



System Design *basics*

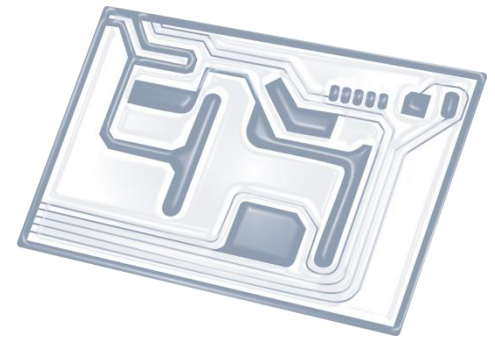
IB Computer Science



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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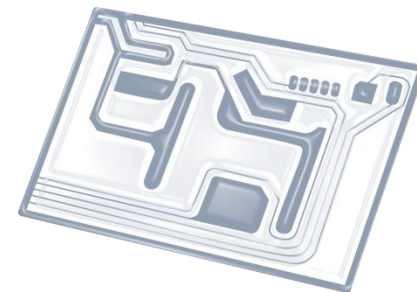


7: Control

D: OOP



Topic 1.2.7



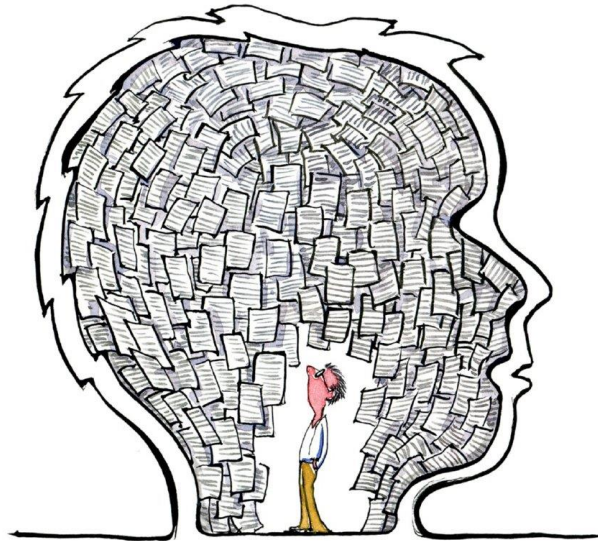
Construct **suitable representations** to **illustrate** system requirements



A picture is worth a thousand words...

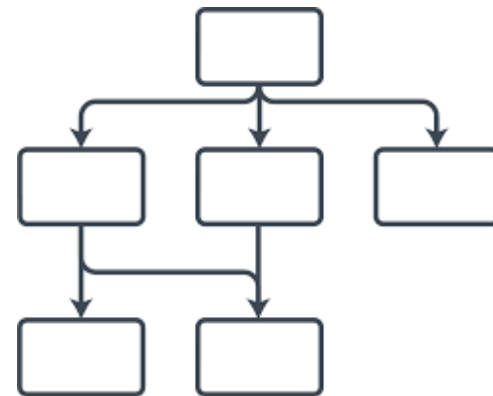
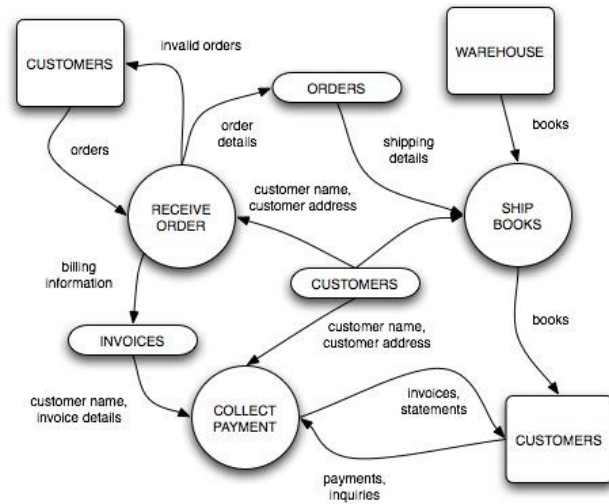
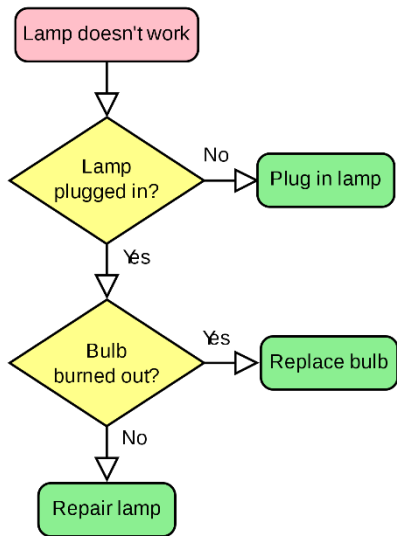
Often it is much better to explain how a new system will work by including a diagram or chart.

