Winter Camp Robotics Club

(Microcontrollers)

Overall Session Plan:

1. **Introduction**:
    - Different microcontrollers available, specifications for required work...
2. **Arduino:**
    - Physical parts explanation (pins uses)
    - Arduino IDE
        - Basics of processing language
        - Different functions
3. **Basic sensor with arduino:**
    - Different sensors and their practical applications
    - Working of the sensors
    - Arduino circuit
4. **Raspberry pi:**
    - Basic introduction of the parts on board
    - OS installation and SSH to rpi

DAY 1:

INTRODUCTION:

- What is a microcontroller?
- Specifications
- Different microcontrollers we use

Arduino:

- Complete introduction, parts and manufacturing of the board, pin definition, etc
- Arduino IDE: processing language, different functions, coding

Sensors:

- Ultrasonic sensors, QTR(an array of IR sensors which we used in Line following bot) and InfraRed sensor, temperature humidity sensor, HC05 bluetooth module (Anmol and Kuldeep)
- Sensor working and arduino circuit

Day 2:

Sensors continuation in day 2….

Raspberry Pi:

- Basic introduction
- Board specifications and manufacturing

- Ssh to rpi basics
- Real life applications

Day 3: very complicated tasks with sensors, Arduino and Rpi -
Using ultrasonic sensors, count number of people crossing one point. (in front of the sensor)
If you are given 2 sensors, can you count the number of people present in a room = number people entering room - number of people leaving room.

Tasks:

- Led Brightness Control/ Motor Speed Control using Gyroscope(IMU)
- **Ultrasonic sensor - bluetooth interface (ask Anmol Gupta/Kuldeep)**
- **Counter and motor direction controller using 2 ultrasonic sensors**
- **Running a DC motor in any specific given sequence of directions**

If time permits teach communication protocol I2C, SPI ,UART. (How sensors data to microcontroller or if there are two microcontrollers how will they communicate)