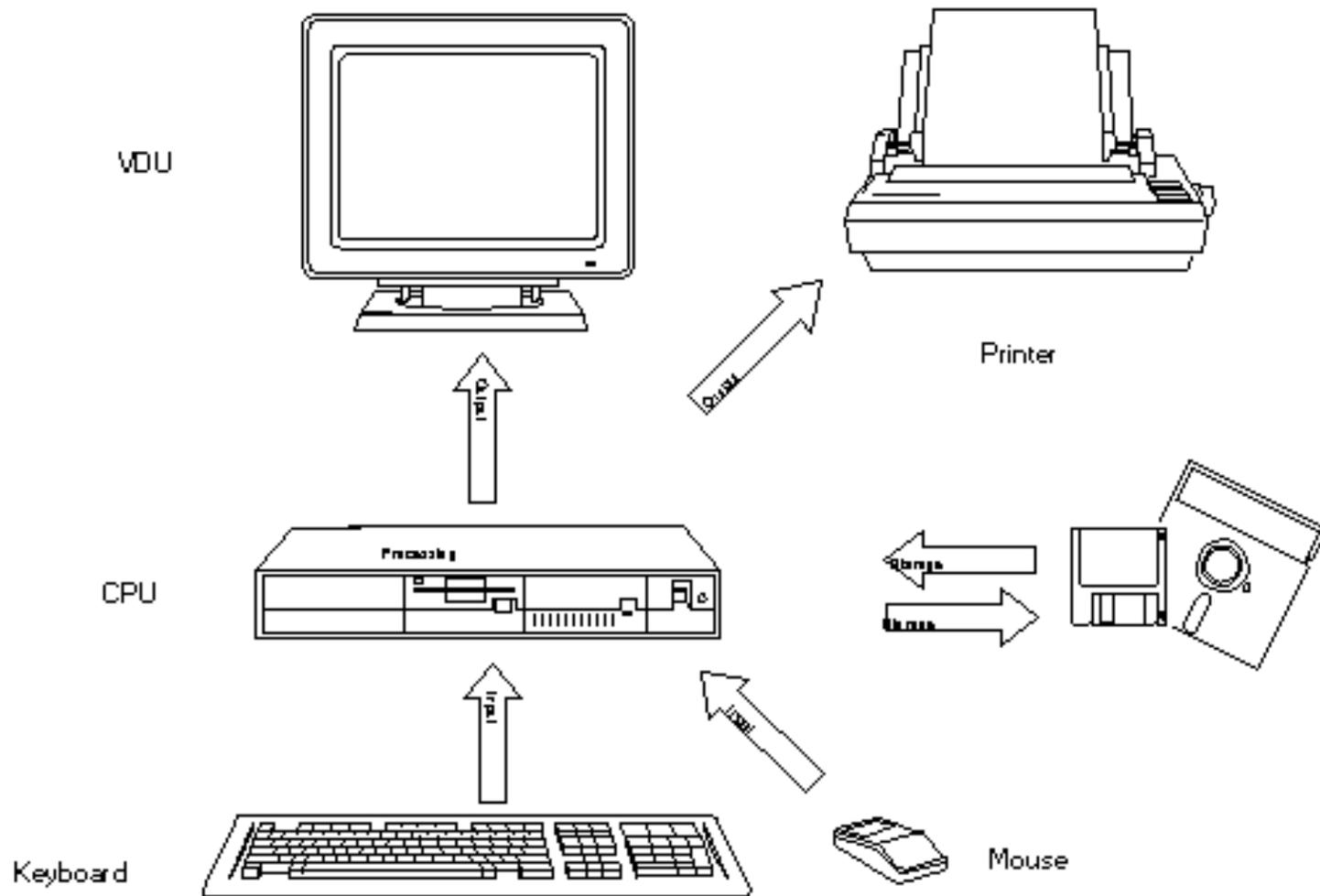
# 1970s era



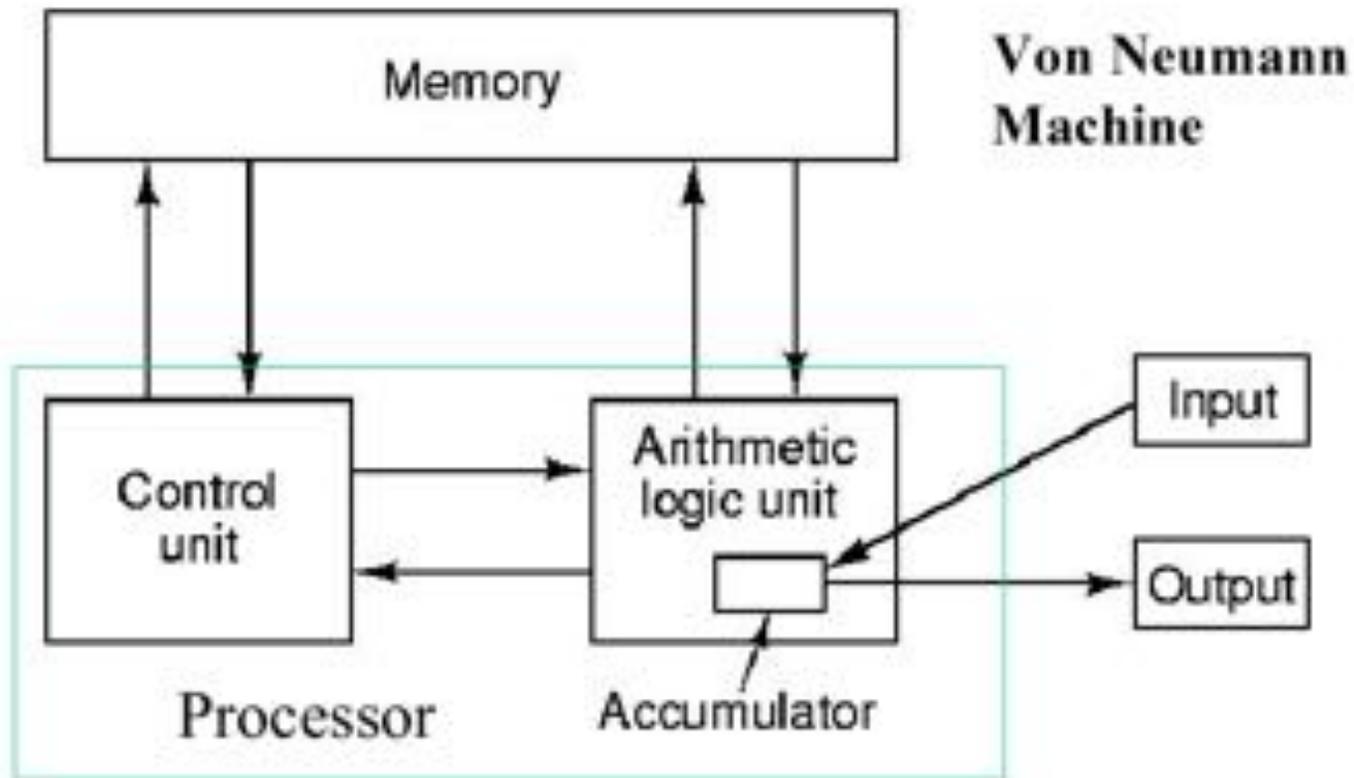
# Today



# Which part is the computer?



# How many people drew this?



# Our view of the computer is inherently tied to the interface



# Agenda

- Administrivia
- What is this course all about?
- Is it right for me?
- Intro to Don Norman's POET
- A few exercises

# Course Web Site

- [www.cim.mcgill.ca/~jer/courses/hci](http://www.cim.mcgill.ca/~jer/courses/hci)
  - evaluation
  - readings (you must be logged on to a McGill computer system in order to download the readings from the ACM web site)
  - term project info and (some) exercises
  - other course resources

# Office Hours

- Thursday 10-11:30 in MC 424
- Text-based electronic communication is a poor substitute for face-to-face or video-mediated communication -- if you have course-related questions, please attend office hours
- however, on-line discussion encouraged ...