Although we will look at three examples of diagram types, there are **many more** that could be given in an exam.

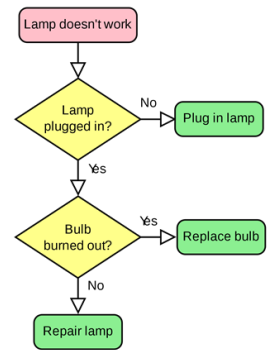


Three types of illustrations

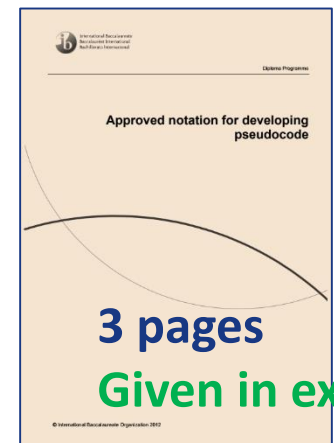
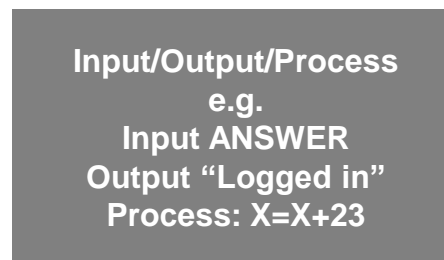
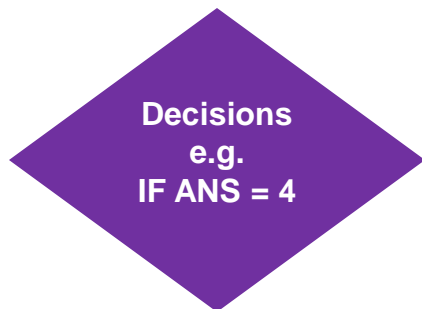
- A. System flow chart
- B. Data flow diagram
- C. Structure chart



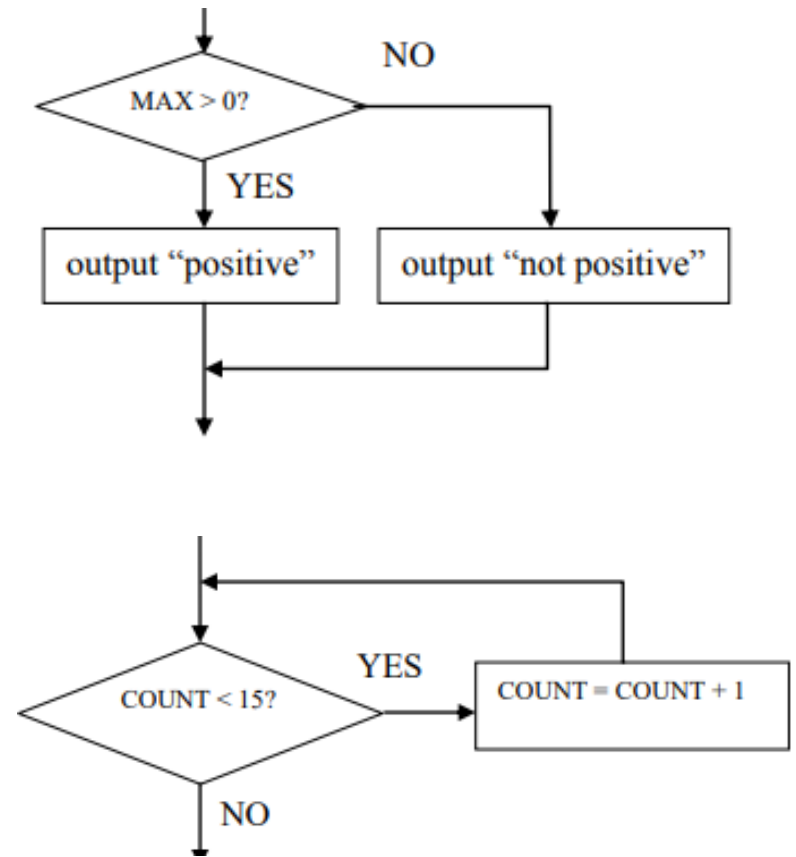
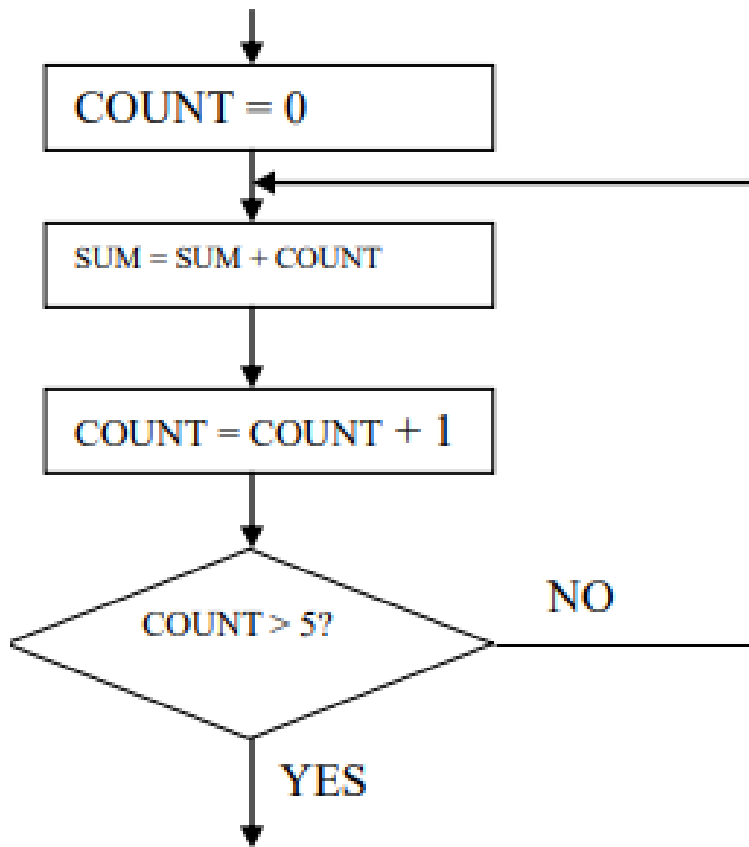
A. System flow chart



