

Tell me and I forget.

Teach me and I remember.

Involve me and I learn.

— Benjamin Franklin

Chapter 0

Introduction to Information Systems

Dr. Nardjes BOUCHEMAL

Information System =

System

+

Information

System?

First, what does the word "system" mean?

What is a system?

A broad definition:

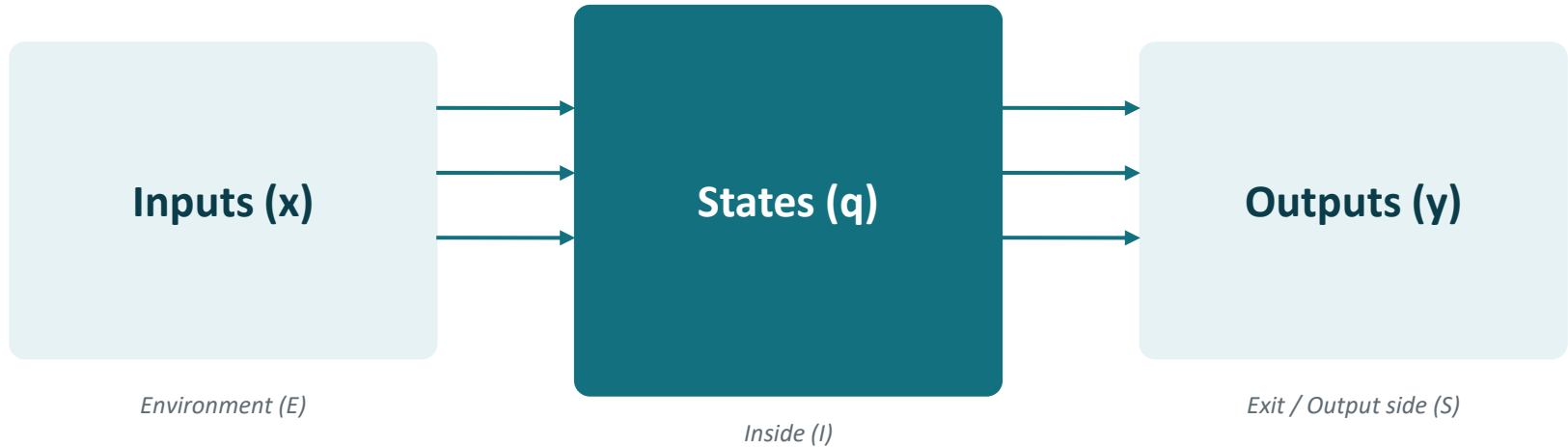
A system is a group of elements that are linked to each other and form a whole.



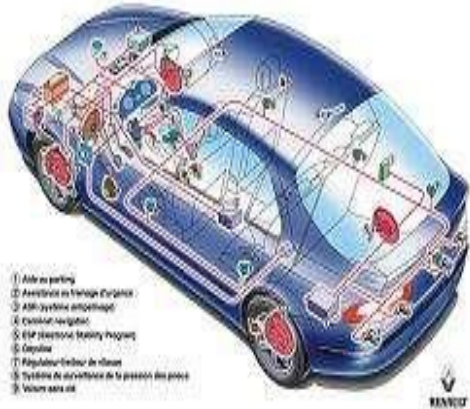
A "group" already means that there is an **INSIDE** and an **OUTSIDE** of the system.

What is a system?

So we often draw a system as a box with input flows and output flows. What happens inside is described by a state/event machine: it shows how the states change over time.



Examples of systems



Embedded system

Electronics inside a car



Legislative system

A parliament making laws



Information system

Dashboards and business data

Where do we find systems?

1) Natural systems

Here, "system" is used to describe things in nature and their properties:

Molecular system

Cellular system

Nervous system

Hormonal system

Immune system

Cloud system

Ecosystem (links between species)

Solar system

Where do we find systems?

2) Artificial systems

Here, "system" describes ideas created by human activity.

In mathematics and physics:

- The metric system
- Coordinate systems (Cartesian, Galilean, relativistic...)
- Systems of equations (differential, finite differences...)
- System dynamics (turbulence, chaos, attractors...)
- Systems modeling

Where do we find systems?

In technology and applied sciences

- Flight management system (aviation)
- Telecommunication system
- Control-command system

In economy and finance

- International monetary system
- System of government (capitalist, planned, self-managed...)
- Quality management system
- Systemic risk

Where do we find systems?

