Assam Textile Institute

Empowering Textile Education

Class 7

COURSE TITLE = TEXTRONICS

COURSE CODE= TT-603

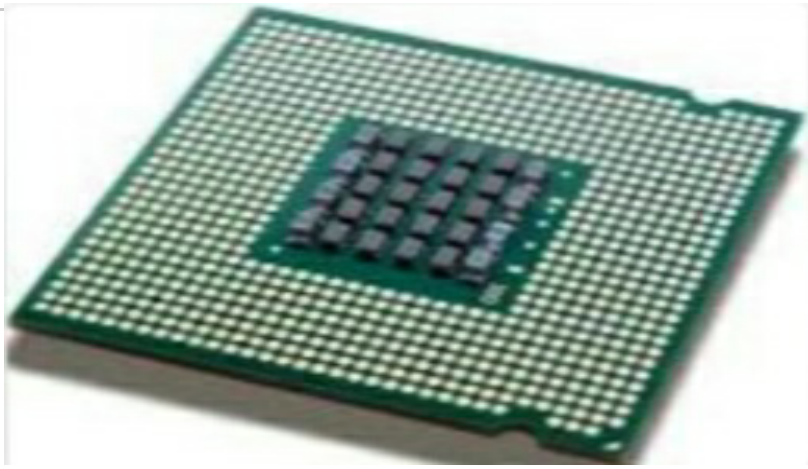
by,

PANKAJ JYOTI DAS

(M.TECH),(ECE)