# On-line Class Communication

- discussions previously on myCourses
- but this is a class on **good** human-computer interfaces... enough said
- instead, we're using Piazza, which supports:
  - group discussions (bulletin board)
  - collaborative (Wiki-style) Q&A
  - private communications (please use this, not email, to reach me)
  - unlike some other tools, appears to be usable by human beings

# Term Project Themes: Previous Years

- **pre-2011:** physically distributed, multimodal, context-aware systems
- **2011: making life easy:** technologies for education, healthcare, transportation, communication, work, etc. that serve people first
- **2013: technologies for the visually impaired:** interactive systems to assist the blind and visually impaired community
- **2014 winter: games for rehab:** facilitate physical, speech, or memory rehabilitation

# Term Project Themes: Fall 2014

- **up to you!**
- this semester, you're invited to propose your own topic
- only requirements:
  - focus of effort is on HCI (more on this later)
  - instructor approves of project and scope

# How will this work?

- brainstorm of problem category and type of solution(s)
- guided observation of target user population
- refine project idea to best serve users' needs
- obtain instructor approval
- validate idea
- submit project proposal

# Why not to take this course

- you don't get an A for memorizing or being a great mathematician
  - Fitts' Law for movement tasks:  $ID = \log_2 (2A/W)$
- it's going to be challenging and a lot of work
- sample comment from a previous course evaluation:

*"I do know that I have worked harder in this course than in some 5 credit courses I have taken and probably will not do as well..."*

# Why take this course?

- it's going to be challenging
- you'll learn valuable skills
- you'll get a chance to be creative and exercise your design skills
- continuing the previous course evaluation comment:

*“.. This is more than made up by the interesting content of the course and overall quality of the lectures.”*

# What is HCI? A simple definition:

*"... about designing computer systems that support people so that they can carry out their activities productively and safely."*

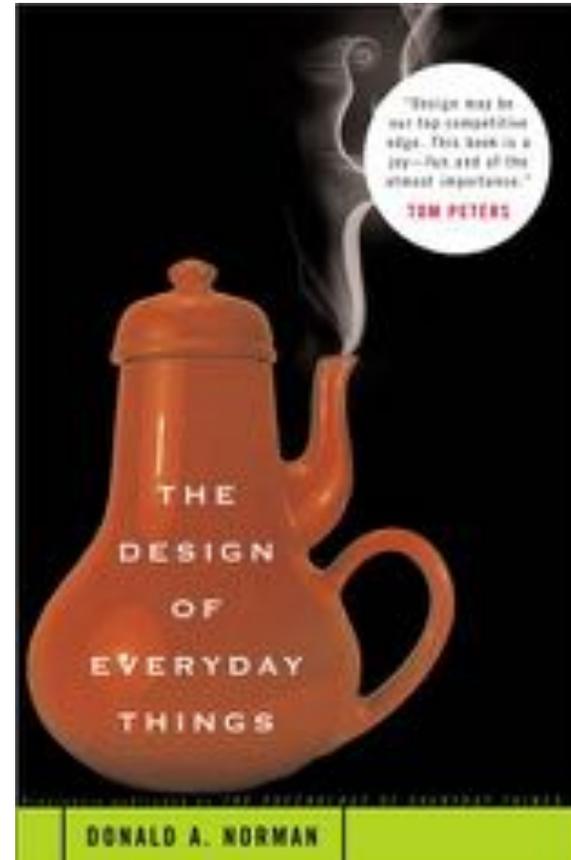
## **An even simpler definition**

*"...the study of people, computer technology and the ways these influence each other."*

# The Psychopathology of Everyday Things



Don Norman  
guru of “good design”  
(now has a course on Udacity)



## Here's a thought

*“In the everyday world, we interact with tens of thousands of objects, yet generally manage to use them properly the first time they are encountered.”*

# Making sense of everyday objects

- subtle clues
  - in public buildings do doors swing in or out?
  - we learn that about doors by experience
  - if there is no handle then we 'know' to push



# Affordances

*“actionable properties  
between the world  
and an actor”*

J.J. Gibson, 1977, 1979

*“the [perceived or]  
actual properties of  
an object that  
determine how it  
could be used”*

