



IOT Session 2: Hardware Discussion

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Revise the concepts

What actually is brain ?

Microcontrollers and MicroProcessors

Why we are going to use microcontroller ?

What actually is brain ?

Biological Definition: Brain is a complex organ that controls thought, memory, emotion, touch, motor skills, vision, breathing, temperature, hunger and every process that regulates our body.

Hardware Definition

Brain in terms of hardware, gives all features which human brain can do, like

- Storing information (memory)

- Input and Output (Receiving Data and Sending Data)
- Battery Status (Hunger)

Microcontrollers and Microprocessors

Microprocessor

Microprocessor is a type of computer processor in which both the data processing logic and control are included on a single integrated circuit or on small numbers of integrated circuits. These processors consist of logic, control and arithmetic circuits. Its integrated circuit is capable of interpreting and executing program instructions. These are multiple purpose, clock-driven and register based digital integrated circuits that accept input in binary data and processes it as per the instruction stored in its memory.

Microcontroller

A microcontroller is a small and low-cost microcomputer on a single VLSI integrated circuit (IC) chip. It is used for controlling portions of an electronic system through a microprocessor unit (MOU) and some peripherals. Microcontroller contains processor cores with additional peripherals such as serial interface, time, programmable I/O, and memory on the same chip. It interacts with other components due to its functionality that results from the combination of digital memory and digital processor with additional hardware. A microcontroller is also known as an Embedded controller, single-chip-computer, or a computer-on-a-chip.

| Microprocessor | Microcontroller |
|---|---|
| Since memory and I/O are connected externally, the circuit becomes large in size. | Since memory and I/O are present together, the internal circuit is small in size. |
| It cannot be used in compact systems | It can be used in compact systems. |
| Cost is high | Cost is low |

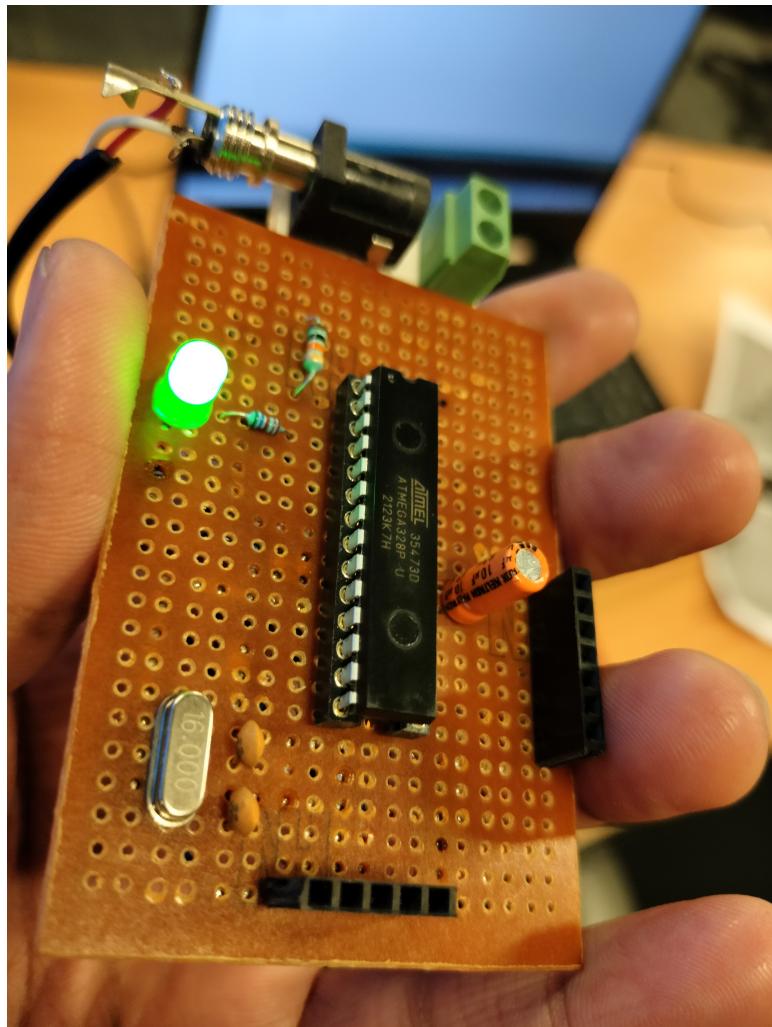
| Microprocessor | Microcontroller |
|---|---|
| It is not suitable for devices that run on stored power since total power consumption is high due to external components. | It can be used on devices that use stored power since total power consumption is low due to less external components. |
| RAM, ROM, I/O units, and other peripherals are not embedded on a single chip. | RAM, ROM, CPU and other peripherals are embedded on a single chip. |
| Do not have power saving mode. | Have power-saving mode. |
| Used in personal computers. | Used in embedded systems. |
| Less number of registers. | More number of registers. |
| Uses an external bus. | Uses an internal controlling bus. |