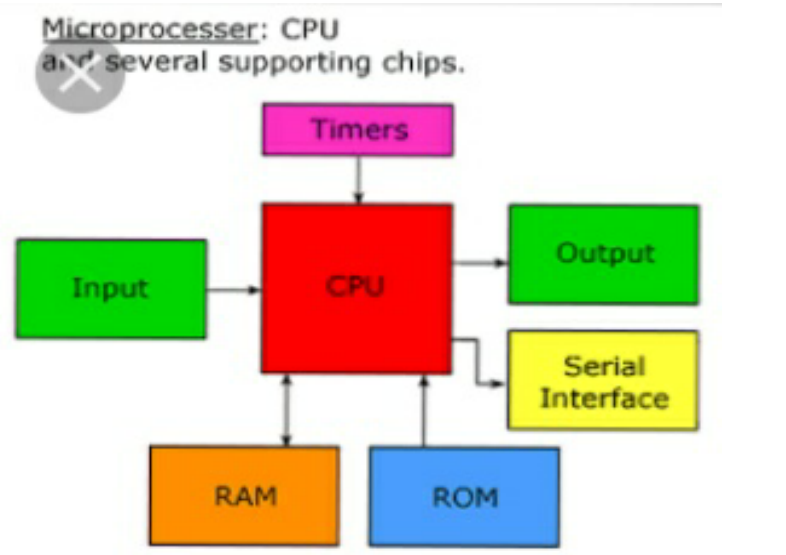
Microprocessor

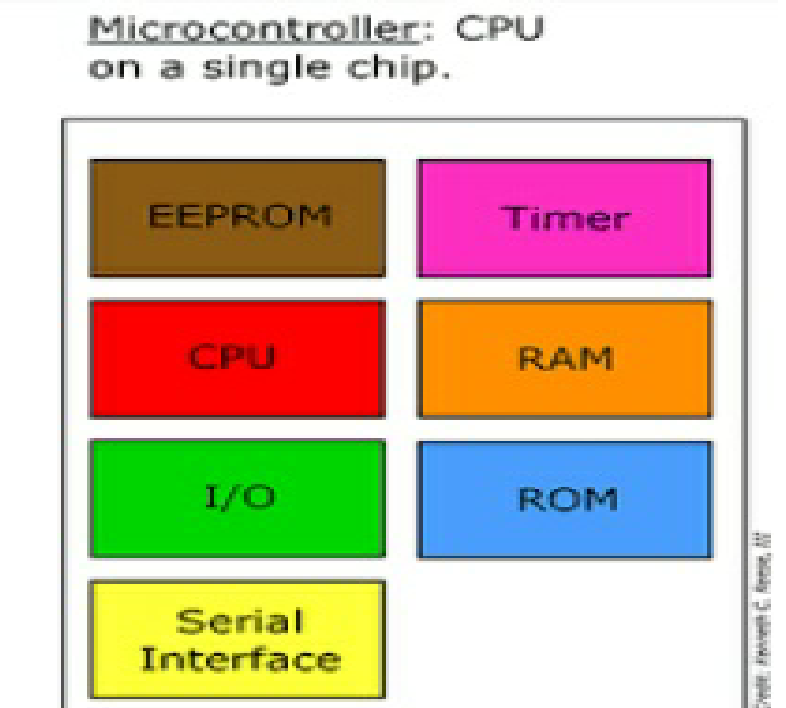
- A microprocessor is an electronic component that is used by a computer to do its work.
- It is a central processing unit on a single integrated circuit chip containing millions of very small components including transistors, resistors, and diodes that work together.



Difference Between Microprocessor and Microcontroller

- Microprocessor is an IC which has only the CPU inside them i.e. only the processing powers such as Intel's Pentium 1,2,3,4, core 2 duo, i3, i5 etc.
- Microcontroller has a CPU, in addition with a fixed amount of RAM, ROM and other peripherals all embedded on a single chip.





Classification of Microcontroller According to Number of Bits.

The bits in microcontroller are

8-bits,

16-bits and

32-bits microcontroller.

- 8 bit Microcontroller : In 8-bit microcontroller, the point when the internal bus is 8-bit then the ALU is performs the arithmetic and logic operations. The examples of 8-bit microcontrollers are Intel 8031/8051, PIC1x and Motorola MC68HC11 families.

Classification of Microcontroller According to Number of Bits.

- **16 bit Microcontroller :** The 16-bit microcontroller performs greater precision and performance as compared to 8-bit. Some examples of 16-bit microcontroller are 16-bit MCUs are extended 8051XA, PIC2x, Intel 8096 and Motorola MC68HC12 families.
- **32 bit Microcontroller :** The 32-bit microcontroller uses the 32-bit instructions to perform the arithmetic and logic operations. These are used in automatically controlled devices including implantable medical devices, engine control systems, office machines, appliances and other types of embedded systems. Some examples are Intel/Atmel 251 family, PIC3x.