- A flow chart is a type of diagram representing a **process** using different symbols containing information about steps or a sequence of events.
- Each of these symbols is linked with **arrows** to illustrate the flow direction of the process.
- The IB only uses two shapes for all commands:



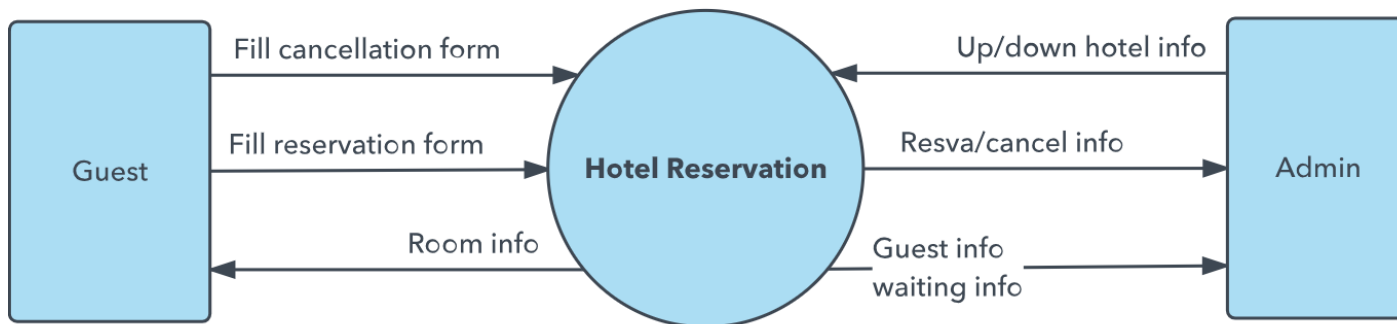
Flow chart examples



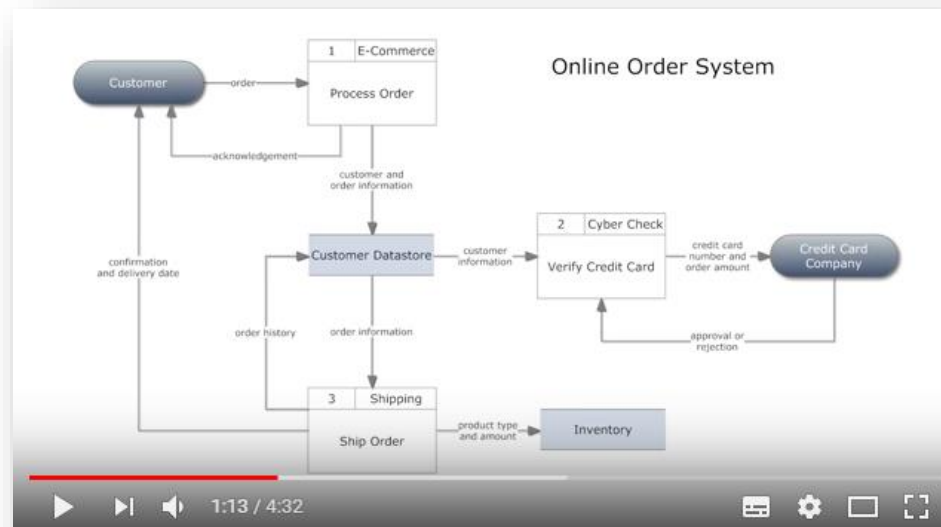
B. Data flow diagram

A data flow diagram (DFD) maps out the **flow of information** for any process or system.

