A Brief History of Computer Science and Computing

Tim Capes

April 4, 2011

Administrative Announcements

Midterms are returned today, A4 is scheduled to go out on thursday.

Early Computing

- ▶ First computing device: The Abacus 2400 BCE in Ancient Babylon. 2000 years before Greek Methods of calculation.

Early Computing

- ▶ First computing device: The Abacus 2400 BCE in Ancient Babylon. 2000 years before Greek Methods of calculation.
- ▶ Invention of Algorithms: First algorithms invented by Brahmagupta in 628 AD in India

Early Computing

- ▶ First computing device: The Abacus 2400 BCE in Ancient Babylon. 2000 years before Greek Methods of calculation.
- ▶ Invention of Algorithms: First algorithms invented by Brahmagupta in 628 AD in India
- ▶ Spread of Algorithms: Persian Mathematician Al-Khwarizmi writes "On Calculation with the Hindu Numerals" a work largely responsible for spreading Algorithms to the west in 825 AD. The word Algorithm is an anglicized version of the name Al-Khwarizmi.

Binary Logic and Number Representation

- Binary Number System Originated by Indian Mathematician Pingala (3rd century BCE)

Binary Logic and Number Representation

- Binary Number System Originated by Indian Mathematician Pingala (3rd century BCE)
- Formal Logic Using Binary developed by Leibnitz (1703)

Binary Logic and Number Representation

- ▶ Binary Number System Originated by Indian Mathematician Pingala (3rd century BCE)
- ▶ Formal Logic Using Binary developed by Leibnitz (1703)
- ▶ Boolean Algebra developed by Boole (1854): Algebra for representing computational processes.

Charles Babbage

- Originated the concept of a programmable computer (1820's)

Charles Babbage

- Originated the concept of a programmable computer (1820's)
- His idea worked, and was implemented in London in 1991.

Ada Lovelace

- Ada Lovelace was the daughter of the well known British Poet Lord Byron

Ada Lovelace

- Ada Lovelace was the daughter of the well known British Poet Lord Byron
- Worked on developing programs for Babbage's difference engine.

Ada Lovelace

- Ada Lovelace was the daughter of the well known British Poet Lord Byron
- Worked on developing programs for Babbage's difference engine.
- She is considered to be the World's first computer programmer.

- 1931: Godel's Incompleteness Theorem

The 1930's: Development of Mathematical Framework

- ▶ 1931: Godel's Incompleteness Theorem
- ▶ 1936: Church-Turing Thesis: Formalizing what can and cannot be computed.

The 1930's: Development of Mathematical Framework

- ▶ 1931: Godel's Incompleteness Theorem
- ▶ 1936: Church-Turing Thesis: Formalizing what can and cannot be computed.
- ▶ 1937: First formal logic for circuit analysis (Shannon)

The 1940's: Practical Applications

- Development mainly focused around the war effort

The 1940's: Practical Applications

- Development mainly focused around the war effort
- Machines for encrypting and decrypting

The 1940's: Practical Applications

- ▶ Development mainly focused around the war effort
- ▶ Machines for encrypting and decrypting
- ▶ Most famous of the machines was the German "Enigma" Cipher Machine (WW2).

The 1940's: Practical Applications

- Development mainly focused around the war effort
- Machines for encrypting and decrypting
- Most famous of the machines was the German "Enigma" Cipher Machine (WW2).
- Much of the work took place in Britain at Bletchley Park which is considered the birthplace of the modern computer.

- 1953: Ada Lovelace's work is republished including the first algorithm specifically tailored for a computer.

The 1950's and 1960's

- ▶ 1953: Ada Lovelace's work is republished including the first algorithm specifically tailored for a computer.
- ▶ 1960's: In this decade symbolic computation progresses to the point where a computer can do well in a first-year university calculus class

The 1950's and 1960's

- ▶ 1953: Ada Lovelace's work is republished including the first algorithm specifically tailored for a computer.
- ▶ 1960's: In this decade symbolic computation progresses to the point where a computer can do well in a first-year university calculus class
- ▶ 1964: First computer mouse is developed

The 1950's and 1960's

- 1953: Ada Lovelace's work is republished including the first algorithm specifically tailored for a computer.
- 1960's: In this decade symbolic computation progresses to the point where a computer can do well in a first-year university calculus class
- 1964: First computer mouse is developed
- 1968: First tablet PC (Dynabook) conceptualized by Alan Kay.

The 1950's and 1960's

- ▶ 1953: Ada Lovelace's work is republished including the first algorithm specifically tailored for a computer.
- ▶ 1960's: In this decade symbolic computation progresses to the point where a computer can do well in a first-year university calculus class
- ▶ 1964: First computer mouse is developed
- ▶ 1968: First tablet PC (Dynabook) conceptualized by Alan Kay.
- ▶ 1969: Unix First written

The 1970's

- ▶ 1973: Unix translated almost entirely into C (from assembly code)

The 1970's

- ▶ 1973: Unix translated almost entirely into C (from assembly code)
- ▶ 1969-1973: C programming language developed at Bell Labs (still popular today, easily the most influential programming language of all time)

The 1970's

- 1973: Unix translated almost entirely into C (from assembly code)
- 1969-1973: C programming language developed at Bell Labs (still popular today, easily the most influential programming language of all time)
- C is complicated and confusing for beginners due to manual memory declaration

1980's to present

- Most interesting and life-altering development was the invention of the internet

1980's to present

- ▶ Most interesting and life-altering development was the invention of the internet
- ▶ We've covered this previously so I'm not going into detail

1980's to present

- ▶ Most interesting and life-altering development was the invention of the internet
- ▶ We've covered this previously so I'm not going into detail
- ▶ Something to consider, is how fast information travels in the modern era. News makes it around the world in minutes. At the beginning of computer science it took hundreds of years for ideas to spread.

Midterms Returned, Marking Questions

Midterms will be returned now. Please take time to go over them and see me if you have questions.