Professional Skills in Computer Science
Lecture 4: Historical Aspects of Computing

Ullrich Hustadt

Department of Computer Science
School of Electrical Engineering, Electronics, and Computer Science
University of Liverpool

What have computers been used for? (Summary)

- 1600 – now: Calculation
  Manipulation of numbers
- 1960 – now: Information Processing
  Manipulation of numbers, text, images, audio, video
- 1960 – now: Cognition (Reasoning)
  Manipulation of knowledge via reasoning / inference
- 1970 – now: Supporting Interaction
  Allowing people to communicate, cooperate, compete

Hypotheses:

- The wave of innovation in the 60s and 70s is due to the increased availability of computing resources to more and more researchers
- Leadership is mostly due to early exposure to state-of-the-art systems and hard work

What have computers been used for?

What important milestones in the development and use of computers were not covered so far?

Personal computers

- 1981: IBM PC 5150
  Intel 8088 processor
  256 kB max main memory
  Microsoft DOS 1.0 OS
  5 1/4" Floppy disk
  (hard drive added in 1983)
  CGA graphics (16 colours)

Personal computers

- 1968: The Mother of All Demos: (Douglas Engelbart, SRI)
  NLS "oN-Line System"
  A 'networked' computer system with GUI, off-line mode, e-mail, collaborative word processing, hypertext, video conferencing and mouse is demonstrated

(The picture shows one of several terminals connected to a mainframe computer; during the demo a telephone line was used to establish the connection)

Videos of the demo are available at
`http://www.youtube.com/watch?v=JfIgzSoTMOs`
(Skip the first two videos)

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  Intel 8088 processor
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  Microsoft DOS 1.0 OS
  5 1/4" floppy disk
  (hard drive added in 1983)
  CGA graphics (16 colours)

- 1983: Apple Lisa
  First PC with a graphical user interface
- 1985: Microsoft Windows 1.0
- 1987: HyperCard
  Hypermedia / hypertext system for Apple computers
- 1988: HyperStudio
  HyperCard clone for MS Windows

The Future (1)

The future is already here
—
it's just not very evenly distributed.

(William F. Gibson;
"*The Science in Science Fiction*"
on Talk of the Nation, NPR,
30 November 1999, Timecode 11:55)

`http://video.google.com/videoplay?docid=4796674762025998102`

Thin clients

- 1978: DEC VT100
  Intel 8080 processor
  3 kb main memory
  Monochrome graphics

Like NLS, this is a terminal connected to a mainframe computer via serial lines

Cloud clients

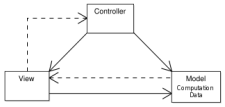
- 2011: Google Chromebook
  Intel Atom processor
  2GB main memory
  16GB SSD
  Web-based applications

(In effect the Chromebook is a 'terminal' connected to Google's servers via a wireless network)

The Future (2)

All the futures are already here
—
we just don't know which one is ours.

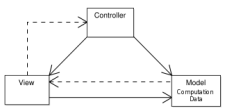
Fundamental questions



- The model manages the behaviour and data
- The view renders the model into a form suitable for interaction
- The controller receives user input and translates it into instructions for the model

1. Where are view, controller, and model located?

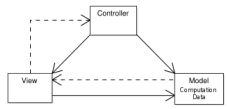
Fundamental questions



- The model manages the behaviour and data
- The view renders the model into a form suitable for interaction
- The controller receives user input and translates it into instructions for the model

2. Where should the view be rendered and
   the behaviour of the model be computed?
   - Close to the user,
     on a single computer exclusively used by the user
   - Away from the user,
     on a central server (farm) shared by a multitude of users
   - Distributed,
     on several computers owned by a large group of users

Fundamental questions



- The model manages the behaviour and data
- The view renders the model into a form suitable for interaction
- The controller receives user input and translates it into instructions for the model

1. Where should the data for the model be held?
   - Close to the user,
     on a single computer exclusively used by the user
   - Away from the user,
     on a central server (farm) shared by a multitude of users
   - Distributed,
     on several computers owned by a large group of users

Fundamental questions

- The answers to these questions will depend on
  - the domain in which the question is posed
  - available technology
  - available resources
- The answers to these questions change over time
- We may go back and forth between the various answers
- The reason for that is not purely technological
  - economic factors
  - legal factors