COMPSCI 1JC3

Introduction to Computational Thinking

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07 The World Wide Web

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Admin

- Midterm 1 marks.
  - ▶ Stage 1 average: 67%.
  - ▶ Stage 2 average: 81%.
  - ▶ Average: 69%.
  - ▶ 10% of the class submitted incomplete answer sheets.
- Assignment 1 marking.
- Assignment 3 correction.
- Office hours: To see me please send me a note with times.
- Are there any questions?

Opinion on the Midterm Test 1 (iClicker)

What did you think of the two-stage midterm format?

A. Too easy.

B. Just right.

C. Too hard.

Advice

Give a 100% effort to your study of computing!

- ▶ Your competitors at Waterloo, U. of Toronto, and American schools are giving 100%.
- ▶ Work with intensity (not just putting in time).

Review

1. Structure of the Internet.
2. IP protocol.
3. TCP protocol.
4. DNS system.
5. Client/server architecture.

Tim Berners-Lee

- Inventor of the World Wide Web.
  - ▸ In 1989 implemented the first web client and server at the CERN (European Organization for Nuclear Research) laboratory outside of Geneva, Switzerland.
  - ▸ Developed the HTTP communication protocol.
  - ▸ Developed the HTML language.
  - ▸ Developed the first web browser called Nexus.
- Has won many awards including British knighthood in 2004 and the Turing Award in 2016.

What is the World Wide Web

- The World Wide Web (Web for short) is a vast collection of interlinked documents and related services that is accessible via the Internet.
  - ▸ Includes almost all information intended for the public.
- Web resources are identified by Uniform Resource Locators (URLs).
- Web resources are obtained by requesting web pages using the Hypertext Transfer Protocol (HTTP) or related protocols.
- Web pages are written using the Hypertext Markup Language (HTML) or related languages.
- The Web is one of the greatest inventions of all time!
  - ▸ Will have greater influence than both radio and TV.
  - ▸ Will be an influential as the printing press.

Web Browsers (iClicker)

What is your favorite web browser?

A. Google Chrome.
B. Mozilla Firefox.
C. Internet Explorer.
D. Safari.
E. Something else.

Web Search Engines (iClicker)

What is your favorite web search engine?

A. Google.
B. Bing.
C. Yahoo.
D. Something else.

Hypertext Markup Language (HTML)

- Documents called web pages contain links to other units of information, inside and outside the document.
  - ▶ Contain text and markup tags.
  - ▶ May contain embedded images and interactive programs.
  - ▶ Use the file extension `.html` or `.htm`.
- Information is represented in two ways:
  1. Statically in files.
  2. Dynamically via scripts or programs that assemble information on the fly.
- The links allow one to travel across the Web.
- HTML files are easy for machines to process but difficult for humans to read and write.
  - ▶ Software tools are used to develop and present web pages.

Hypertext Transfer Protocol (HTTP)

- Enables a web browser (web client) to request documents from a web server.
  - ▶ HTTP also allows a client to offer documents to a server.
- Uses TCP for transport.
  - ▶ Web servers usually listen at TCP port 80, but may listen at many other TCP ports (e.g., 81, 8000, 8080, etc.).
- A HTTP transaction consist of a client request followed by a server response.
  - ▶ HTTP is stateless: no information about the state of a client-server interaction is recorded.
  - ▶ State is tracked using cookies.
- A requested document can be processed both server side (e.g., using PHP) and client side (e.g., using JavaScript).

Uniform Resource Locators (URLs)

- A URL is composed of six items:
  1. Protocol: TCP protocol needed for transferring the information (e.g., `http`, `https`, `ftp`, `file`).
  2. Host: The server that has the information.
  3. Port: Optional protocol port at which the server is listening. (Default is TCP port 80.)
  4. Path: The path to the file containing the information.
  5. Query: Optional query concerning the information.
  6. Fragment: Optional fragment identifier.
- Have the following form:

  `<protocol>://<host>[:<port>]/<path>[?<query>][#<fragment>]`
- Example.

  `http://imps.mcmaster.ca:80/wmfarmer/`

Web Services

- The Web provides access to a wide range of services in addition to documents.
- Examples:
  - Web search.
  - Web user interfaces for programs and databases.
  - Shopping.
  - Banking.
  - Maps and directions.
  - Weather information.