Why we are going to use microcontroller ?

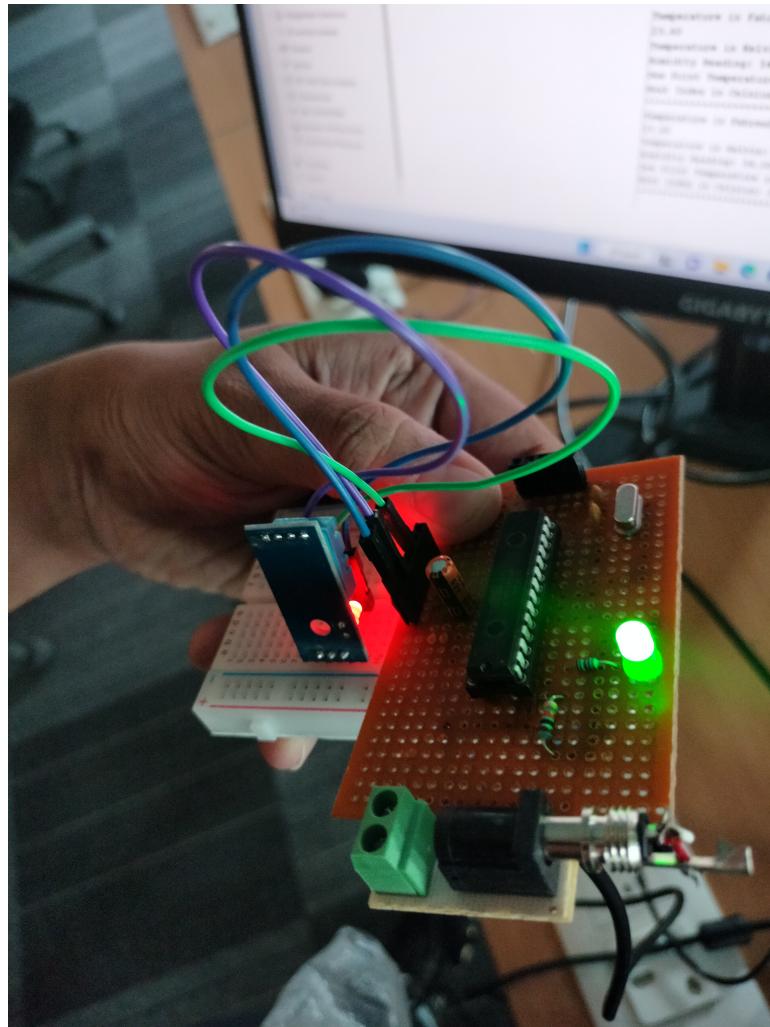
Why Statement Socho

Practical Demo of microcontroller and microprocessor.

Microcontroller Used: Indie Board



Device: Temperature Logger



What this device is doing ?

```
Temperature in Fahrenheit: 74.48 F
23.60
Temperature in Kelvin: 296.75 K
Humidity Reading: 54.00 %
Dew Point Temperature in Celsius: 13.77 C
Heat Index in Celsius: 23.43 C
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