In artificial systems made for information technology, we find:



Computer system

Hardware + software working
together



Operating system

Software that runs the
computer



Expert system

Software that reasons like an
expert

Remember...

Natural or artificial, a system lives and changes over time. Even when a system is not alive, it behaves like a living thing. And this is true even for a system built by human activity.

Information

The second word: what is information?

The idea of information

The main value of information is that it carries meaning.

Whatever its form, the first thing we look for in information is its meaning: what it covers, or its semantic value.

Text

Mail

Speech

Signs

Events

**Computer
program**

Different forms (supports) of information

What is information?

Information is a fact.

Kinds of information:

Commercial

Financial

Technical

Administrative...

Examples:

Customer **X** paid **200 EUR** on **15/04/2009**

The technical problem of customer **X** was fixed by technician **Y** on **18/09/2009**

What is information?

- Information plays a key role in making decisions.
- Information must be understood, analyzed and used.

Example: find the meaning of these:

12051965

217DTM77

1650577470013

??????????????

What is information?



- It gives us knowledge, or improves our knowledge, about any topic.
- It is a useful piece of news.
- It depends on who receives it.
- What is information for one person is not always information for another.
- The value of information grows with its impact and how surprising it is.
- It is a resource and a wealth, just like the other resources.

Information, Data, Knowledge, Expertise

Data

The raw material of information. Interpretation gives data a meaning.

Information

Data + meaning.

Knowledge

A set of experiences, rules and conclusions that let us act based on information.

Expertise

Very deep knowledge on one topic.

Quality of information



Relevant

It must meet the needs of the user.



Accurate

It must not be wrong.



Recent

It must not be out of date.



Available

The user must get it in a reasonable time for their work.



Shareable

It must move (circulate) correctly.

Some thoughts

"To inform is to give representations that help solve problems."

— Robert Reix

"Information is a difference that makes a difference."

— Bateson

"Information is the meeting of a problem and a set of data."

— Mc Donough

Conclusion and discussion on IS design: is the human part of the information system?

Comparison with biological systems



The IS can be compared to a kind of basic **nervous system** of the organization:

- Fast flow of good-quality information between the different "organs"
- Give the right information, to the right person, at the right time:
 - to make the right decisions
 - so the company acts in a way that fits the situation
- So the IS clearly helps the organization to perform well

Analysis and Design of Information Systems

In French: "Analyse et Conception des SI" (ACSI)

The goal of IS analysis and design

Build an information system (IS) for the company.

IS = a set of software for the company

Analysis

We usually focus on one business area of the company:

Sales

Production

Logistics

Finance

HR...

Users' needs

We take into account what the users need.

The problem

We define the problem to solve: the features and the qualities that are expected.

Design

We define a computer **solution**:

Data

How the data is structured

Processing

How the processing (treatments) is organized

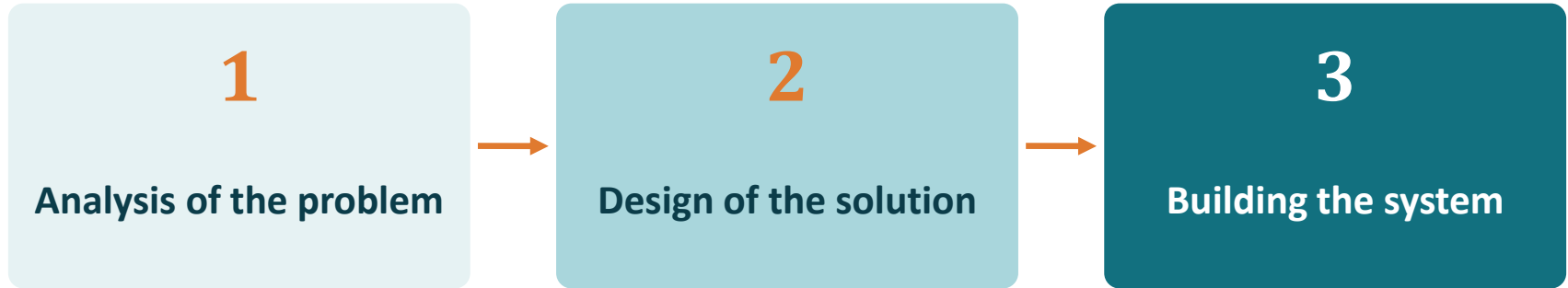
Workstations

Which workstations (job posts) are needed

Technical choices

Hardware, programming languages, database management systems (DBMS)...

