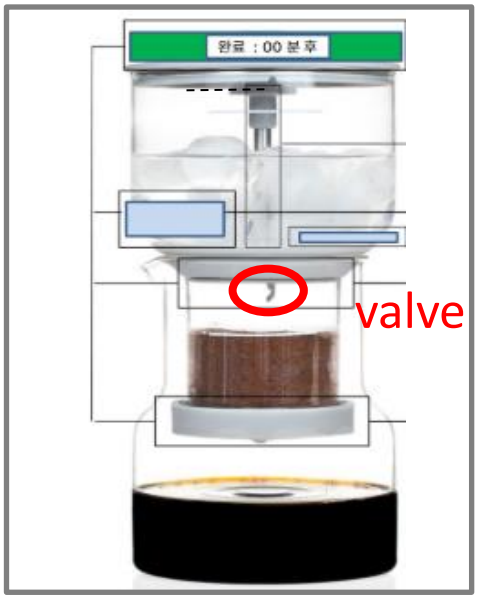
**[ 프로젝트 목적 ]** Cold Brew Coffee Automation System




주 목적

<---- optional
<---- mandatory

1 Auto Valve Control <---- Coffee Ground Analysis

Image processing

| How 1 : Solenoid Valve | How 2 : Valve with Motor |
|---|---|
| on/off control ( <100ms) | Motor – Water drop : P control |
| water drop volume calculation at different height | Water drop volume calculation at different height |

2 Estimated Time Display

Estimated Time = interval * (current water volume / water drop volume)

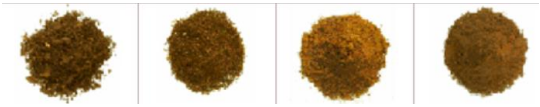
water drop volume calculation at different height

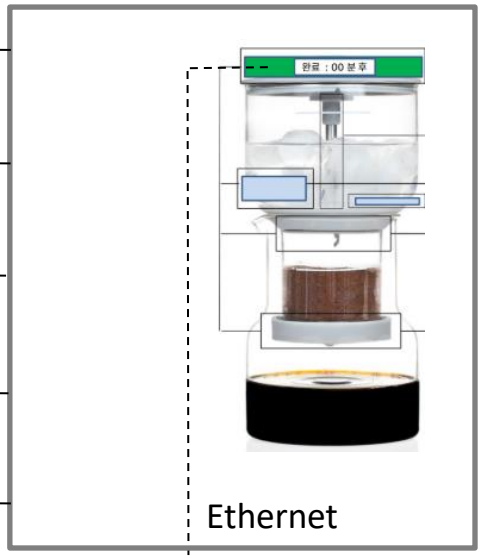
Current water volume calculation

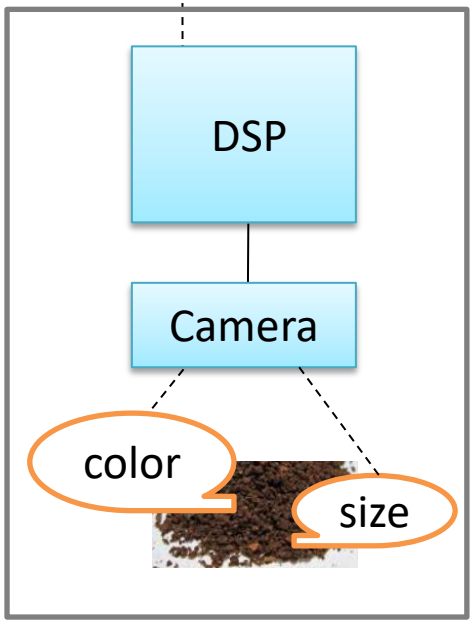
| How 1 : Distance sensor | How 2 : weight sensor |
|---|---|

# [ 프로젝트 구성도 ] Cold Brew Coffee Automation System

| Can YOU? | < Tech requirement > | < Function Block > |
|---|---|---|
| √ | On/off control | UV sterilization |
| √ | IR data processing | Remote Control |
| √ | On/off control, sensing | Temperature Control |
| √ | LCD control | Estimated Time Display |
| △ | mcu / dsp Ethernet setup | Ethernet Communication |
| √ | On/off motor control | Auto Valve Control |
| | Image Processing (Color) | Coffee Ground Analysis |

