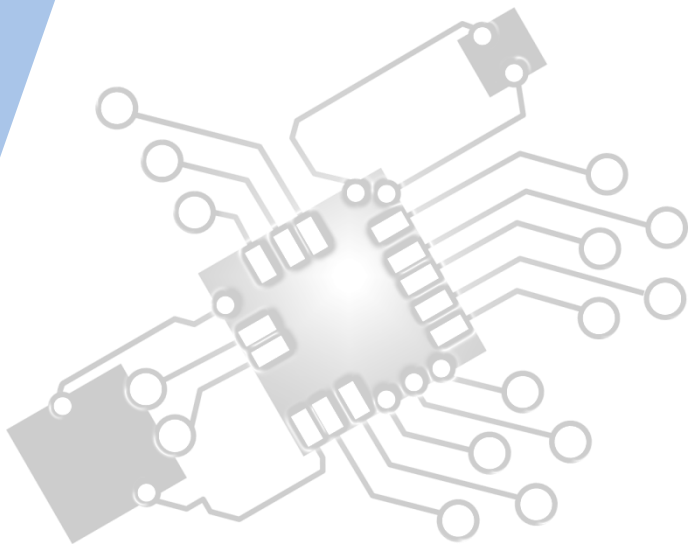
Resource Management

IB Computer Science



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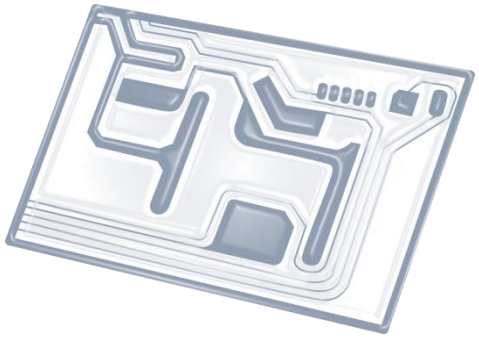
HL Topics 1-7, D1-4



1: System design

2: Computer Organisation

3: Networks

4: Computational thinking

5: Abstract data structures

6: Resource management

7: Control

D: OOP

HL only 6 Overview

System resources

6.1.1 Identify the resources that need to be managed within a computer system

6.1.2 Evaluate the resources available in a variety of computer systems

6.1.3 Identify the limitations of a range of resources in a specified computer system

6.1.4 Describe the possible problems resulting from the limitations in the resources in a computer system

Role of the operating system

6.1.5 Explain the role of the operating system in terms of managing memory, peripherals and hardware interfaces

6.1.7 Outline OS resource management techniques: scheduling, policies, multitasking, virtual memory, paging, interrupt, polling

6.1.8 Discuss the advantages of producing a dedicated operating system for a device

6.1.9 Outline how an operating system hides the complexity of the hardware from users and applications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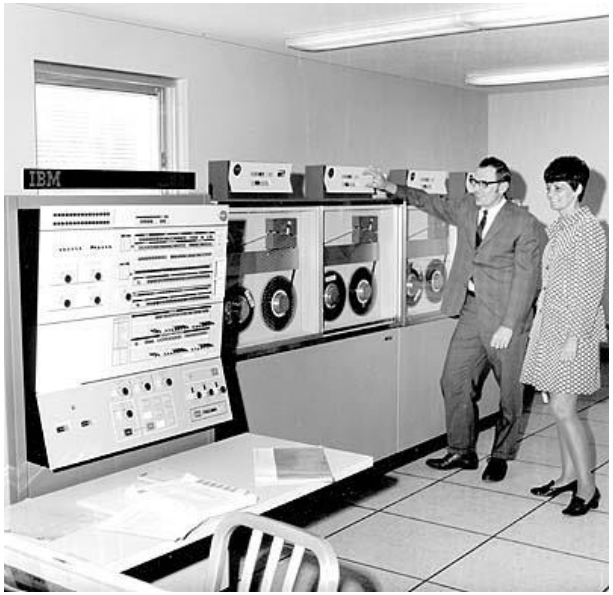
Topic 6.1.2

Evaluate the resources available in a variety of computer systems

Types of computer systems

- Mainframe
- Servers
- PCs
- Sub-laptops
- Cell phones
- Tablets
- PDAs
- Digital cameras

Mainframes



Processor: Thousands of cores

Primary memory: Vast amounts

Secondary memory: Vast amounts

Common use:

- Used in large companies
- Used for weather/financial models and predictions
- Used to ‘virtualize’ smaller computers
- Main players: CRAY/IBM

Server & Server farms

Processor: Many high spec PCs running in parallel (3-4GHz)

Primary memory: Big capacity (32GB+ per machine)

Secondary memory: Terabyte per machine

Common use:

- Used to ‘serve’ networks
- Used as data centers for ‘cloud storage’
- Size varies according to use

PCs (Desktop)

Processor: Single processor (multiple cores) 1-4 GHz

Primary memory: 2-16 GB

Secondary memory: 256 GB to 2 TB

Common use:

- Used in companies/schools (where portablility is not needed)
- Can be expanded by adding expansion cards (graphics cards)
- Used to be the most common type of personal computer

Sub-laptops (netbooks)

Processor: Single/multiple core (1-2 GHz)

Primary memory: 1-2 GB

Secondary memory: Normally SSD – 16-128 GB

Common use:

- Fueled by ‘netbook boom’ of early 2000s (before tablets)
- Runs stripped down OS (Linux, Chrome OS)
- Portablity and battery life are key features

Cell phones/mobiles

Processor: Single/Multicore

Primary memory: 1-3 GB

Secondary memory: Usually limited, but can be upgraded (MicroSD card)

Common use:

- Most common personal computing device in the world
- Getting more capable, rivaling PCs/laptops
- Biggest constraint is screen size and input options (lack of physical keyboard)

Tablets

Processor: Single/Multicore

Primary memory: 1-4 GB

Secondary memory: Usually limited, but can be upgraded (MicroSD card)

Common use:

- Very common for media consumption
- Getting more capable, rivaling PCs/laptops
- Biggest constraint is lack of physical keyboard

PDAs (Personal Digital Assistants)

Processor: Single core (<1GHz)

Primary memory: Limited (<500MB)

Secondary memory: Limited (<128MB)

Common use:

- Not used that much any more
- Used for calendars/emails
- Was overtaken by smartphones and mobiles in early 2000s

DON'T confuse with Siri/Cortana!

Digital Camera

Processor: Single core

Primary memory: Limited

Secondary memory: Expandable through use of memory cards (SD/Compact flash/Memory Stick)

Common use:

- For higher end photography
- Most digital cameras now integrated in mobile phones/laptops/tablets