History of Computing

Lecture 16 – COMPSCI111/111G S2 2016

Admin

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  303S-567, open door policy
- **Week 7** (12th September – 16th September)
  Lab 5: Web Design - HTML5
  Lecture 16: History of Computing → **Reuel**
  Lecture 17: Digital Game Design → **Damir**
  Lecture 18: Digital Game Design

  Week 8 (19nd September – 23rd September)
  Lab 6: Web Design - Cascading Style Sheets (CSS)
  Lecture 19: Vector graphics and digital images → **Damir**
  Lecture 20: Databases → **Reuel**
  Lecture 21: Databases

Today's lecture

- The history of computing, focusing on the personal computer (PC)
  - The first computers
  - Computers in WWII
  - 1950s - 1980s: from the room to the desk
  - 1980s – 2000s: the computer becomes personal
  - Future of the PC

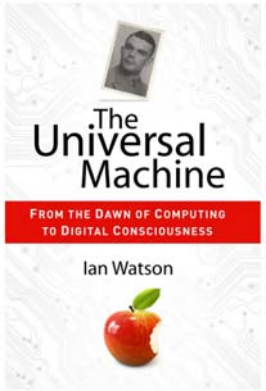
Why bother?!

- Knowing the history of computing gives us:
  - A better understanding of how computers work
  - An appreciation how quickly computing technology has developed
  - Insights into the future of computing

Computer Science timeline

Helpful resources

- "The Universal Machine" by Assoc Prof Ian Watson

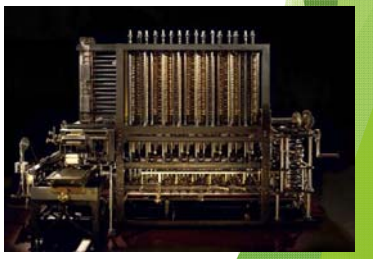


Helpful resources

- Computer Science Department's Computing History displays
- Website explaining the displays: https://www.cs.auckland.ac.nz/historydisplays/

The first computers

- People were the first computers, performing calculations by hand to produce tables of mathematical results (eg. ordinance tables)
- In 1832, Charles Babbage designed the Analytical Engine; a mechanical device that performed basic arithmetic
  - Basic operations could be combined to perform complex calculations
  - Key advantages: speed and accuracy
  - Cost, construction challenges and the Engine's size meant it was never built



The first computers

- It took clerks 7 years to manually compile the results of the 1880 US census
- The **Electric Tabulating System** designed by Herman Hollerith compiled the 1890 Census results in 2½ years rather than a decade!
- Over the 1800's and early 1900's, computing machines were designed and refined
- In 1914, Computing-Tabulating-Recording Company (CTR) was renamed **International Business Machines Corporation (IBM)**

Computers in WWII

- IBM and Harvard built the Harvard Mark 1 to calculate artillery tables for the US military
- In Bletchley Park, computers were used to break encrypted German radio messages
  - Alan Turing developed the **Bombe** in 1939 to decode Engima messages
  - Tommy Flowers developed **Colossus** to decode Lorenz messages

Rotating drums on the Bombe

Using a reconstruction of Colossus

The 1950's

- Mainframes such as the UNIVAC and the IBM 701 were the only computers available
- Mainframes were very expensive, took up a lot of room and were difficult to operate

IBM 701 operator's console

The 1960's

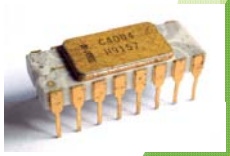
- Invention of the transistor, which replaced vacuum tubes, made computers smaller, faster and more reliable
- IBM became the dominant computer manufacturer, producing successful computers like the IBM 7090

The 1970's

- Palo-Alto Research Centre (PARC)
  - Opened by Xerox in 1969
  - Created things used by modern computers; eg. mouse, GUI, laser printer

- Terminals and time-sharing systems
  - Users worked on a terminal connected to a main computer
  - Each user's processing was completed in a short slice of time on the main computer. To the user, it seemed like they had full use of the main computer

- First microprocessor – the Intel 4004
  - Intel founded in 1968 by Gordon Moore and Robert Noyce
  - Intel 4004 released in 1971, followed by the Intel 8080 in 1974



The 1970's

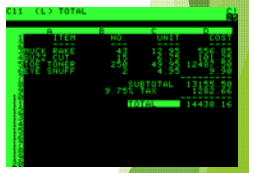
- MITS releases the Altair in 1975
  - Founded by Ed Roberts, MITS originally produced calculators
  - The Altair was a kitset computer that buyers had to assemble
  - Initially, users had to toggle the front switches to load programs into the Altair's memory

- Microsoft founded in 1975
  - Bill Gates and Paul Allen developed a BASIC interpreter for the Altair

The 1970's

- Apple founded in 1976
  - Steve Jobs and Steve Wozniak initially sold the Apple I kitset
  - Apple II was the first successful personal computer
    - First sold in 1977
    - Features: colour graphics, slots for third-party cards

- VisiCalc released in 1979
  - Developed by Dan Bricklin and Bob Frankston of VisiCorp
  - First spreadsheet program
  - VisiCalc was initially released on the Apple II. It became the computer's **killer app**, making the Apple II very popular
  - VisiCalc was killed by Lotus 1-2-3



The 1980's

- Microsoft purchased QDOS in 1981 from Seattle Computer Products
  - "one of the shrewdest business deals of the century…" – *The Universal Machine*
- QDOS was renamed MS-DOS and licensed to IBM
  - PC-DOS was the operating system for the IBM PC, released in 1981
- Other manufacturers reverse-engineered the IBM PC's proprietary BIOS and produced 'IBM clones'
  - Crucially, Microsoft was able to license MS-DOS to other manufacturers, meaning they could compete with IBM
  - This eroded IBM's market dominance and made Microsoft very profitable

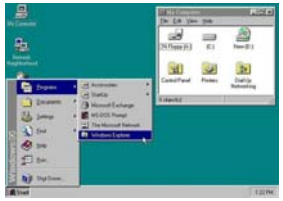
The 1980's

- In 1984, Apple released the Macintosh; the PC with a GUI (based on the Alto)

- "For the first time a person could buy a computer, take it home, take it out of the box, turn it on and use it without having to learn and type complex and arcane commands." -*The Universal Machine*

1990's

- Microsoft releases Microsoft Office (1990) and Windows 95, followed by Windows 98



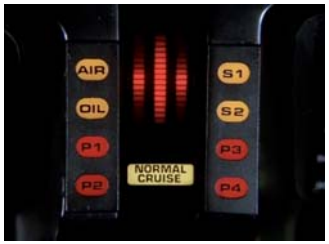
- Apple releases the iMac in 1998

The 2000's

- Greater interest in laptops as they become more powerful and portable (lighter and better battery life)
- Growing popularity of different ways of interacting with computers; gestures, voice, touchscreens
- Apple releases the iPhone in 2007 and the iPad in 2010, creating new categories of personal computing devices
- Increasingly availability of fast Internet connectivity opens new uses for our PCs

The future of the PC

- The end of the desktop PC with the rise of:
  - Mobile computing
  - Cloud computing
- Computers get even more personal – wearable tech, embedded tech
- Computers that are artificially intelligent?



Summary

- The first computers were people, followed by very large electromechanical devices
- Key technologies such as transistors and microprocessors helped to reduce size and cost
- Software, such as MS-DOS and VisiCalc, were important to the success of early personal computers
- Over time, computing technology has become smaller, cheaper, more user-friendly, more powerful