Architecture of 8051 Microcontroller

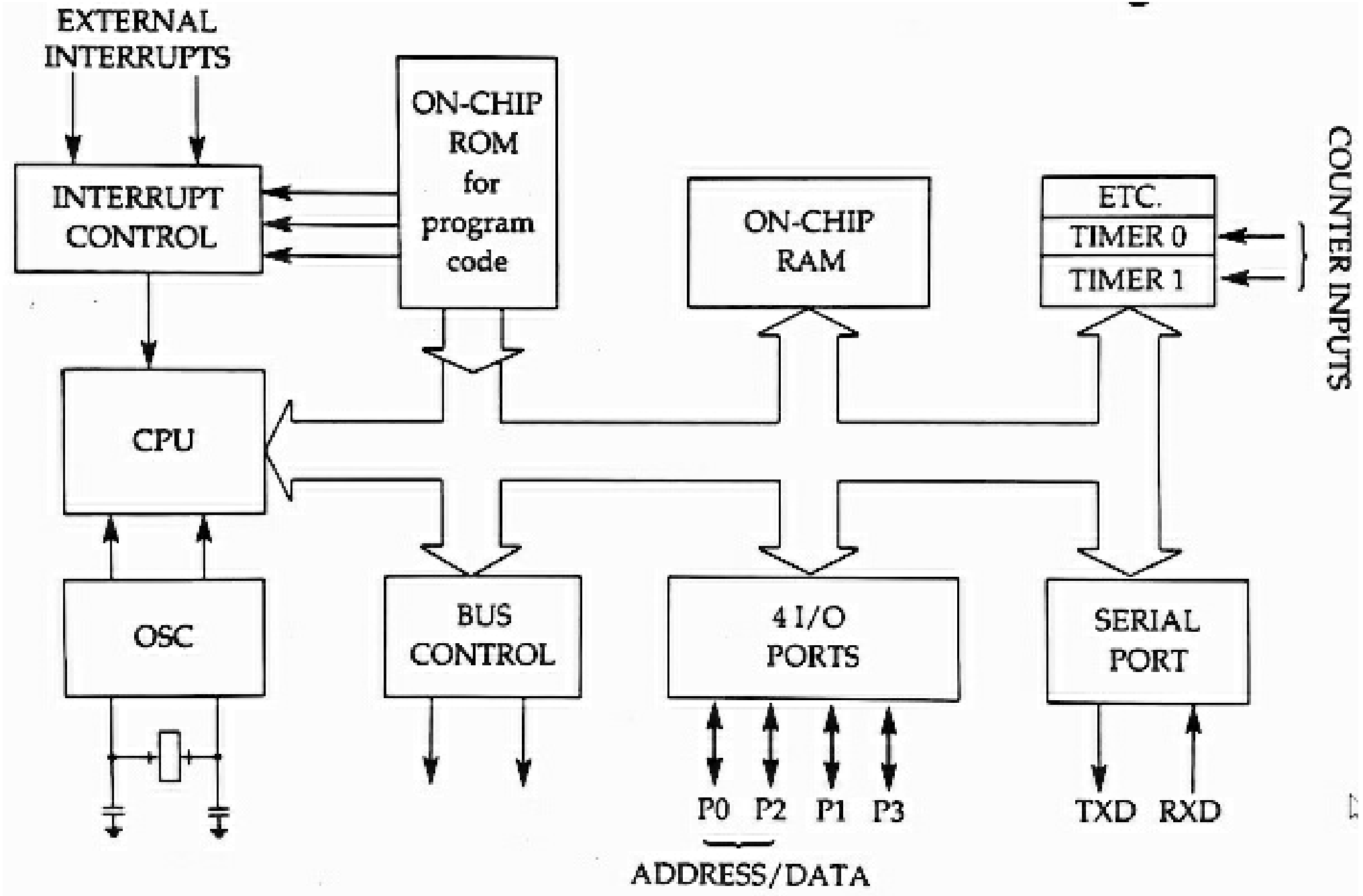
8051 MC	• 8 bit microcontroller

Components of 8051

RAM	• 128 bytes
ROM	• 4 K bytes
Timer	• 2-16 bit timer
Serial port	• 1 serial port
I/O port	• 4 I/O port • Each of 8 bit wide
Data Bus	• 8 bit width
Address bus	• 16 bit width

Intel MCS-51

Architecture of 8051 Microcontroller

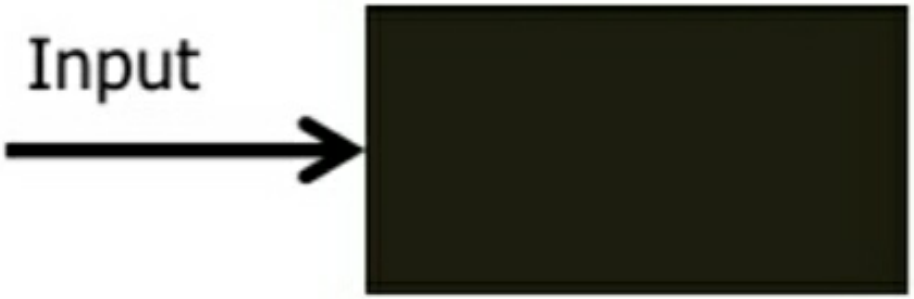


CONTROL SYSTEM

Control System

- It is an arrangement of different physical elements connected in such a manner so as to regulate, direct or command itself to achieve a certain objective.