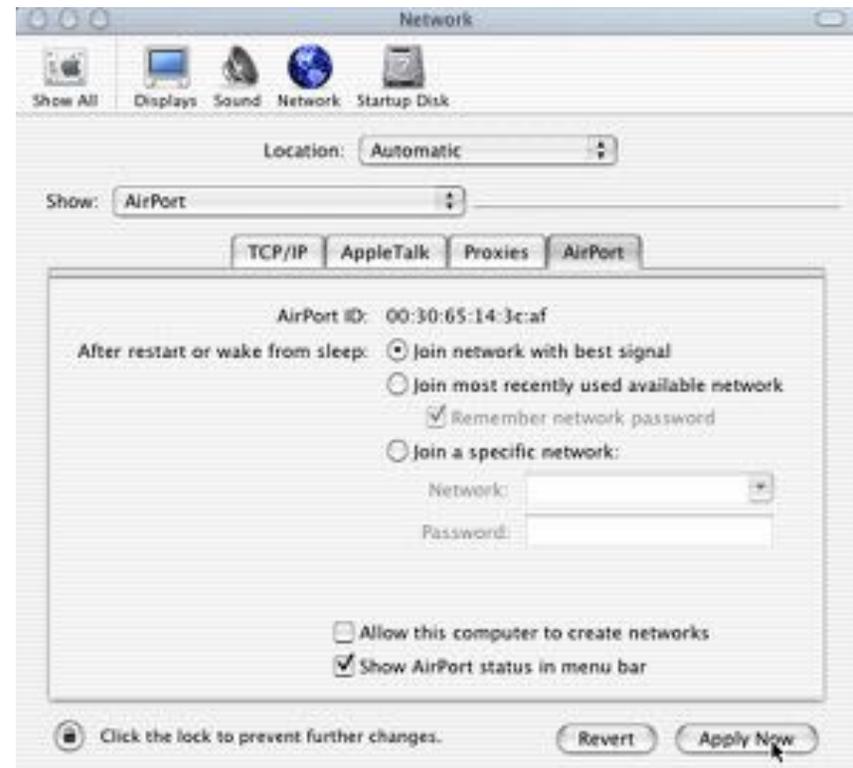
Don Norman, 1988



# Actual vs. Perceived Affordances

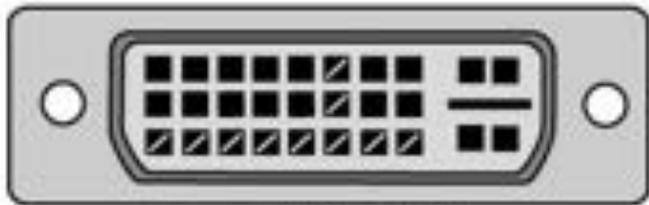


- with opposing male and female surfaces and featureless sides, Lego naturally afford plugging into one another



- clicking while the mouse cursor is on an image on the screen does something particular

# Constraints



Dual Link DVI-I



Dual Link DVI-D

© 2008 HowStuffWorks

Missing pins at right of female DVI-D connector prevents insertion of male DVI-I cable



3.5" diskette

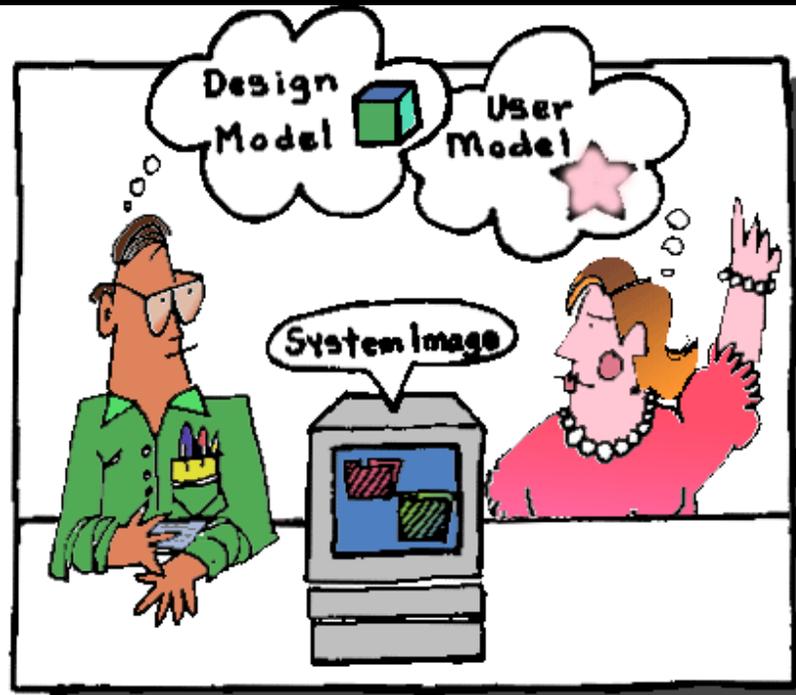


USB

These can only be inserted one way, although it's not necessarily the most clearly visible.

