



System Design *basics*

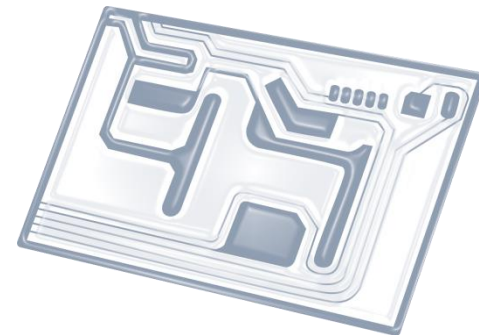
IB Computer Science



Content developed by
Dartford Grammar School
Computer Science Department



HL Topics 1-7, D1-4



1: System design



2: Computer Organisation



3: Networks



4: Computational thinking



5: Abstract data structures



6: Resource management



7: Control



D: OOP

HL & SL 1.2 Overview

Components of a computer system

- 1.2.1 Define the terms: hardware, software, peripheral, network, human resources
- 1.2.2 Describe the roles that a computer can take in a networked world
- 1.2.3 Discuss the social and ethical issues associated with a networked world

System design and analysis

- 1.2.4 Identify the relevant stakeholders when planning a new system
- 1.2.5 Describe methods of obtaining requirements from stakeholders
- 1.2.6 Describe appropriate techniques for gathering the information needed to arrive at a workable solution
- 1.2.7 Construct suitable representations to illustrate system requirements
- 1.2.8 Describe the purpose of prototypes to demonstrate the proposed system to the client
- 1.2.9 Discuss the importance of iteration during the design process
- 1.2.10 Explain the possible consequences of failing to involve the end-user in the design process
- 1.2.11 Discuss the social and ethical issues associated with the introduction of new IT systems

Human interaction with the system

- 1.2.12 Define the term usability
- 1.2.13 Identify a range of usability problems with commonly used digital devices
- 1.2.14 Identify methods that can be used to improve the accessibility of systems
- 1.2.15 Identify a range of usability problems that can occur in a system
- 1.2.16 Discuss the moral, ethical, social, economic and environmental implications of the interaction between humans and machines



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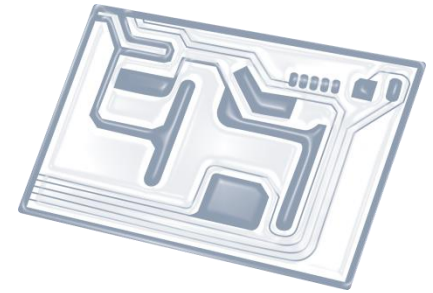
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Topic 1.2.12

Define the term **usability**



Usability = Ergonomics + Accessibility

- **Ergonomics**: the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance.
- **Accessibility**: refers to the design of products, devices, services, or environments for people with disabilities or specific needs
- **Usability**: the ease of use and learnability of a human-made object. The object of use can be a software application, website, machine, process, or anything a human interacts with.

Alternative definition

- Usability is the property of a system that determines how easy and self-explanatory the use of the system is for unexperienced end-users. It usually measures ergonomics and accessibility of the system.

Depends on:

- Consistency of user interfaces (Windows 8 vs. 7)
- Keeping to conventions users are accustomed to (a button with a floppy image stands for saving)
- Keeping conventions of key combinations (CTRL+S stands for saving a document)
- Structuring controls in a logical way
- Let ALL the relevant controls be visible and labelled to the user (Have you found out how to turn off Windows 8 on the first try?)
- Include any special functions and buttons into user documentation
- Do not include any major design changes between different versions of a system. Try introducing them bit by bit to let users get accustomed
- A design award is not necessarily a usability award
- Never let designers smoke weed when designing a system
- Put all controls having similar functions in a group ('save' and 'save as...' buttons or the 'close, minimize and maximize window' controls)