

Competency 07

Explores the systems concept and uses systems analysis and design methodology in developing information system

7.1 Explores Characteristics of Systems

Time: 4 periods

Learning Outcomes

- Recalls the definition of systems
- Lists and describes the characteristics of systems
- Classifies and describes systems with examples

What is a System?

A system is a collection of elements or components that are organized for a common purpose.

Or

A system is an orderly grouping of interrelated and interdependent components linked together according to a plan to achieve a specific objective.

(Teachers' Guide 2017)

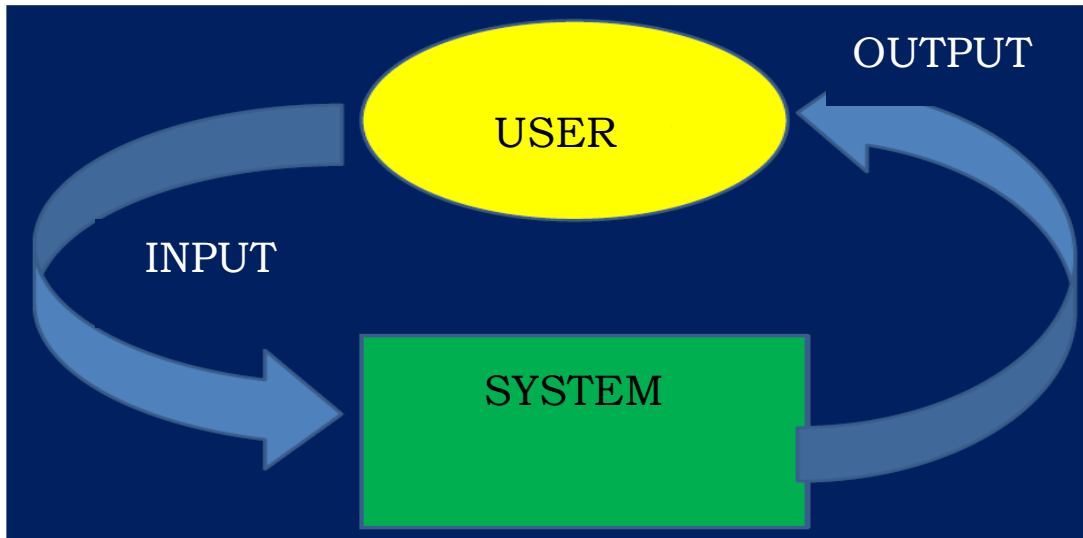
A purposeful collection of inter-related components working together to achieve some common objective. **(Ian Sommerville, Software Engineering, 7th edition)**

Example:

“Mobile phone is a system” and “Bicycle is a system”

Prove above statements

Characteristics of a system



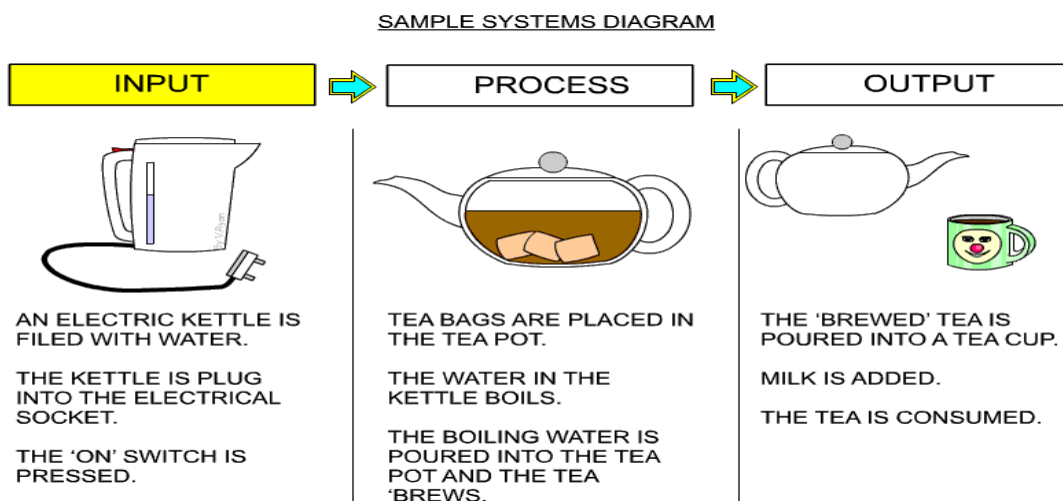
User – May be a Person or a another system (Someone or something)