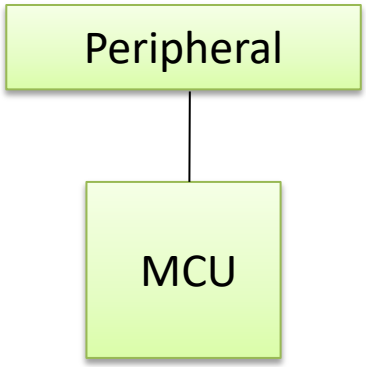




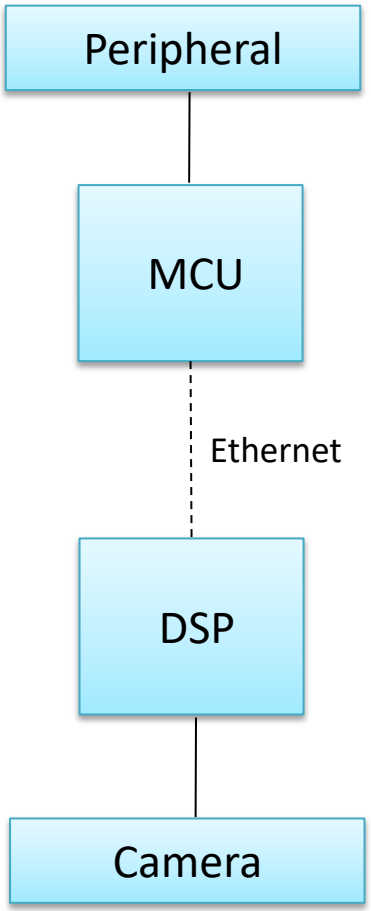



# [ 전체 H/W 개략도 ]

