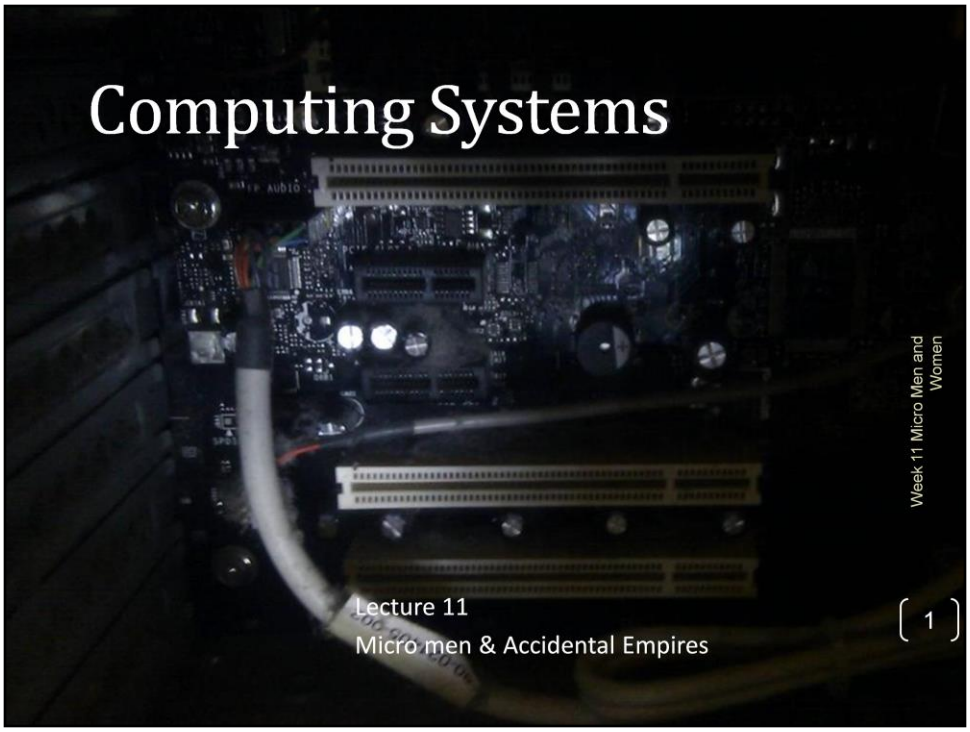

Computing Systems
Lecture 11
Micro men & Accidental Empires
Week 11 Micro Men and Women
1

The People Behind The Innovations

- The machines and the software only tell a small part of the story
- The stories of the people behind the computing revolution are also well worth learning...
  - From **Accidental Empires** to **The Social Network**

Charles Babbage

- *Designed* early **mechanical** computers
  - ***Difference Engine 1 & 2***
  - ***Analytical Engine***
- Limited uptake of ***Difference Engine 1*** in his lifetime
  - But his ***ideas influenced*** other ***computing pioneers***
- *"On two occasions I have been asked, "Pray, Mr. Babbage, if you put into the machine wrong figures, will the right answers come out?"*

Week 11 Micro Men and Women

3

Also an eccentric figure – see http://en.wikipedia.org/wiki/Charles_babbage

The quote relates to a very well understood modern saying – Garbage In: Garbage Out. Without sensible input (data and program) a computer cannot generate sensible output

- Title link to video on Babbage

Ada Augusta, Countess of Lovelace

- AKA Ada Lovelace
  - Mathematically educated daughter of the poet Byron
- Corresponded with ***Babbage*** and in particular Babbage's work on the ***Analytical Engine*****.**
- Wrote notes and a ***program*** for the (unbuilt) ***Analytical Engine***
  - Is often considered the ***first computer programmer***
- The ***programming language Ada*** is named after her
- Died from cancer treatment aged 36

What was the first commercial use of an electronic digital computer?

- Payroll calculations for a chain of tea-rooms?
- Pharmaceutical company record keeping?
- Geological modelling for oil surveying?
- Long term financial forecasting for banks?
- Tracking parts for a car manufacturer?

