COMPSCI 111/111G Learning Outcomes v1.0

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1 Bits, bytes and binary numbers

Students will be familiar with the binary representation of numbers and the prefixes commonly used with binary numbers.

Students should be able to:

- define the terms "bit" and "byte".
- use the decimal SI units (kilo, mega, giga, and tera) appropriately.
- compare and contrast the binary SI units (kibi, mebi, gibi, tebi) with the corresponding decimal SI units.
- state the biggest decimal number that can be represented using a given number of binary digits.
- state the number of binary digits required to represent a given decimal number.

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2 Standards

Students will have an appreciation of how numbers can be used to represent different kinds of information (such as text and images). Students will understand the importance of standard methods of encoding.

Students should be able to:

- describe how numbers can be used to encode text and images.
- compare and contrast open standards with proprietary standards, giving examples of each.

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3 Hardware

Students will understand the purpose of the major components of a computer system, and will be able to identify those components visually.

Students should be able to:

- assign common hardware to one of the categories "Input", "Output", "Processing", "Storage" and "Communication".
- identify the major components of a computer system.
- explain the purpose of each of the hardware components found in a typical desktop computer.
- state Moore's Law and discuss the implications for computing.
- compare and contrast primary memory with mass storage devices.
- describe the major factors influencing the performance of a computer, and explain the different ways that computer performance is measured.
- read an advertisement for a computer system and explain what it means.

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4 Software

Students will be aware of some major software companies. Students will have an understanding of different software licences, and the purpose of common system and application software.

Students should be able to:

- distinguish between software and hardware.
- identify some major software companies and the products that they create.
- distinguish between application software and system software.
- describe the different categories of software licences.

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5 Operating systems

Students will be aware of the major operating systems available today, will be able to explain the purpose of an operating system and will be able to use a standard operating system comfortably.

Students should be able to:

- identify common file extensions and the applications they correspond to.
- give examples of different operating systems.
- discuss the purpose of an operating system.

6 User interfaces

Students will understand the purpose of a user interface and will be aware of the differences between command line interfaces and graphical user interfaces.

Students should be able to:

- explain the meaning of the acronyms GUI and CLI.
- compare and contrast a GUI with a CLI.
- use the correct terminology to identify parts of a graphical user interface.

7 Internet

Students will have a basic understanding of the development of the Internet, and will be familiar with simple networking terminology.

Students should be able to:

- explain the meaning and purpose of TCP/IP.
- put a series of Internet related events into chronological order.
- describe some of the design features of the Internet and explain why it was designed the way it was.
- state the purpose of the DNS and describe how it works.
- describe the purpose of networking components required for a home network — network card, modem, router.
- describe,in simple terms, how information is transferred through the Internet.

8 WWW

Students will be familiar with the development of the WWW, its relationship to the Internet and how to effectively use the WWW.

Students should be able to:

- put a series of events related to the WWW into chronological order.
- describe the difference between the WWW and the Internet.
- describe the underlying process that occurs when a user looks at a web page.
- describe the way that web page access is logged.
- discuss how search engines rank pages
- discuss the implications arising from our use of search engines to access the WWW.
- describe some of the copyright issues that relate to the use of search engines.

- define the following terms/acronyms: www, http, hypertext, hypermedia, url.
- use a search engine to find information on the WWW.

9 Electronic communication — Email, IM, Forums

Students will be familiar with different tools used to communicate online.

Students should be able to:

- explain the purpose of the common header fields — To, From, Reply-to, CC, BCC, Subject.
- compare and contrast IMAP and POP3.
- describe how an email message is transferred from the sender to the receiver.
- discuss issues around the privacy of email and the use of email in the workplace.
- state some of the benefits and dangers present in electronic communication.
- compare and contrast different forms of communication — Email, IM, Forums.
- give examples of good and bad netiquette.
- explain what spam is and why it is undesirable.
- describe some of the tools that are typically included with an email system — address books, filters.
- define (with examples) common terminology used with electronic communication systems — threads, moderators, flames, quotes, emoticons, acronymns.
- use webmail to send and receive email messages.
- create and use address book entries.
- read and post messages to an electronic forum.

10 Online community tools — Blogs, Wikis

Students will have an appreciation of the tools that are commonly used by online communities.

Students should be able to:

- describe what a blog is.
- discuss the social implications of blogs.
- compare and contrast the different tools used to publish information online — Forums, Blogs, Wikis.
- describe what a wiki is.
- discuss the accuracy of information on a wiki.
- explain how a community can effectively maintain a wiki.
- describe the common tools that are used within a wiki.
- create a blog.

- add a new posting to a blog.
- use wiki markup to create a wiki page.
- contribute to an existing wiki.

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11 Word processing

Students will be familiar with the idea of encoding text, and the importance of standards. Students will gain experience using a word processor to format documents.

Students should be able to:

- describe the meaning of the acronym "ASCII" and explain why ASCII is important.
- use ASCII to encode or decode text.
- explain the difference between a text editor and a word processor.
- distinguish between examples of surface formatting and examples of structural formatting.
- describe the advantages of structural formatting over surface formatting.
- use common formatting commands to format a document.
- create, modify and apply user-defined styles within a document.
- use EndNote to create citations.