Input

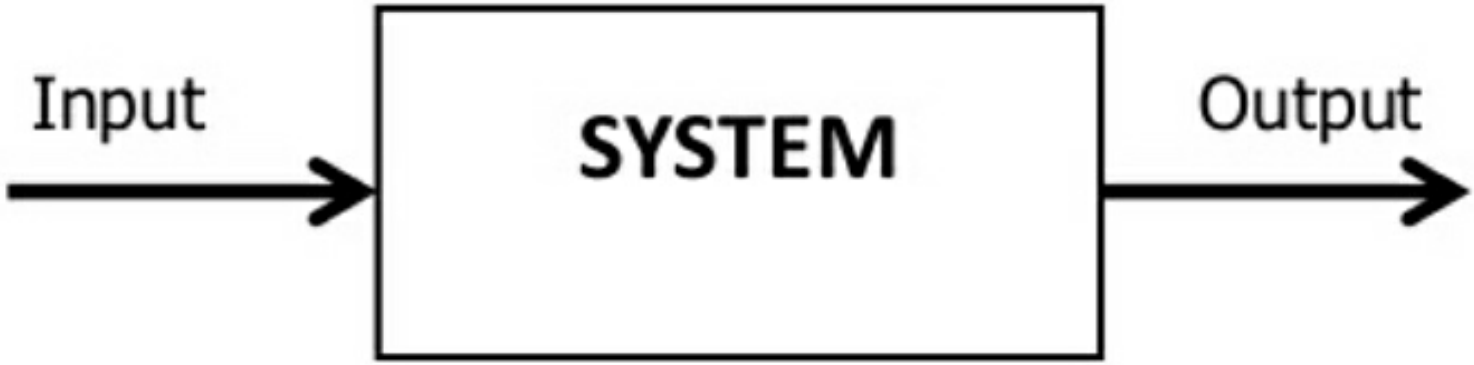


- The stimulus or excitation applied to a control system from an external source in order to produce the output is called input

Output

- The actual response obtained from a system is called output.

"System"



- A system is an arrangement of or a combination of different physical components connected or related in such a manner so as to form an entire unit to attain a certain objective.

Control

- It means to regulate, direct or command a system so that the desired objective is attained

Combining above definitions

System + Control = Control System

Examples of system, non system and control system

A Fan: Can't Say System

- A Fan without blades cannot be a "SYSTEM"

  Because it cannot provide a desired/proper output

  i.e. airflow

Input

230V/50Hz

AC Supply

Output

No Airflow

(No Proper/ Desired Output)

Examples of system, non system and control system

A Fan: Can be a System

- A Fan with blades but without regulator can be a "SYSTEM"
  Because it can provide a **proper output** i.e. airflow
- But it cannot be a "Control System" Because it cannot provide desired output i.e. controlled airflow