It uses defined symbols like rectangles, circles and arrows, plus short text labels, to show data inputs, outputs, storage points and the routes between each destination.



How to draw a data flow diagram



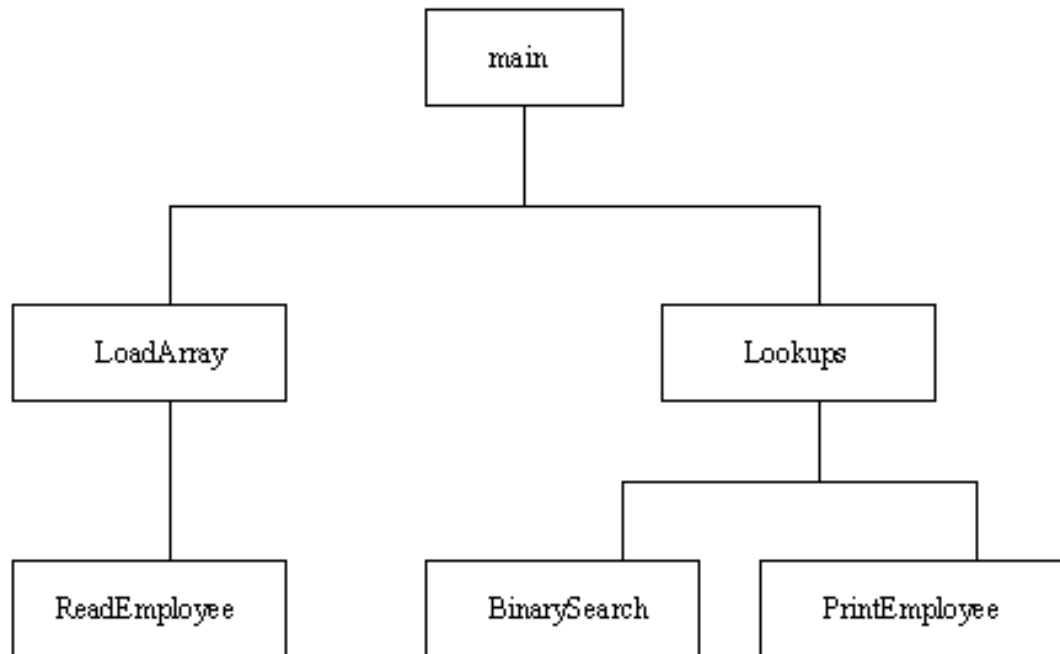
Online tool: SmartDraw (7 day free trial) <https://www.smartdraw.com/>

Video link: <https://youtu.be/oV6gPbS67vc>

Alternatives: *MS Visio, LucidChart, Visual Paradigm*

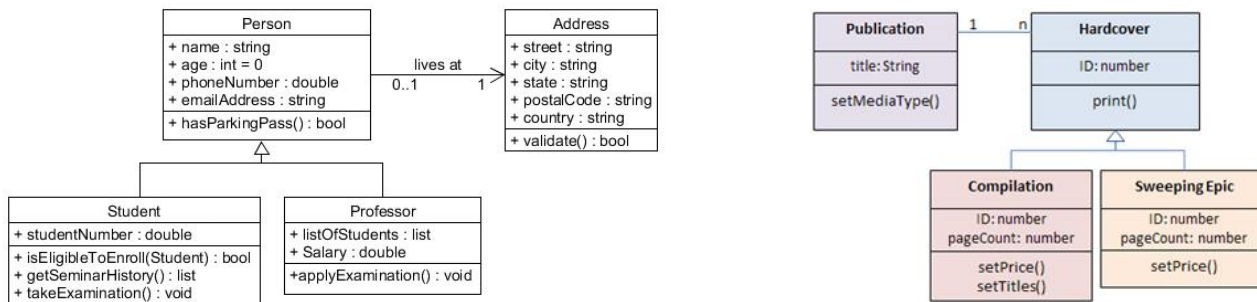
C. Structure chart

Diagram representing the **organization** of a system, usually with showing the different parts in **hierarchical** order.



Other diagrams worth knowing

- UML class diagrams (links to [Topic D](#))



- Wireframes (links to [Internal Assessment](#))