Alan Turing

- Alan Turing was an English mathematician, ***wartime code-breaker*** and pioneer of computer science.
- Turing was involved with the *construction* of both the ***Colossus***, the *electronic computer* built at *Bletchley Park* during WW2, and, later, the ***Automatic Computing Engine***.
- Here he played a vital role in *deciphering* the messages encrypted by the German ***Enigma machine***

Konrad Zuse – 1910 - 1995

- Konrad Zuse earned the **s**emiofficial title of "***inventor* of the *modern computer***" for his series of ***automatic calculators***, which he invented to help him with his lengthy engineering calculations.
- He developed the earliest examples of ***Turing-Complete computers*.**
- Konrad Zuse wanted to overcome the difficulty in doing large calculations.
- He realized that an automatic-calculator device would require three basic elements: a **control**, a ***memory***, and a ***calculator*** for the **arithmetic**.
- Inventor of the ***Z1 Mechanical Computer*** - an ***electric*** driven ***mechanical calculator*** with ***limited programmability***.

John von Neumann

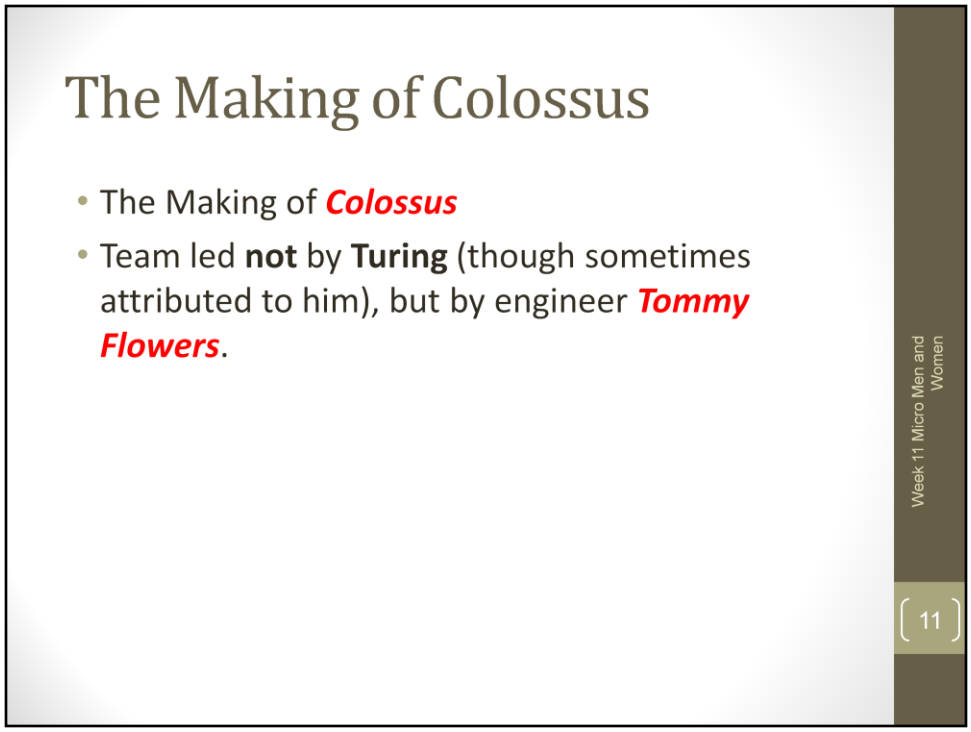
- While consulting for the Moore School of Electrical Engineering at the University of Pennsylvania on the EDVAC project, von Neumann **wrote** an incomplete First Draft of a **Report** on the ***EDVAC***.
- He worked with **Mauchly** and **Eckert** on the ***design*** of the ***EDVAC***.
- The paper, described a ***computer architecture*** in which the ***data*** and the ***program*** are both stored in the **computer's *memory*** in the **same address space**.
- Thus the ***machine*** itself can ***alter*** either its ***program*** or its ***internal data***.

Grace Hopper (1906 – 1992)

- A pioneer in the field, she was one of the ***first programmers*** of the **Harvard Mark I** computer, and invented the ***first compiler*** for a computer **programming language**.
- She popularized the idea of **machine-independent programming languages**, which led to the development of ***COBOL***, one of the first modern programming languages.
- She is credited with popularizing the term "***debugging***" for fixing **computer *glitches*** (inspired by an actual moth removed from the computer).