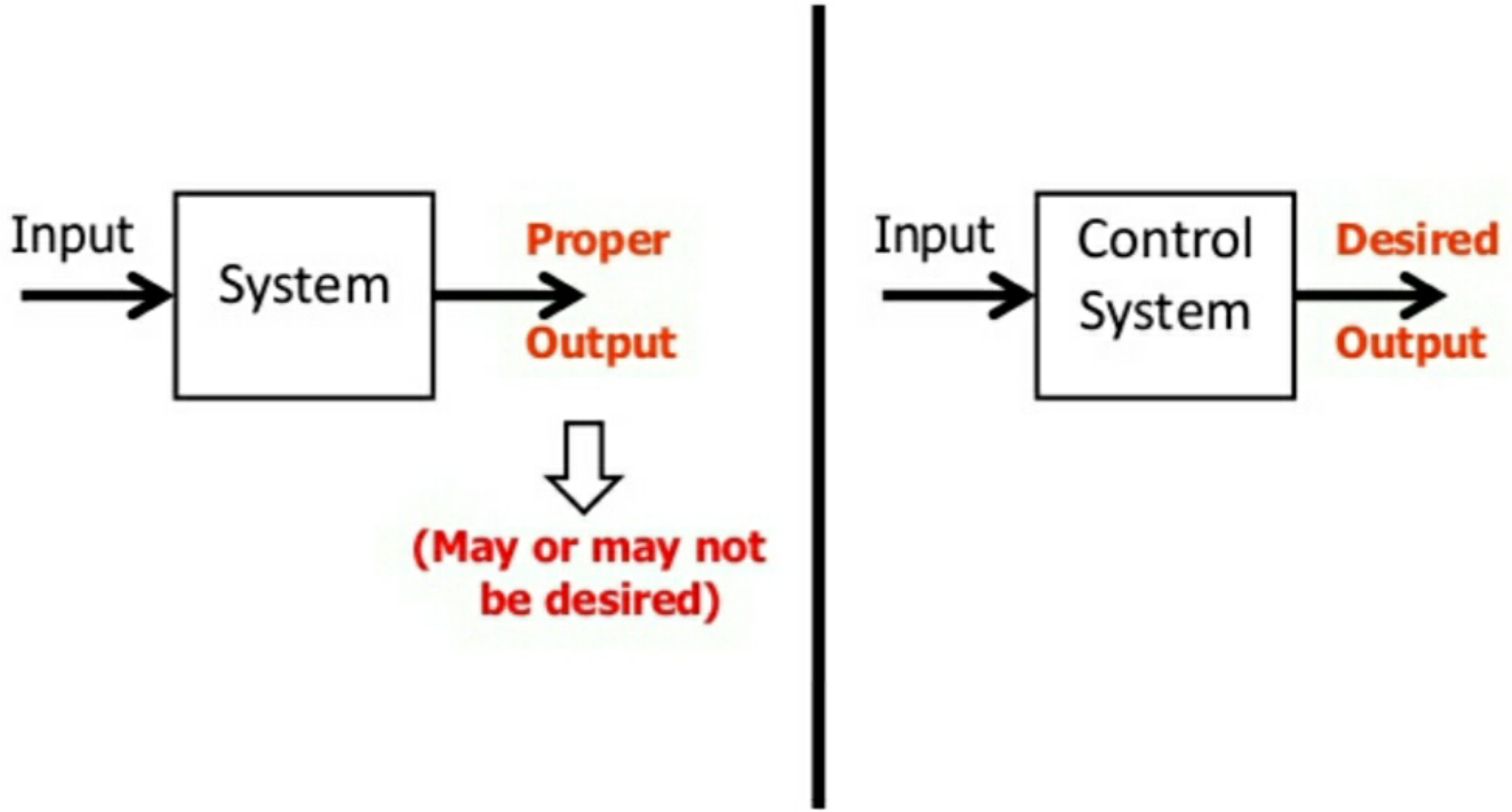
Examples of system, non system and control system