Example –

Man → ATM → Co Banking

Man → Phone → Tower

IPO (Input Process Output)



Input - Inputs are the information that enters into the system for processing.

Output - The main objective of a system is to get an output which is helpful for its user. Output is the final outcome of processing.

Process - A process is a set of activities that interact to produce a result.

I	P	O
√	√	√
√	x	x
x	x	√
x	x	x

In all the system there must be at least one input, one process and one output.

Classification of Systems

Systems can be classified as,

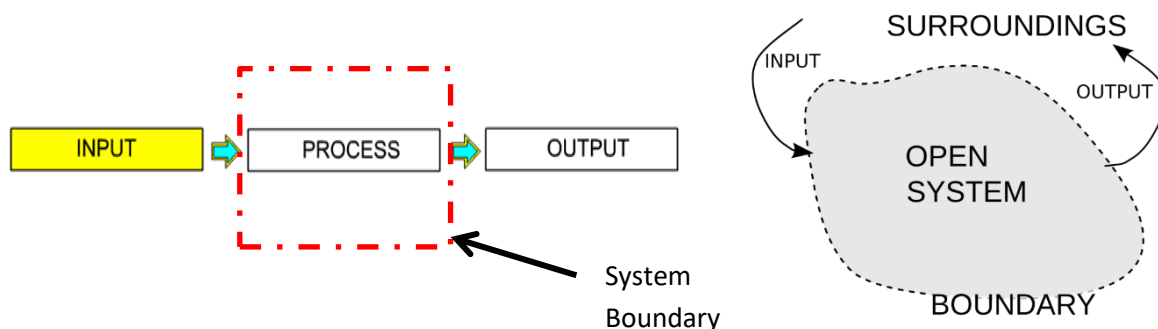
- Open and closed systems
- Natural and manmade systems
- Living and physical systems

Open System

A system that interacts freely with its environment, taking inputs and returning output.

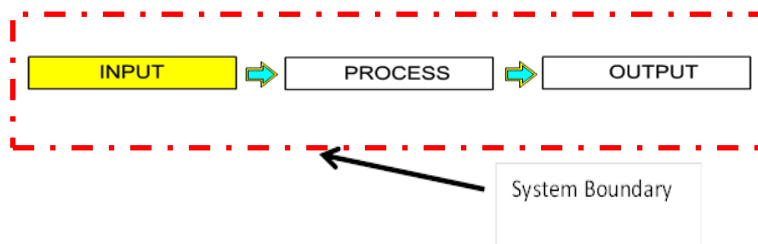
For example, living organisms are considered open systems because they take in substances from their environment, such as food and air and return other substances to their environment.

Humans, for example, inhale oxygen out of the environment and exhale carbon dioxide into the environment.



Closed System

Closed systems refer to systems having relatively little interaction with other systems or the outside environment. Or A system that is cut off from its environment and does not interact with it. A watch is an example of a closed system in that it is a relatively self-contained, self-maintaining unit that has little interaction or exchange with its environment. A vacuum thermos flask does a really good job of stopping energy from leaving the system to keep your drink warm. So it might make sense to treat it as a closed system - but no system in the real world is ever perfectly closed, so it will only be an approximation.



Natural and manmade systems

System which is made by man is called man made system such as education system, Transportation system and so on. Systems which are in the environment made by nature are called natural system such as animal's digestive system and so on.

Living and Non-living / physical systems

Living systems are open self-organizing living things that interact with their environment such as Human digestive system. The systems consist of non-living things are categorized into physical systems such as Solar System.

References

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