History of Communication

CS 146

Intro to Web Programming and Project Development

Objectives

Students will:

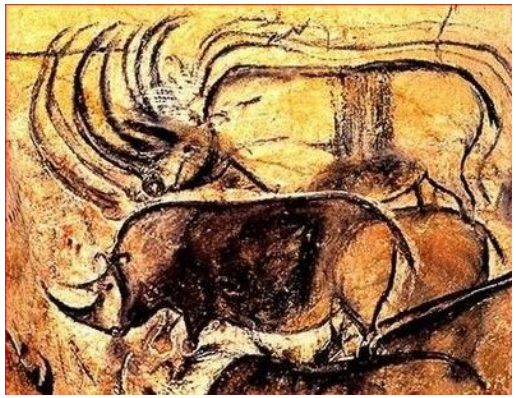
- Discover various communication techniques that were developed over the years
- Learn the reasons behind each invention
- Research people or creations that revolutionized the telecommunications world

Sequence

- Human communication was revolutionized with
  - speech approximately 100,000 years ago
  - symbols about 30,000 years ago
  - writing about 5000 years ago

Cave Paintings

- The oldest known symbols created with the purpose of communication through time are the cave paintings, a form of rock art, dating to the Upper Paleolithic.
- The oldest known cave painting is that of the Chauvet Cave, dating to around 30,000 BC.



Writing

- The oldest-known forms of writing were primarily logographic in nature, based on pictographic and ideographic elements.
- The invention of the first writing systems is roughly contemporary in with the beginning of the Bronze Age in the late Neolithic of the late 4000 BC.
- About 2600 BC cuneiform (writing made with a wedge-shaped stylus began to represent syllables of spoken Sumerian language.

26th century BC Sumerian cuneiform script in Sumerian language, listing gifts to the high priestess of Adab on the occasion of her election. One of the earliest examples of human writing.

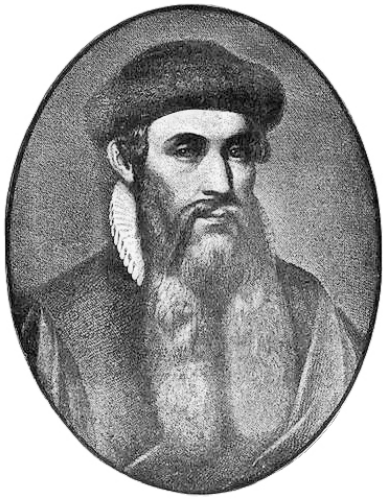
Paper

- Paper was invented in ancient China during the Han Dynasty (206 BC – 220 AD) and spread slowly to the west via the Silk Road.
- Papermaking and manufacturing in Europe was started by Muslims living on the Iberian Peninsula, (today's Portugal and Spain) and Sicily in the 10th century, and slowly spread to Italy and Southern France reaching Germany by 1400.

Oldest paper book, dating to AD 256

Movable Type Printing

- Johannes Gutenberg's invention of mechanical movable type printing started the Printing Revolution and is widely regarded as the most important event of the modern period.
- Gutenberg was the first European to use movable type printing, in around 1439.
- Unrestricted circulation of information yielded a sharp increase in literacy that broke the monopoly of the literate elite on education and learning and bolstered the emerging middle class.