A Fan: Can be a Control System

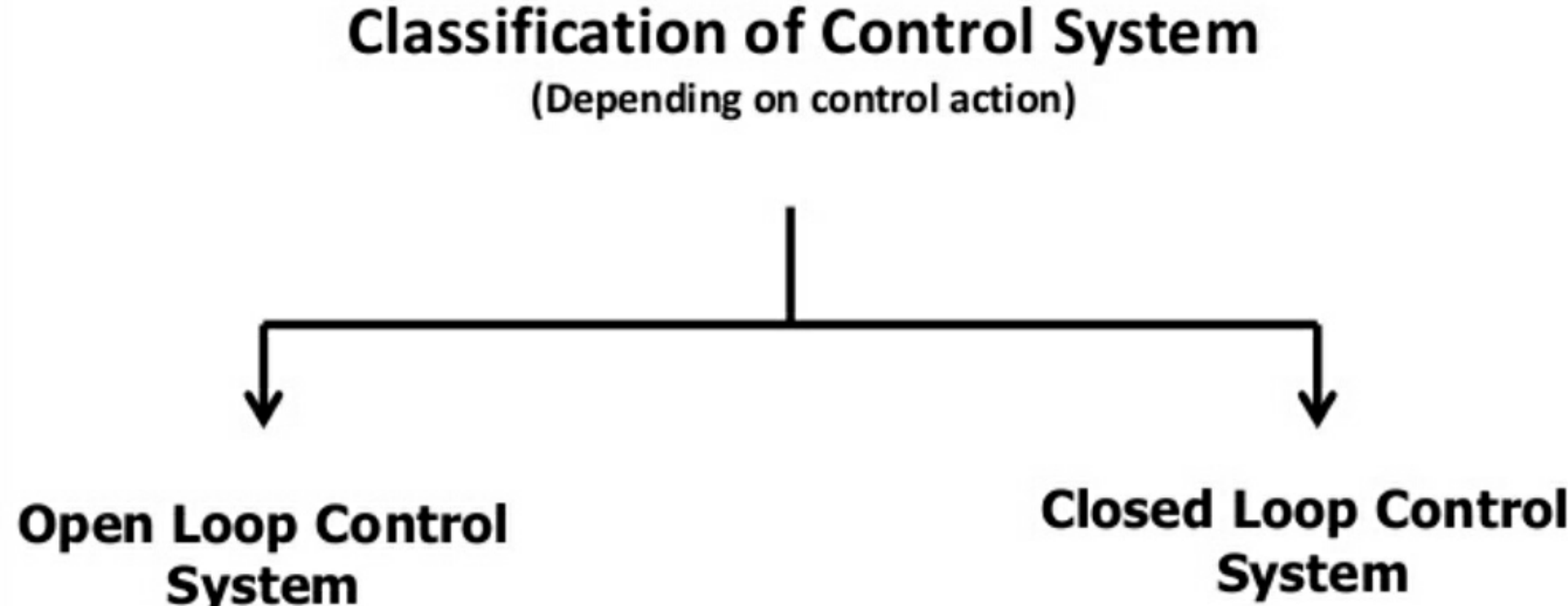
- A Fan with blades and with regulator can be a "CONTROL SYSTEM" Because it can provide a **Desired output.**

  i.e. Controlled airflow

Difference between System and Control System



Classification of Control System



Open Loop Control System

Definition:

"A system in which the control action is totally independent of the output of the system is called as open loop system"