Global approach to computerization



In other words, it means **learning** a professional way of **working** to **build** complex **computer applications** inside companies.

Everything is based on models

The analysis and design of information systems is based on the idea of models.

What is a model?

Usually, a model is a simplified picture of a reality we want to learn about. Examples: a plan, a map, a diagram...

How is it written?

A model uses a set of concepts, with rules for how to use them and how to show them (often as drawings).

What are models used for?



Communicate

Check that the analyst has understood the users well.

Analysis phase

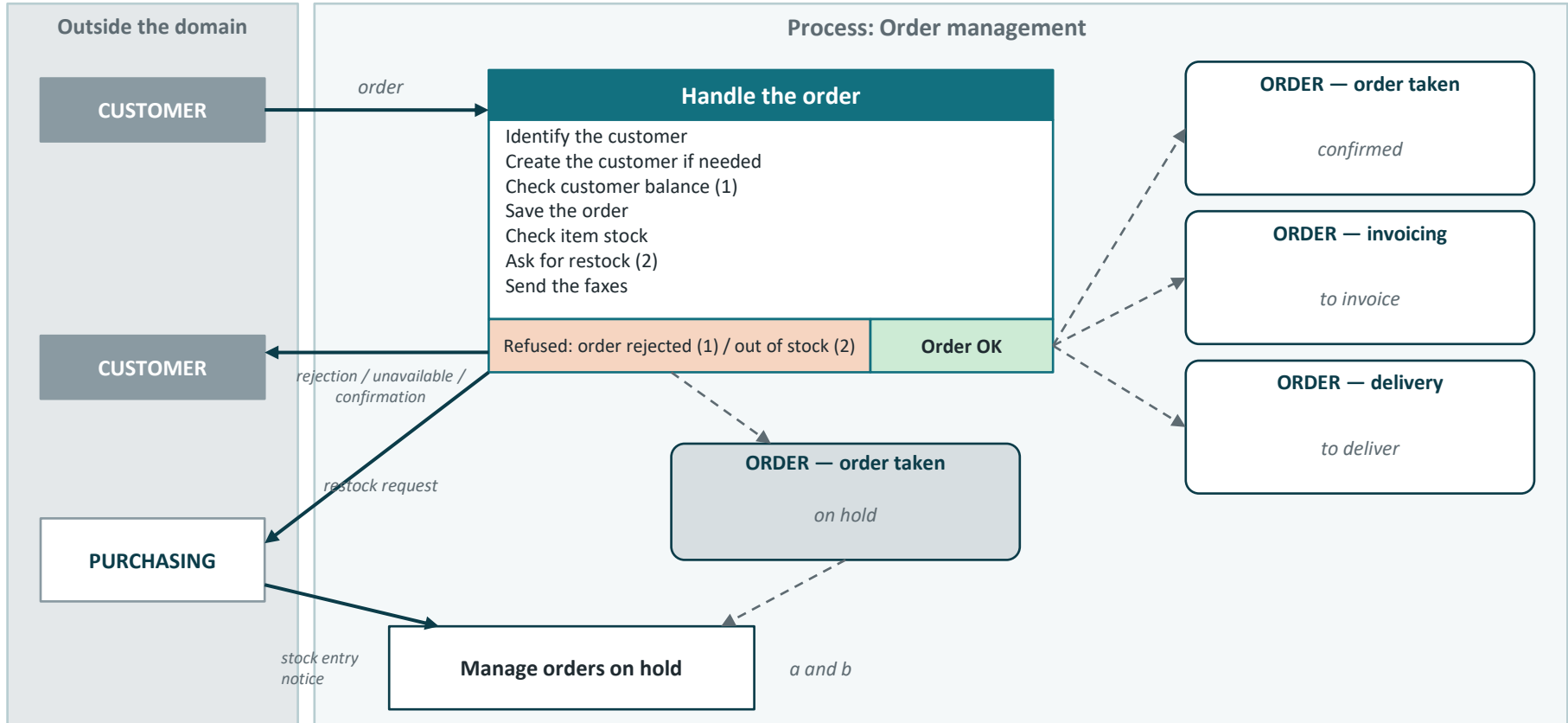


Prepare the building

Using a model of the solution.

Design phase

An example of an ACSI model



Qualities of a good analyst-designer



People skills

Talk with users, work in a team.



Persistence and rigor

Find what is important, do not get lost in details, avoid "more or less" work.



Creativity

There are few ready-made recipes: invent a solution that fits.