

Workshop Notes

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Tinkering Workshop

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Overview

processors are used as a method to control and process inputs and output as an **IFTTT** device (if this then that). It takes input from users, process it and then give an particular output.

Unlike PCB which electrically connects electronic components or electrical components using features etched from one or more sheet, processors can adapt themselves to different circuits.

PCB are "PARTICULAR" to only one kind of function and can not be changed . For example , in the case of a remote control for your T.V , it is based on a particular arrangement of PCB and it generates signals which effect only that particular bandwidth T.V and not your A.C or any other device.

On the other hand, **Processors** are 'programmable' and can be adapted to different requirements like seen in the case of universal remotes which are adaptable to different devices since the are programmed to learn from signals of other remotes.

BIBOX HORNBILLS

On the whole , the workshop discusses the use of the processors . Hornbill is on of those microcontrollers discussing it reaction to how it is made to respond to its surroundings and it is done with help of hands on projects.

HORNBILL ,with its name taken from a bird , is a microcontroller (in complexes) , embedded with multiple data exchange universal technologies including bluetooth , USB , external WiFi etc. along with AUX cable for connections with input and output devices . It is based on custom android for firmware.

Input & Output devices

INPUT - hardware or peripheral device used to send data to a computer. An input device allows users to communicate and feed instructions and data to computers for processing, display, storage and/or transmission. Eg - LDR (Light Dependent Resistor) , Switches , Thermal Sensors etc.

OUTPUT - used to send data from a computer to another device or user. Most computer data output that is meant for humans is in the form of audio or video. Thus, most output devices used by humans are in these categories. Examples include LED, projectors, speakers, headphones and printers etc.

How HORNBILL adapts to input and output devices

For input devices , it can detect any analog signals on 4 pin that are A1 , A2 , A3 and A4

For output, only A2 and A3 are analog , the other two are digital.

M1 and M2 are high power outputs for connecting motors and the pin in between both of them is for power source.

That means one can take input of about any fluctuating values but for output, one can only change the voltage on A2 and A3 pins . On A1 and A4 , it will be either on or off. This way, if we

need to make an led to dim as per our requirement , we need to give it an analog output i.e- on A2 and A3.

Difference between digital and analog

DIGITAL

It is either on or off that is either 1 (on) or 0(off).

For example a usual tube light we see is either on or off. It is also seen in case of computer processing and storage where one unit of component in a memory ,storing data is either on signifying 1 or off signifying 0.

ANALOG

It give variable output/ input on different voltages.

It ranges from 0 to 65535 in a bibox hornbill.

For example a fan speed can be regulated by a regulator is stimulating analog output.

3D PRINTER

We know there are 3 axis in 3D that are X-axis , Y-axis and Z-axis.

2D printing is done on a paper on X and Y axis. Now imagine that , we stack multiple pages on top of each other .We find that it gained a height that is the Z-axis. This is the concept of 3D printing.

3D printers use an organic degradable plastic called as **PLA or Poly Lactic Acid** which is red in color when made however , coloration may be given to it when it is mixed with some dyes. It is better than ordinary plastics because

1. It is Degradable ie - environmental friendly.
2. It is easily moldable and also hardens quickly
3. It does not release harmful fumes while burning making it , child friendly.

On the other hand plastics like ABS (Acrylonitrile butadiene styrene) when used for 3D printing produce Hydrogen Cyanide which can cause cancer.

Filament comes from back and heats up at the end of nozzle to get moulded to shape that is wanted. Then a 2D layer is created from that plastic which is stacked over one another again and again to form a 3D plastic model.

These models are generated first in computer programs and then converted to the format of .gcode which can be understood by the printer.