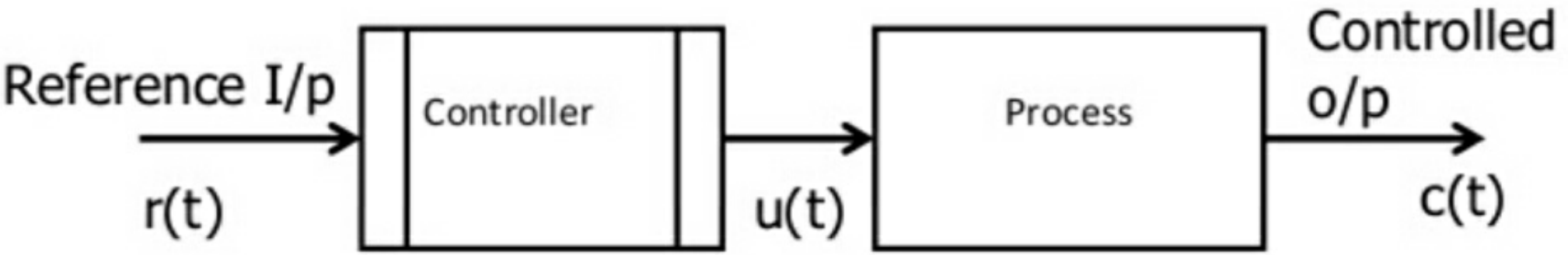


Fig. Block Diagram of Open loop Control System

OLCS Examples

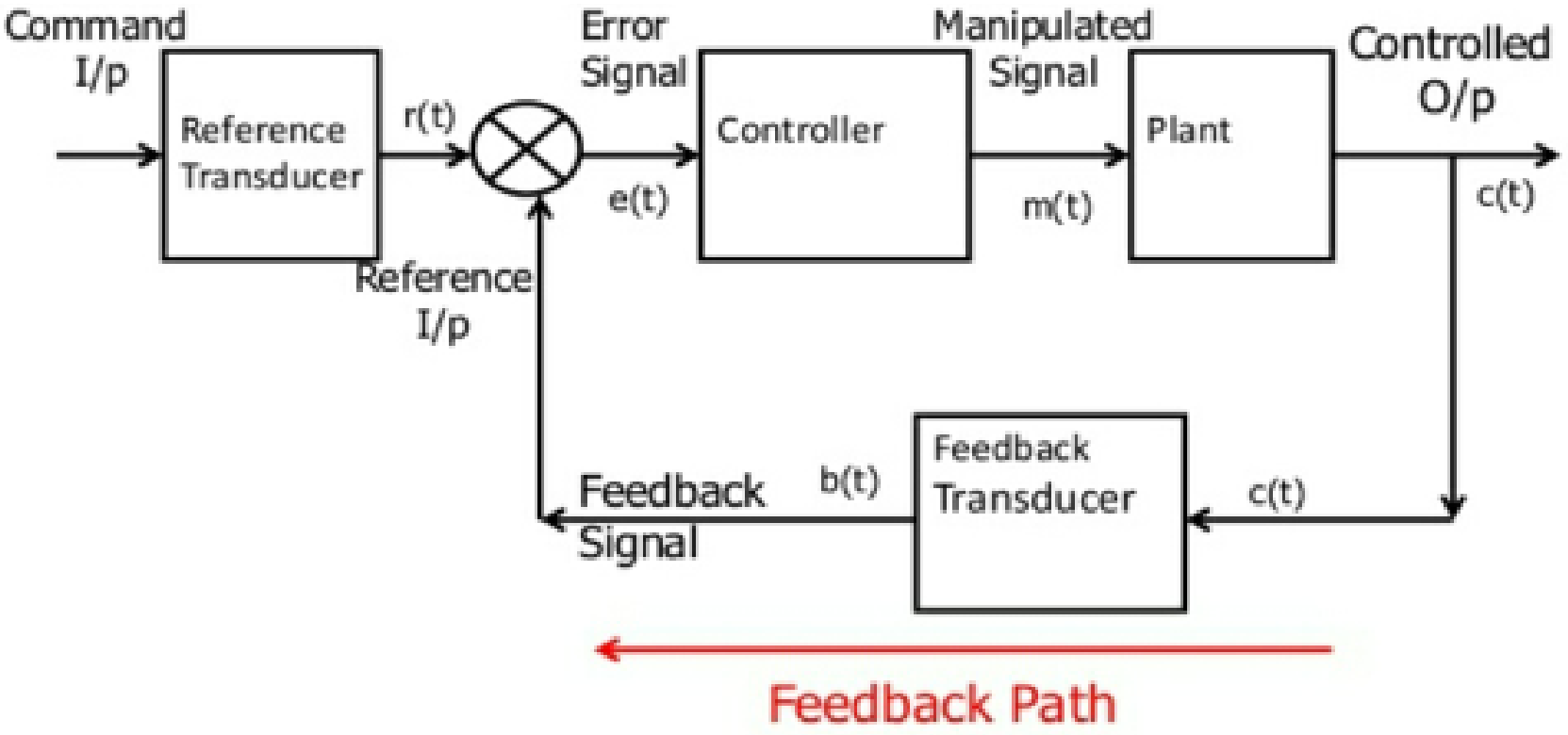
- **Automatic washing machine**

  – This machine runs according to the pre-set time irrespective of washing is completed or not.

