

Business & Computer Science

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Course Introduction

1.1 Course Aims

Despite what the name might make you think, the course is *still* a practical one, it aims to introduce how computers work in a real world scenario, such as a company.

The Purpose of a Computer Through the lens of this course, the purpose of a software is to improve the company's efficiency and throughput, everything is evaluated through a framework of costs and profits, hence, even something as simple as buying a pen must be evaluated at multiple levels, from the cost of the pen itself, to the cost of the time spent by the employee to go to the store and buy it.

1.2 Course Structure

The course is usually organized in two parts, alternating on a weekly basis:

Day	Purpose
Tuesday	Lecture
Thursday	Seminars

Table 1.1: Course Structure

Naturally, the seminars are *included* in the course's materials and are hence expected

The exam is also split into multiple sections:

Part	Contents
Written	30 to 50 closed questions
Oral	Optional, to raise marks

Table 1.2: Exam Structure

The general information about the course is available at the [official course page](#).

1.3 Information Systems

As studied in the first unit of *Data Management & Analysis*, an information system is a set of compo-

nents that allows an organization to collect, process, store and distribute information, it is *not* necessarily something software-based, it can even be a file cabinet!

Definition 1.3.1

An Information System is something that Manages the flow of information in an organization.

Information Naturally, information is something *abstract* and *immaterial*, it is naturally difficult to manage, but it is possible to construct a set of rules, conventions and tools that allow us to represent it in a way that is *manageable*, this process is the *Flow*, and hence, as defined above, these systems are called *Information Systems*.

Computers When a computer is involved, the Information System is naturally labeled a Computer Information System, or *CIS* for short.

This chapter aims to give us the following capabilities

- Define what an Information System is
- Describe the history of Information Systems
- Describe the basic argument behind the article *Does IT matter?* by Nicholas Carr.

An information system is made up of *Three* main components:

- People: In charge of decision making and organization
- Technology: Hardware and Software that supports the business
- Processes: Collecting and storing information

In General This is a pretty broad definition, that allows a wide variety of software to be seen through the lens of an Information System, from network analyzers, to national healthcare systems, to online education platforms.

Acronyms Depending on the application, an Information System can be called by different acronyms, such as:

- **MRP:** *Manufacturing Resource Planning*
- **CIM:** *Computer Integrated Manufacturing*
- **SAP:** *Systems, Applications and Products*

1.3.1 Anthony's Triangle

Anthony's triangle is a diagram that categorizes the three purposes of an Information System:

1. Strategic (*Executive Information System*): for senior management decisions
2. Tactical (*Management Information System*): For middle management decisions
3. Operational (*Transaction Processing Systems*): For daily transactions of business

1.3.2 Information System Components

Several Components work together to add value to an organization, they are

1. Hardware: The physical components of the system
2. Software: The programs that run on the hardware, they can be:
 - Operating Systems: The programs that manage the hardware
 - Application Software: The programs that are used by the users
3. Data: The information that is stored in the system
4. People: The users of the systems, both producers and consumers of information
5. Processes: The procedures that are used to collect, process and store information¹

This is somewhat redundant to what we stated beforehand in definition 1.3.1, but it is important to restate it to emphasize the fact that the system is composed of both *People* and *Technology*.

1.3.3 Processes

One of the most important components of an Information System is the *Process*, it is the goal of the Computer Information System to optimize the processes of an organization, bringing about an increase in efficiency.

¹ Organizing something in *processes* that is, a series of well-defined steps, brings about a series of benefits in productivity.

Processes Formally Since processes are an advantageous way to organize work, it is important to spend some time to also give a formal definition of their nature.

Definition 1.3.2

A process is a series of well-defined steps that are used to achieve a specific goal, it can be defined as a set of activities

1.4 Does IT Matter?

Nicholas Carr, in *Harvard Business Review*, argues that Information Technology is not an *Investment*, but rather a commodity, so something that must be managed to optimize the company's profits by reducing its operational costs.

IT as a Marketing Tool It is also interesting to note how a company is perceived as better when it uses IT, and when this IT is of high quality, therefore IT can be seen as a *Marketing Tool* that can be used to attract customers.

1.5 Mainframes

A Mainframe is a class of computer that is usually used as the heart of an Information System, where everything is *centralized*, as opposed to a distributed systems, users, which in this architecture are defined *dumb*, are not allowed to access the system directly, but rather act as consumers of its services as allowed by the system's administrators and operating system.

Definition 1.5.1

A Mainframe is an architecture in which a central computer with very high processing power is connected to a multitude of terminals through a star topology, where the central computer is the hub of the network.

Even though *Mainframes* are not as popular as they used to be, they are still used in many field where they are unmatched in terms of performance.

IBM The current IBM's Operating System is z/OS, which is a *Monolithic* Operating System, it is being opened to different programming languages, such as **Java**, beforehand, however, it was only available in **COBOL**.

Batch Processing Mainframes are based on the *Batch Processing* paradigm, where a set of jobs are submitted to be executed in a *batch*, that is, a set of jobs that are executed in a single run,

this is in contrast to *Real Time Processing*, where jobs are executed as soon as they are submitted.

This, provided that the company has a sufficient amount of jobs to be executed, allows for a continuous flow of work, and hence, a higher level of productivity.