Brief descriptions of information at https://ohmsanganak.com/

(1) Make your own arm cortex m3 microcontroller board from scratch (STM32F103RCT6 board)

in this article I took a ARM cortex microcontroller and did circuit design after doing research on web , then I tested my circuit on a breadboard and then used CAD program formerly (Cadsoft's Eagle package now bundled with Autodesk's Fusion 360) to design a custom PCB (Printed circuit Board),got it manufactured. I also did the board bring up by installing a freely available bootloader over USB/serial port and finally I did a hardware hello world by connecting a LED and C/C++ program to blink LED.

(2) Wifi addition to STM32F103RCT6 board

in this article I took Espwifi arduino library to use esp8266 based WiFi serial module to connect to Arduino web site (Arduino.cc) and fetch a page and display it on Arduino's serial port. This opens up possibility of this board can be used as base for IoT.

(3) Reading temperature and humidity from seeedstudio grove DHT-11 sensor using STM32F103RCT6 board

In this article I used Seed studio's DHT11 Temperature and humidity sensor to fetch Temperature and Humidity data and display on Arduino IDE's serial port.

(4) Network attached weather center

I extended it further by displaying Pressure, Temperature, Humidity on a Linux running on onion omega mini (module computer) I used Arduino dock offered by onion omega to fetch data from BME280 sensor and used omega to retrieve it from Serial port and display it in a web browser.

(5) Make your own parallax propeller p1 (P8X32A-D40)

Parallax P1 (P8X32A-D40) eight cog (core) microcontroller's circuit

Was implemented on Vero board after designing circuit, then a PCB was designed and manufactured with EEPROM(non-volatile storage) ,finally compiler and SimpleIDE (C language support)provided by parallax was used to do hardware hello world (blink a LED)

(6) Experiment with teenys4.0 and wifi

teensy 4.0 and tennesy 4.1 Expansion board made by BurgessWorld Custom Electronics

was used to do experiment with onboard ESP-8266 model-12E wifi. WiFiEsp library was used in this experiment to fetch web page from website arduion.cc

(7) Experimenting with DFRobot's Gravity speech synthesis module

Arduino DUE has speech synthesis moule attached to one of it's serial port, sample text was sent to speech synthesis module and audio was heard from it's built in speaker. Experiment with English speech synthesis was done. It also supports Chinese.

(8) Experimenting with Reed Switch and Arduino Due

Reed switch are switches which responsd with state change when magnet is brought near it. In this experiment Arduino DUE microcontroller with reed switch attached to one of its pins was used to observer LED state change (On/Off).

(9) Basic fiber optics experiment

Off the self Fiber modem and fiber duplex break out board was used to create a 1Mbps fiber optics link, "hello there" string/message was echoed back by using Arduino Due. Plastic fiber optical cable was used in creating link/connection.

(10) **CAN BUS EXPERIMENT**

Controller Area Network (CAN Bus)

Controller Area Network (CAN) is a serial communication protocol that allows microcontrollers and devices to communicate in a vehicle or industrial automation system without a host computer. It reduces wiring by using a bus architecture, and it ensures reliable, high-priority data transmission through a message-based protocol with a non-destructive arbitration process

Two Arduino UNO R4 WiFi was used in two node CAN Bus network. One as transmitter and other as receiver. A third node (teensy 4.1) (with expansion board) with built in transceiver (on expansion board) was used in three node CAN Bus network.

(11) LInux (ARM) and STM32F103RCT6 CAN bus experiment

Ti's (Texas Instrument) PocketBeagle with Grove kit running Linux operating system was used to create first three node CAN Bus network, other two nodes were Arduino UNO R4 WiFi. Also five

node CAN Bus setup was also tried, one of CAN bus node was STM32F103RCT6 developed by me. In five node network teensy 4.1 was also used. Simultaneously transmission by two nodes was done without data loss/overrun. One of limitation of STM32F103RCT6 is that USB and CAN cannot be used at the same time, so hardware serial port on STM32F103RCT6 was used to display received CAN Bus messages.

(12) **STM32F103RCT6 and BME688 environment sensor interfacing**

STMicorosystems's STM32F103RCT6 ARM microcontroller is interfaced to BME688 (it is backward compatible to BME680, manufactured by Bosch Sensortec, BME680 and BME688 both sensor are manufactured by **Bosch Sensortec**) environment sensor (Pressure,Humidity,Temperature,Gas), same Arduino code for BME680 was used with minimal(cosmetic) modification.

(13) **Arduino UNO R4 WiFi and battery charge status in Web Browser**

Arduino UNO R4 WiFi and SparkFun's battery babysitter BQ27441 controller is used to charge Li Ion rechargeable battery and UNO R4 WiFi gets battery charge and other vital data from controller and displays in a table in a web browser.