Closed Loop System

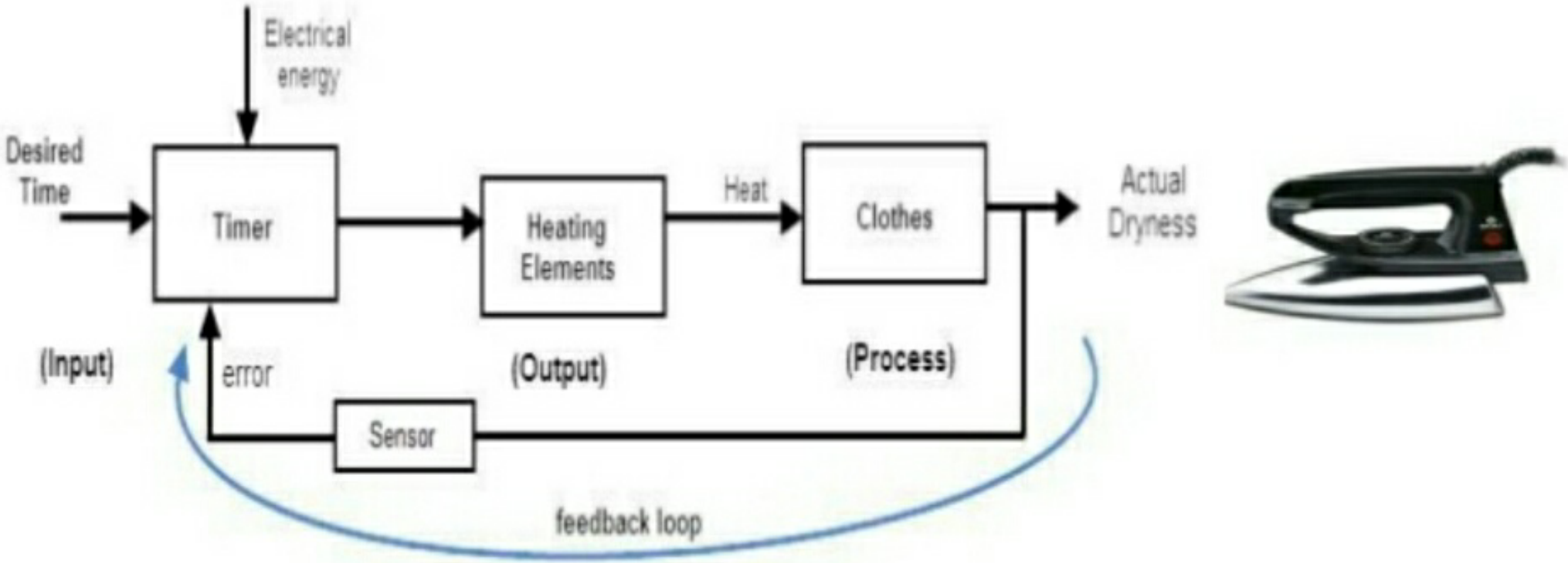
Definition:

"A system in which the control action is somehow dependent on the output is called as closed loop system"



CLCS Examples

- **Automatic Electric Iron**- Heating elements are controlled by output temperature of the iron.



Difference Between OLCS & CLCS

Open Loop Control System	Closed Loop Control System
1. The open loop systems are simple & economical.	1. The closed loop systems are complex and costlier
2. They consume less power.	2. They consume more power.
3. The OL systems are easier to construct because of less number of components required.	3. The CL systems are not easy to construct because of more number of components required.
4. The open loop systems are inaccurate & unreliable	4. The closed loop systems are accurate & more reliable.

Difference Between OLCS & CLCS

Open Loop Control System	Closed Loop Control System
5. Stability is not a major problem in OL control systems. Generally OL systems are stable.	5. Stability is a major problem in closed loop systems & more care is needed to design a stable closed loop system.
6. Small bandwidth.	6. Large bandwidth.
7. Feedback element is absent.	7. Feedback element is present.
8. Output measurement is not necessary.	8. Output measurement is necessary.

Difference Between OLCS & CLCS

Open Loop Control System	Closed Loop Control System
9. The changes in the output due to external disturbances are not corrected automatically. So they are more sensitive to noise and other disturbances.	9.The changes in the output due to external disturbances are corrected automatically. So they are less sensitive to noise and other disturbances.
10. Examples: Coffee Maker, Automatic Toaster, Hand Drier.	10. Examples: Guided Missile, Temp control of oven, Servo voltage stabilizer.