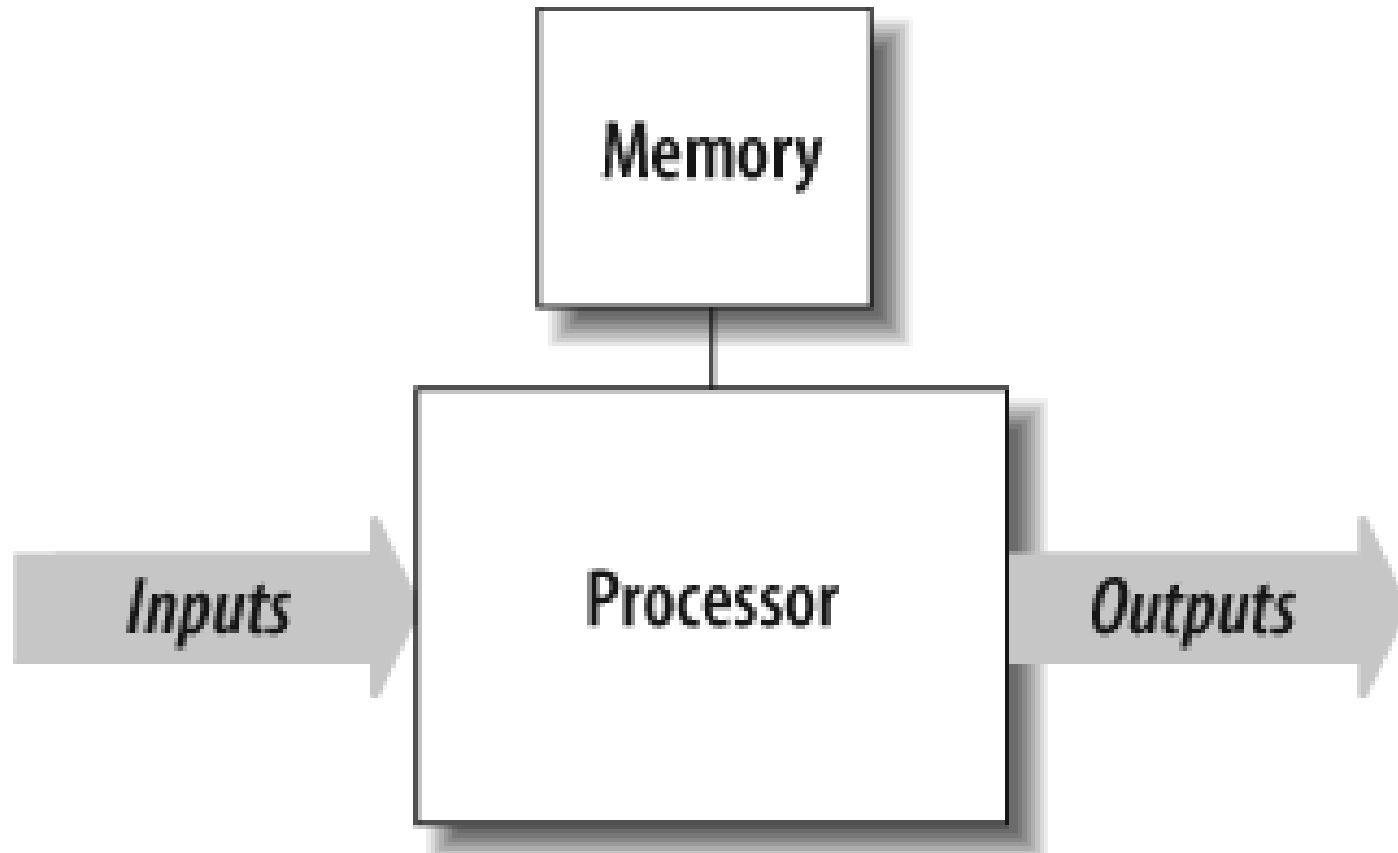


Components of Embedded System



Components of E.S :



INPUT DEVICES



KEYBOARD



MOUSE



JOYSTICK



SCANNER



WEB CAMERA



MICROPHONE

OUTPUT DEVICES



MONITOR



PRINTER



SPEAKER



HEADPHONE



PROJECTOR

What is meant by an output device?

- **The Arduino output devices are the devices that take instructions from the Arduino and provide output in human-readable form.**
- **An example can understand the concept of an output device if an appliance works on the values coming from the sensor, the appliance will be an output device, and the sensor will be an input device.**

➤ **There are several output devices that we can interface with Arduino microcontrollers. So, we have listed some of the output devices that can use Arduino :**

- **LEDs**
- **Motors**
- **Liquid crystal displays (LCDs)**
- **Relays**
- **Seven segment displays**
- **Speaker and buzzer**

Different types of output devices :

Light emitting diode (LED):

- The LEDs can be used as an output device with Arduino as they can serve various purposes in the projects; for example, the colour of the LED can be associated with any type of indication.
- The indication can be for turning on an appliance or a circuit or can indicate there is any fault in the circuit.



Motors :

- **Arduino boards can also be used to drive DC motors, which can run or control another device. For example, if water is to be pumped using Arduino, the DC motor will be an output device.**
- **The device will run when the water level falls below the level given**



Liquid Crystal Displays (LCDs):

- To display the output of the Arduino program, digital displays are interfaced with Arduino.
- These displays come in multiple sizes/resolutions; the most common is 16×2.
- The purpose of the LCD is just to display the output data coming from the Arduino board or the input data given by any input device to the Arduino board.



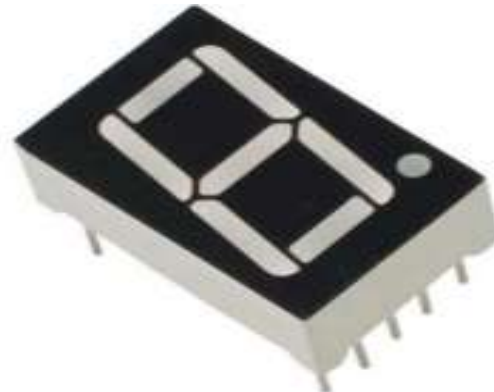
Relays :

- Relays are generally used to protect the devices in the circuit as it isolates the faulty part of the circuit from the whole circuit.
- Another purpose of the relays is to use them to switch from one device to another.
- The Arduino boards mostly use relays as an output device, as they can switch from one device to another



Seven-Segment Displays:

- The seven-segment displays are used when the output of Arduino is only in the form of numbers, for example, in digital counters, clocks, or electronic meters.
- A single module of the seven segments can display numbers from 0 to 9.
- It comes in two configurations: a common anode and a common cathode.



Speaker and Buzzer:

- In Arduino projects, the speakers or buzzers are interfaced as an output device.
- These can be used for sounding an alarm or playing any melody on specific frequencies.
- Similarly, speakers can also be used for giving voice commands in case of the occurrence of an event.



THANK YOU