# Conceptual Models

The difficulty for the designer is to find a way to make the **design model** obvious to the user via the system delivered to the user.

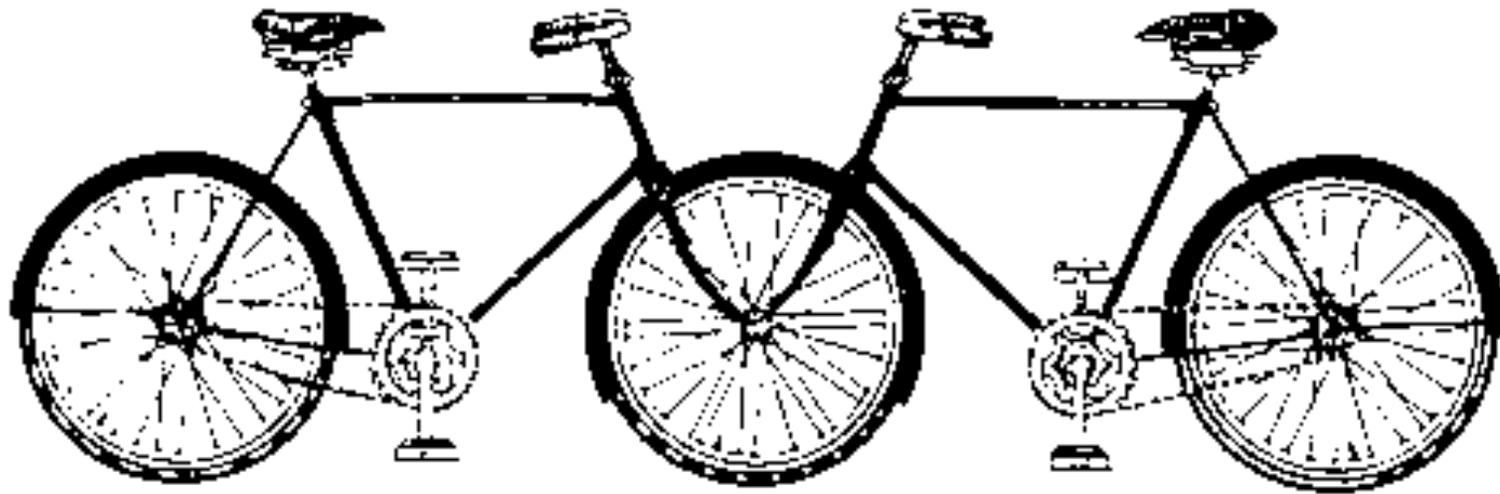


Norman Conceptual Model,  
Illustrated by Laurie Vertelney

If the system image does not make the **design model** clear and consistent, the user will end up with the wrong **mental model**.

# Using the Conceptual Model

- our understanding of how things work
- allow us to make predictions about behaviour



Our mental models of how bicycles operate can “simulate” this to know it won’t work

# Bad Example

From the user's perspective, the conceptual model is arbitrary, and therefore must be taught



- affordances
  - four push buttons afford pushing
- constraints
  - any button (or combination?) can be pressed at any time
- relationships between controls and results
  - not clear what the buttons do
  - no obvious relation between them and end-result of actions

# Mappings

- relationships between controls and the things being controlled
- allow us to predict the effects of our actions
- “**natural mappings**” take advantage of physical analogies and cultural standards for immediate understanding