Electric Communications

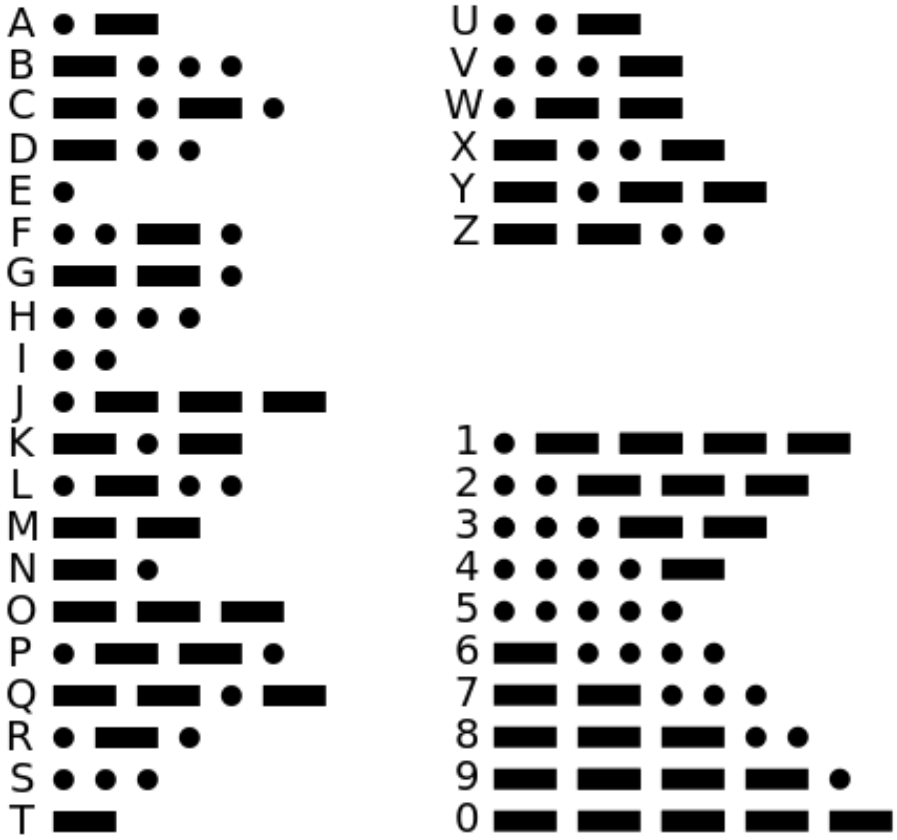
- Joseph Henry (December 17, 1797 – May 13, 1878) was an American scientist.
- He invented a precursor to the electric doorbell (specifically a bell that could be rung at a distance via an electric wire, 1831) and electric relay (1835).
- Henry's work on the electromagnetic relay was the basis of the practical electrical telegraph, invented by Samuel F. B. Morse.

Electric Telegraph

- Samuel Finley Breese Morse (April 27, 1791 – April 2, 1872) was an American painter and inventor.
- Started out as a portrait painter.
- In his middle age Morse contributed to the invention of a single-wire telegraph system based on European telegraphs.
- He was a co-developer of the Morse code, and helped to develop the commercial use of telegraphy.

International Morse Code

1. The length of a dot is one unit.
2. A dash is three units.
3. The space between parts of the same letter is one unit.
4. The space between letters is three units.
5. The space between words is seven units.



International Morse code is composed of five elements:

1. short mark, dot or "dit" (·) — "dot duration" is one time unit long
2. longer mark, dash or "dah" (–) — three time units long
3. inter-element gap between the dots and dashes within a character — one dot duration or one unit long
4. short gap (between letters) — three time units long
5. medium gap (between words) — seven time units long

Moving Forward

- In 1843, Morse built a telegraph system from Washington, D.C., to Baltimore with the financial support of Congress. On May 24, 1844, the first message, “What hath God wrought?” was sent.
- On February 14, 1876 at the US Patent Office, Bell's lawyer filed Bell's patent application for a telephone.
- The first successful bi-directional transmission of clear speech by Bell and Watson was made on March 10, 1876 when Bell spoke into the device, “Mr. Watson, come here, I want to see you.” and Watson answered.
- Tivadar Puskás introduced the multiplex switchboard, which was a revolutionary step in the development of telephone exchanges.

Tivadar Puskás

…and Onward

- 1933 – TELeprinter Exchange (telex) invented for text transmissions in Germany.
- The service was operated by the Reichspost (Reich postal service) and had a speed of 50 baud - approximately 66 words-per-minute.
- In 1958, Western Union started to build a telex network in the United States.
- By the late 1970s, many companies around the world (but especially Japan), entered the fax (short for FACSIMILE) market.