Douglas Engelbart (1925 – 2013)

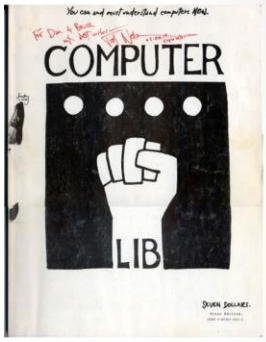
- **Douglas Engelbart** had invented a number of ***interactive***, ***user-friendly*** information ***access systems*** that we take for granted today: the ***computer mouse***, ***windows***, ***shared-screen teleconferencing***, ***hypermedia***, ***GroupWare***, and more.
- At the **Fall Joint Computer Conference** in San Francisco in 1968, Engelbart demonstrated the aforementioned systems---using an utterly primitive ***192 kilobyte mainframe*** computer located 25 miles away!
- Engelbart most memorable patent is perhaps for his "***X-Y Position Indicator for a Display System***": the prototype of the computer "***mouse***" whose convenience has revolutionized personal computing.



Another ten minute video

Ted Nelson

- Influenced by **Engelbart**, further developed idea of **hyperlinks**
  - Coined terms "***hypertext***" and "***hypermedia***"
- Influential manifestos on personal computing mixing politics, philosophy and technology
  - Driven by wanting to make computers accessible to ordinary people
- **Ideas** more **influential** than his **technical** work



Homepage at: http://ted.hyperland.com/

His autobiography, Possiplex, is available online and he has also written a history of computing – Geeks bearing Gifts

Xerox PARC & Alan Kay

- **Xerox PARC** was a research group
  - **Alan Kay** a notable figure at the group
- Alan Kay and colleagues introduced term '***Object Oriented Programming***' with Smalltalk – and also developed ***windows-based graphical user interfaces***, **laser printers**, and **networked workstations**
- **Kay** conceived '**Dynabook**', a precursor of modern laptops & tablets

"The best way to predict the future is to invent it" – Alan Kay

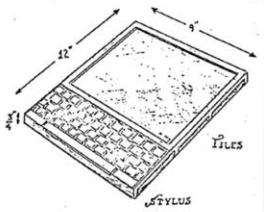
Week 11 Micro Men and Women

13

Xerox PARC was hugely influential in the design of modern computers – but not so successful at commercialising the work. Apple paid Xerox for access to the lab, and it was on visits to the Xerox PARC that Apple discovered computer mice and windowing operating systems – which Apple then used in their Lisa and Mac computers. By this time, the patent on the computer mouse had almost expired, being almost 20 years old by then...

Dynabook

- Conceived in **1968**
- **Pad** sized, **portable computer** (with **pen** input) for children to allow them to create their own programs
  - Only a **cardboard model** was **made**!
- **Conceptual precursor** of the **iPad** and **modern ultra-light laptops**



Alan Kay's Dynabook

Sir Tim Berners-Lee(1955)

- **Inventor of the *World-Wide* Web**
  - Developed as a means to make it easier to **share** *information* across **different systems** connected **via** the **internet**
  - Developed in **1990**, the first **http client server**.

"The web is more a social creation than a technical one. I designed it for a social effect — to help people work together — and not as a technical toy. The ultimate goal of the Web is to support and improve our web like existence in the world"

Steve Jobs & Bill Gates

- Co-founders of ***Apple*** and ***Microsoft***
  - Two of the largest, most successful, companies on the planet
- Success built on turning hardware & software developments into commercial successes
  - Microsoft through selling ***compilers***, ***operating systems*** and ***software***
  - Apple through selling computers (and controlling the ***operating system*** for their own computers)

Clive Sinclair & Chris Curry

- British ***home computing pioneers***
  - **Sinclair** & **Acorn**: Sinclair **Spectrum** & **BBC Micro**
  - Created the first computers that went into many British homes (**Spectrum**) and schools (**BBC**)
- **Sinclair** pioneered very **low cost computing**
- **Acorn** also a pioneer in **local area networking**

Marc Zuckerberg

- **Founder** and original **developer** of ***Facebook***
- Subject of the film "**The Social Network**"
- Several ***lawsuits*** have been fought over **Facebook invention** & **shares**

Quick quiz

- Join the ‘Socrative’ app ‘Room 642124’ and try the quick quiz.

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