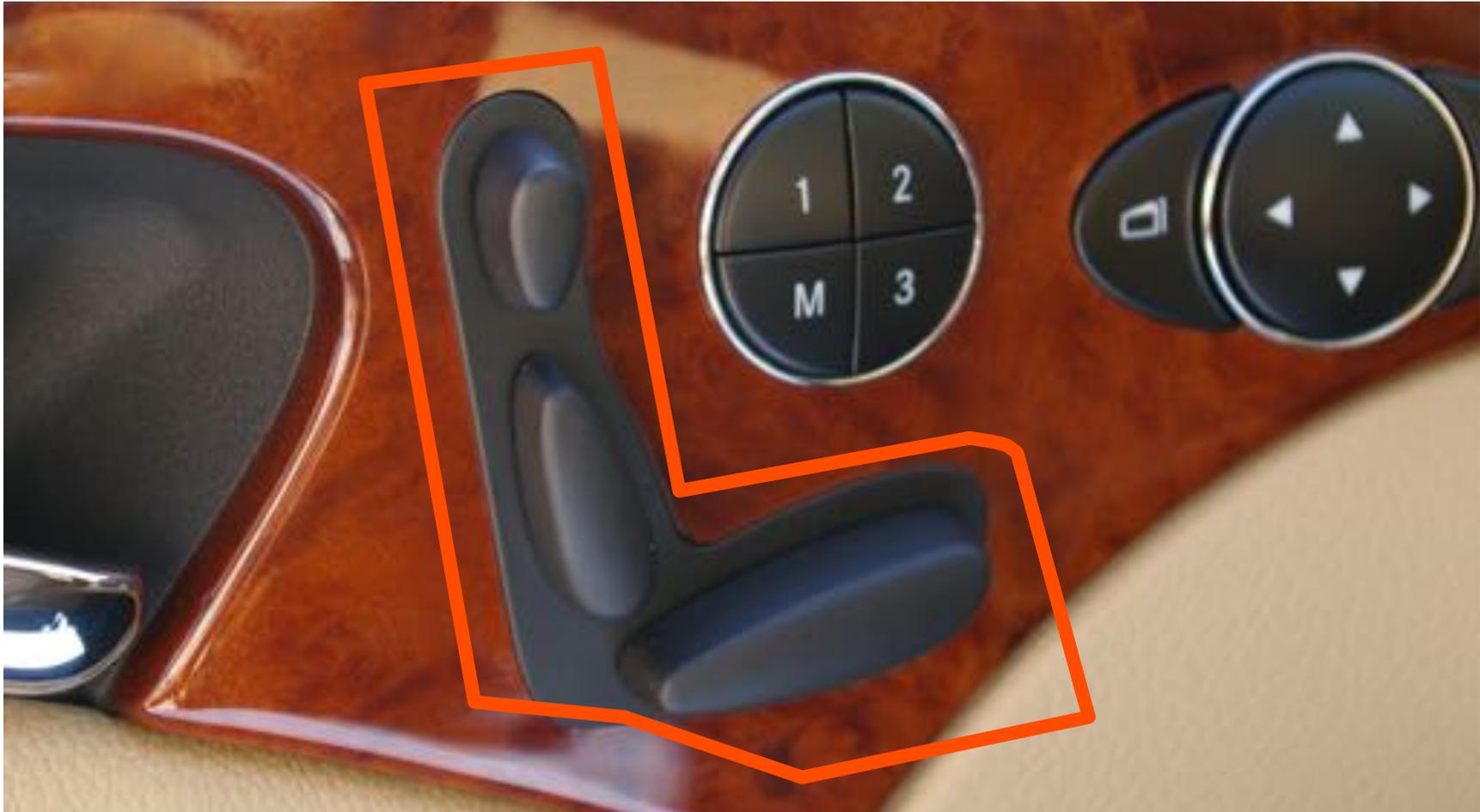
## Exercise (2 minutes)

- design a controller to adjust your car seat, allowing you to:
  - raise/lower the seat
  - tilt the seat forward/back
  - slide the seat forward/backward
  - raise/lower the headrest

## Exercise (3 minutes)

- exchange your design with the person sitting next to you
  - which one appears easier to use? why?
  - can you suggest any improvements?

# Mercedes sedan



# Another reason to take the course

- you get marks for ripping apart the flaws in other people's work

(provided you supply constructive criticism:  
i.e., “what should they have done?”)

# Video: Intelligent Home Critique



# Recap

- Office hours: Thursday 10-11:30 in MC 424
- Piazza for course communication
- Course website: [www.cim.mcgill.ca/~jer/courses/hci](http://www.cim.mcgill.ca/~jer/courses/hci)
- Introduced terminology from Norman's POET
- Considered some important issues of usable (and unusable) system design

# Homework

- This week:
  - Exercise 1: Yearbook page (due Sept. 7)
  - Exercise 2 Design Critique (due Sept. 9)
  - Readings and videos

# Next Class Agenda: Alan Kay



with Dynabook prototype

- “The best way to predict the future is to invent it.”
- Brought us the concept of laptop and tablet computers in 1968