Early Days of the Internet

- Concept of Computer Networks begins during the Cold War
- 1969 – Advanced Research Project Agency creates the first computer network (ARPANET)
  - At this point only basic facilities exist (email, Telnet, …)
- 1971 – Ray Tomlinson creates the username@hostname email standard
- 1971 – First FTP standard presented (updated in 1985)
- 1972 – Use of routers allows the connection of more hosts to the ARPANET
- 1974 – Vinton Cerf and Robert Kahn present the TCP/IP
- 1985 – First TCP/IP Wide Area Network
- Connection of the ARPANET to the NSFNET leads to the use of the term Internet
  - At this point, mainly Telnet and FTP

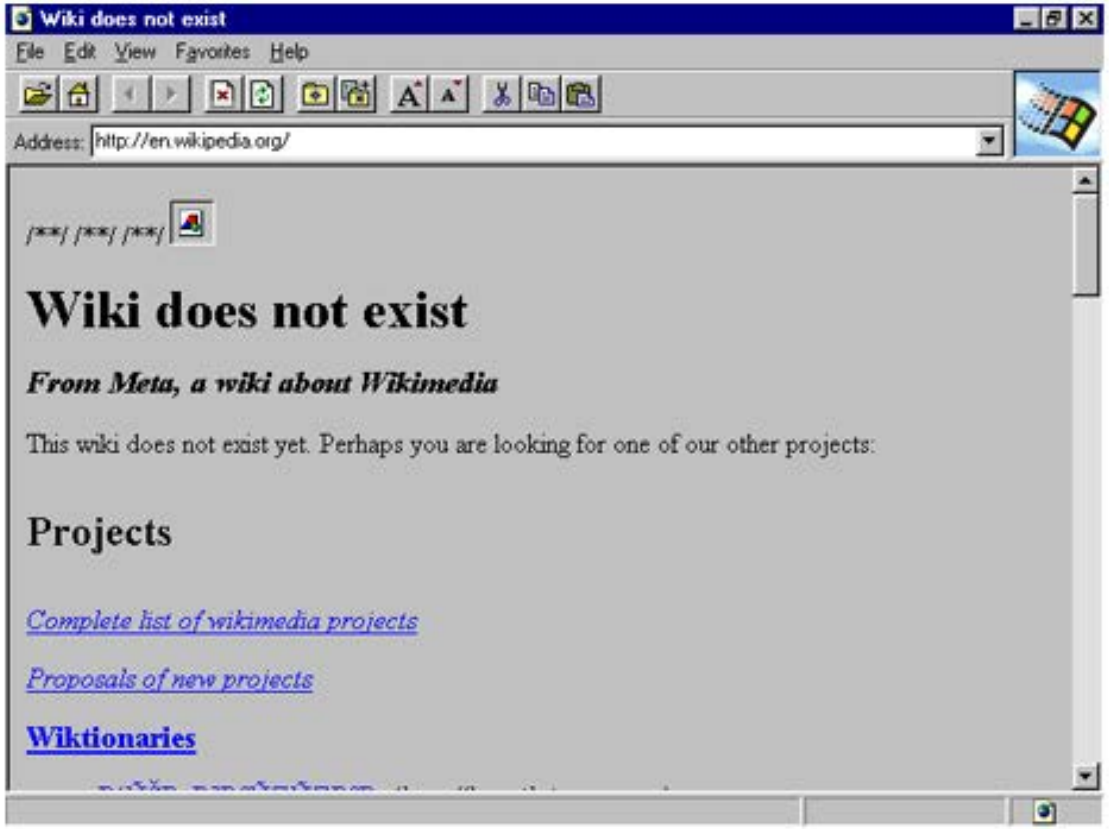
Internet = Web, right?

- NO! Internet was the connection of computers together
- 1989 – Tim Berners-Lee at the CERN presents the World Wide Web standard.
- 1991 – The High Performance Computing Act (HPCA) is passed to promote development of information super-highway.
  - It is a new way to communicate through the Internet
- 1993 – Marc Andreessen develops Mosaic, first graphical browser, with funds from the High Performance Computing Act.
- 1994 – W3C (World Wide Web Consortium) created to lead the development of the WWW standards.
- 1994 – Opera browser and Netscape (the original Mozilla) make their debut.
- 1995 – Windows 95 comes into play, bundled with IE.

Browser Wars

- IE was bundled with Windows 95 which led to a lawsuit by Netscape. In the end MS had to add the option allowing to remove it.
- IE becomes the dominant browser around 1998 (same year AOL buys Netscape).
- 2003 – Safari comes out (mainly for Mac users, or anyone not reading the options when installing iTunes).
- 2004 – Mozilla Firefox comes out as an update of Phoneix/Firebird (and what a relief).
- 2008 – Netscape discontinued (blame AOL).
- 2008 – Google Chrome comes out (yay!).
- 2011 – IE still the dominant browser in the world (followed by Netscape and far behind Chrome).
- 2014 – IE still dominates the web browser market share, and still some people use IE6 from 2001!