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12 Digital images

Students will have an appreciation of different methods of encoding digital images.

Students should be able to:

- describe how a bitmap is used to represent an image.
- describe how vector graphics are used to represent an image.
- compare and contrast bitmaps and vector graphics.
- calculate the size (in bytes) of a given bitmap image.
- compare and contrast jpeg and gif compression methods.
- use common drawing tools to create a diagram within a word processing document.

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13 XHTML

Students will understand how web pages are created using a recent standard (XHTML 1.0 Strict), and will be able to create their own web pages using this standard.

Students should be able to:

- discuss the importance of using published standards.
- state what a Document Type Definition is used for.
- state the meaning of the acronyms HTML and XHTML.
- use XHTML tags to create a web page that adheres to the the XHTML 1.0 Strict standard.
- validate web pages using an online validation tool.

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14 CSS

Students will understand the advantages of using Cascading Style Sheets, and will be able to create a web page that uses both XHTML and CSS.

Students should be able to:

- state the meaning of the acronym CSS.
- compare and contrast the different locations that styles can be defined.
- distinguish between <div> and <span>.
- distinguish between class and id selectors.
- write a style sheet that will produce a specified appearance (given a table of attributes).
- use style sheets to create a standard appearance for a web site that includes at least three web pages.

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15 Web page design

Student will gain an appreciation of simple aspects of web page design.

Students should be able to:

- describe design that will aid navigation.
- discuss design decisions that arise with hypertext links.
- discuss the use of fonts, colour and backgrounds in web pages.

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16 PowerPoint

Students will understand the functions and limitations of PowerPoint software, and will be able to use PowerPoint to create a presentation.

Students should be able to:

- state some of the criticisms of PowerPoint.

- identify aspects of good and bad presentation design.
- describe good use of structure and appearance (colour, backgrounds, font).
- use design templates, master slides, and animation to create a short presentation.

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17 Spreadsheet

Students will understand how to create spreadsheets using cell references and simple functions.

Students should be able to:

- distinguish between absolute references and relative references.
- write formulae that calculate results based on the contents of other cells.
- write formulae that use common mathematical functions.
- evaluate boolean expressions.
- use IF, VLOOKUP and HLOOKUP functions.

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18 Database

Students will understand what a relational database is, how to create and how to use a relational database.

Students should be able to:

- explain the difference between a database and a database management system.
- identify a field, record and table in a relational database.
- define and identify primary and foreign keys.
- use a relationship diagram to identify the relationships between different fields.
- create a simple relational database.
- compare and contrast QBE with SQL
- use QBE to create simple queries and run them on an existing database.
- write simple SQL queries that use SELECT, FROM, WHERE, ORDER BY and GROUP BY

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19 Programming/Python

Students will understand simple programming concepts and be able to write very simple programs.

Students should be able to:

- compare and contrast interpreters with compilers.
- identify and use comments.
- distinguish between different types of information (strings, integers and floating point numbers).
- create expressions using standard mathematical operators.
- use the print statement to generate output.
- identify and use variables to store and recall values.
- read and store input from the user.
- write simple programs that read input, perform a calculation and produce output.
- evaluate boolean expressions that include comparison operators and logical operators.
- use an if statement.
- use a while loop to perform repetitive tasks.
- read a simple program and determine the output that would be produced.
- write simple programs that contain a while loop and/or if statements.

20 LaTeX

Students will be able to use LaTeX 2_ε to typeset a document, including the typesetting of mathematical formulae.

Students should be able to:

- compare and contrast LaTeX 2_ε with MS-Word.
- distinguish between the preamble and the document body.
- identify and use comments.
- use environments and simple commands
- distinguish between the three commonly used math modes.
- use math commands to typeset a complex mathematical formula.
- typeset a document that includes titles, columns, sections, footnotes, images and mathematical formulae.

21 History

Students will have a basic understanding of the history of the personal computer, the major companies and the people involved in that history.

Students should be able to:

- put a list of historically important events into chronological order.
- match the names of people with their accomplishments.
- explain why IBM failed to dominate the personal computer industry.
- explain how VISICALC and Apple are related.
- explain the relationship between Microsoft, MS-DOS, IBM and PC clones.

22 Social issues

Students will have an appreciation of some of the complex social issues that result from the Internet.

Students should be able to:

- explain how anonymous the Internet is.
- discuss advantages and disadvantages of anonymity.
- discuss issues of cultural dominance.
- describe the complexity of Internet censorship.
- discuss methods of protecting children from undesirable content on the Internet.
- compare and contrast different forms of malware — viruses, worms, trojans and logic bombs.

23 Acronyms

Students will be able to state the meaning of the following acronymns:

- CPU
- HDD, FDD
- RAM, ROM
- AGP
- ASCII
- GUI, CLI
- WYSIWYG
- OS
- TCP/IP, HTTP, FTP, SMTP, IMAP, POP3
- ISP
- DNS, WWW, URL
- JPEG, GIF, PNG
- HTML/XHTML, CSS
- DBMS, SQL, QBE