IE 1.0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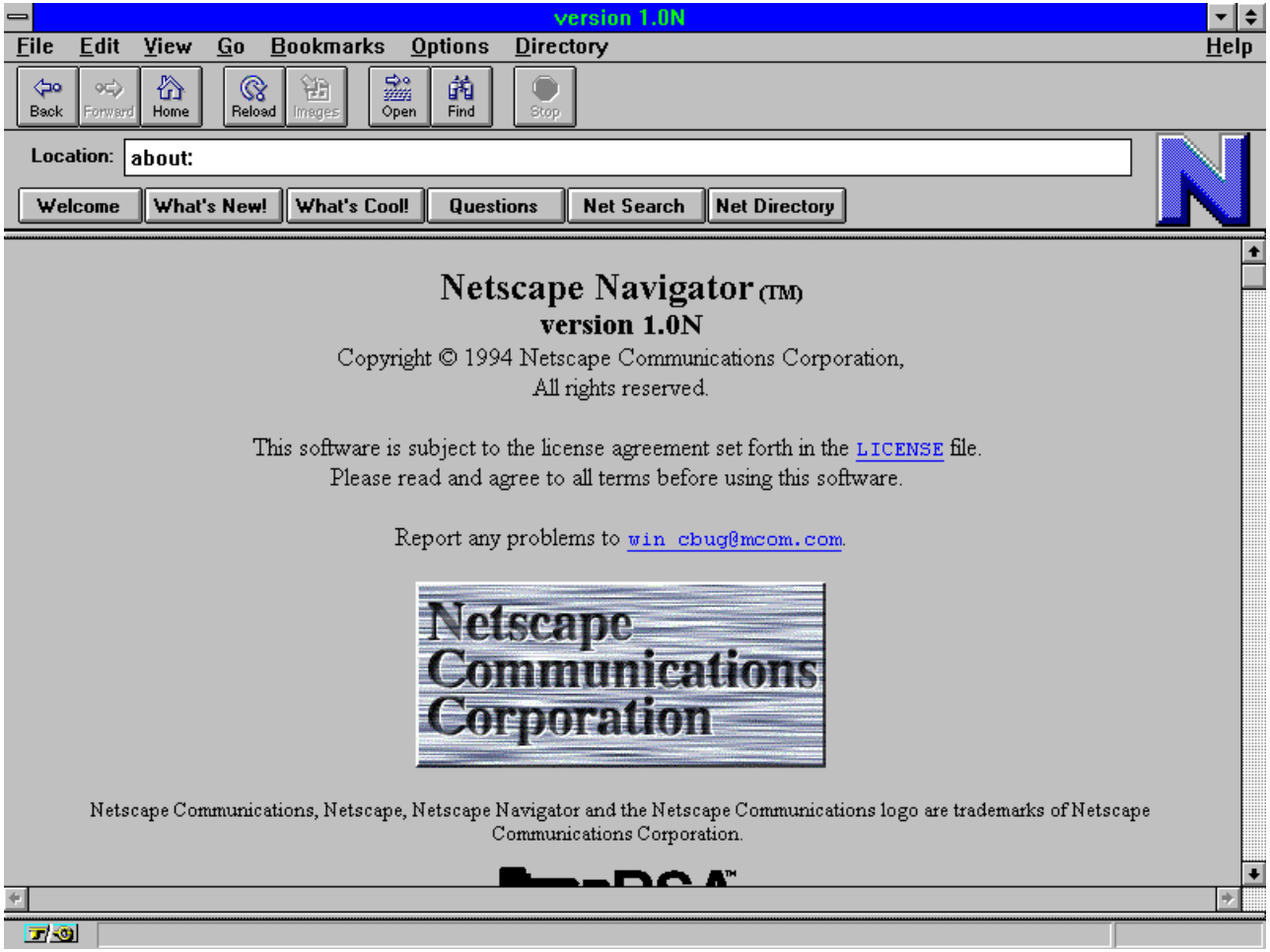
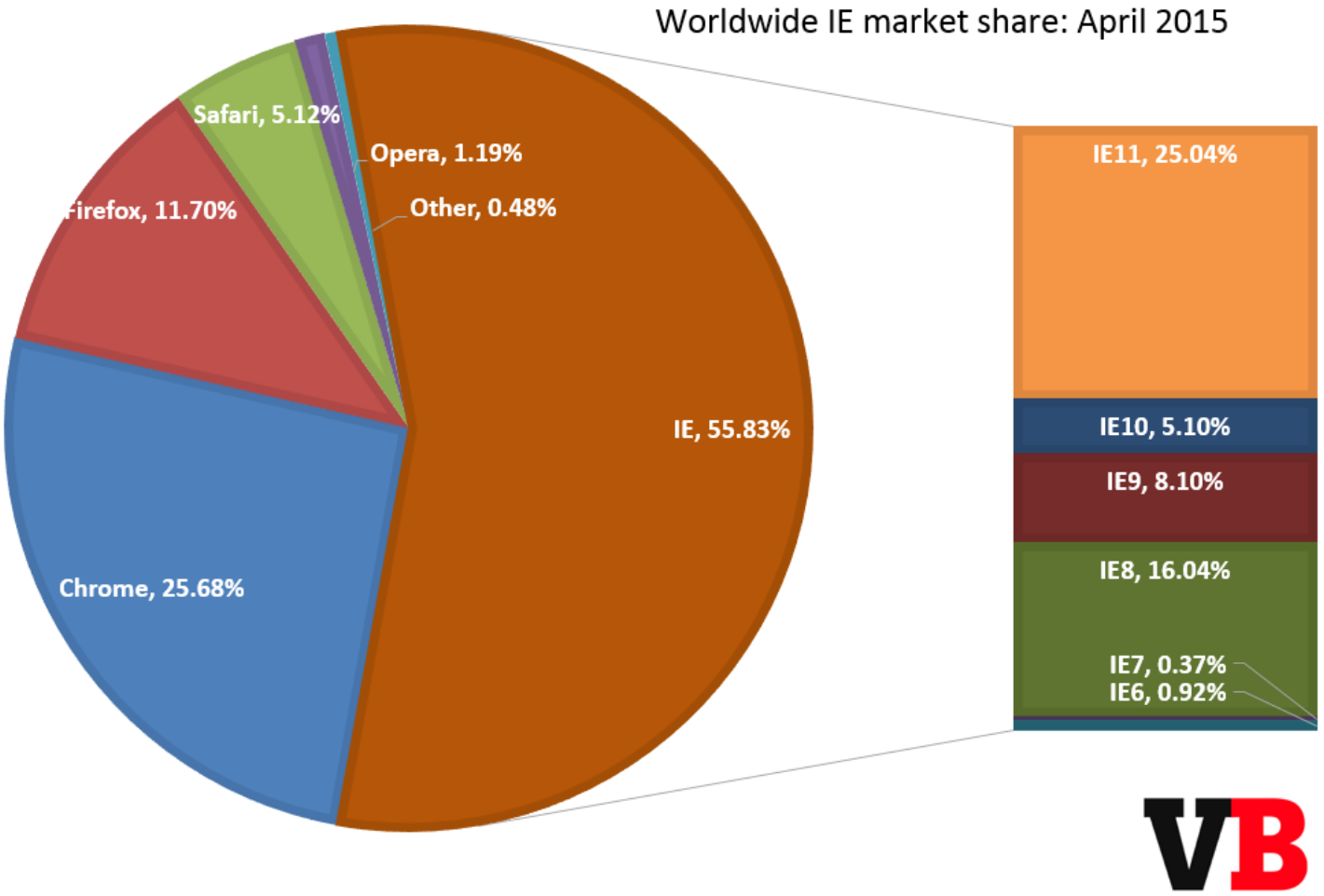


Browser Market Share



Additional Information

- SRI International – Timeline of Innovation
  - http://www.sri.com/work/timeline-innovation/landing-computing-digital.php?timeline=computing-digital
- Paul E. Ceruzzi. *Computing: A Concise History*. Cambridge: MIT Press, 2012.