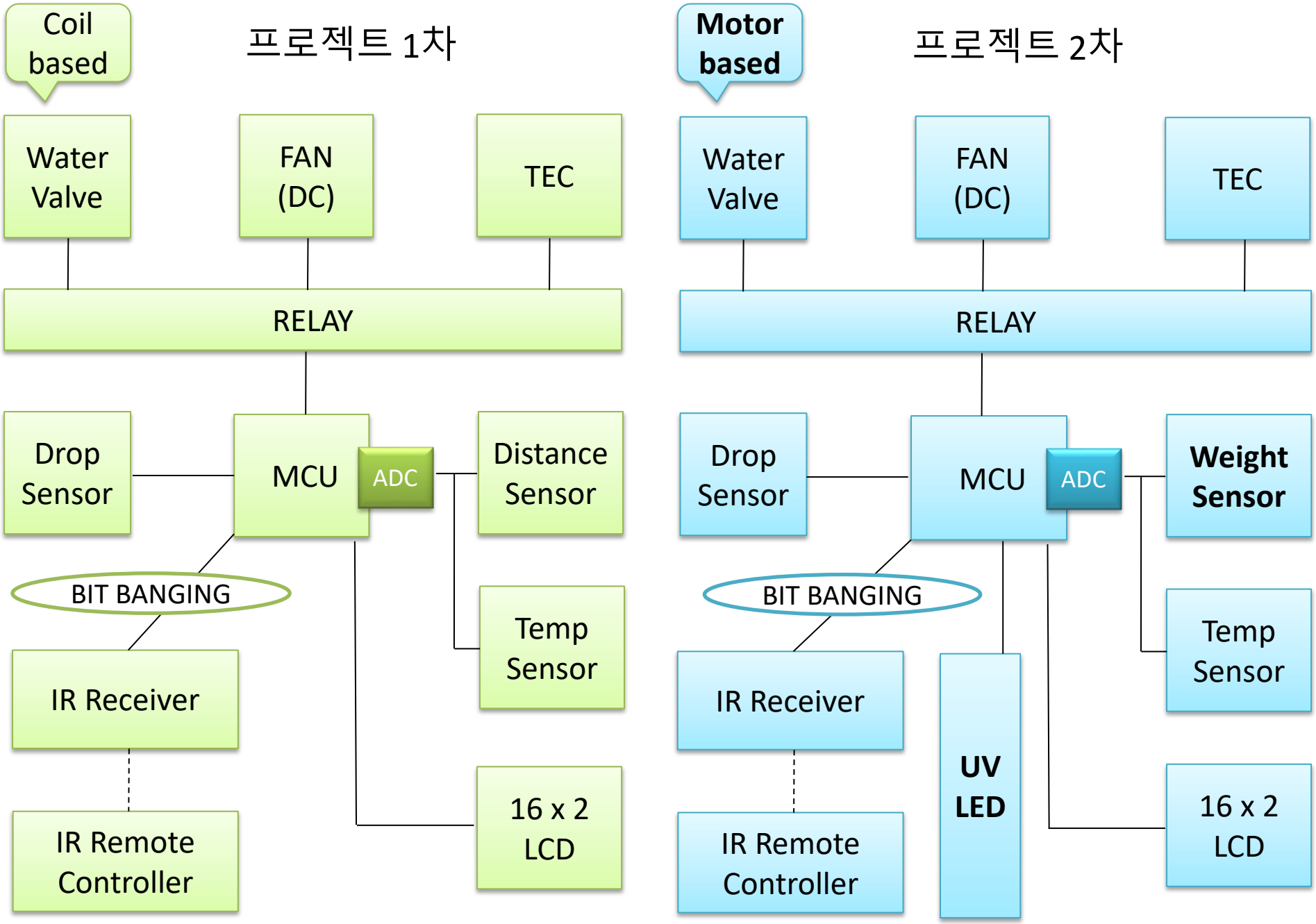
프로젝트 1차



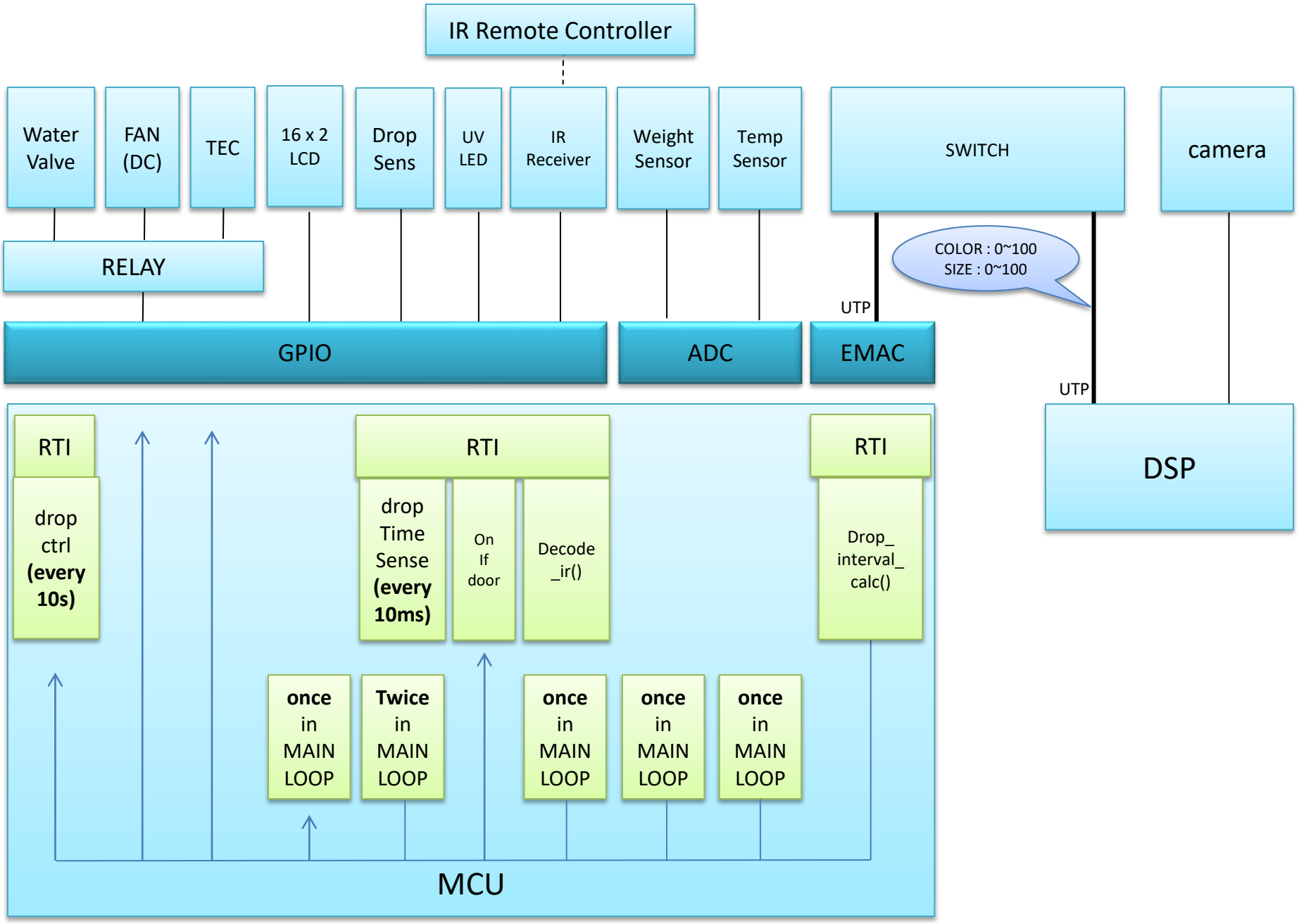

프로젝트 2차



**[ MCU Peripheral ]**

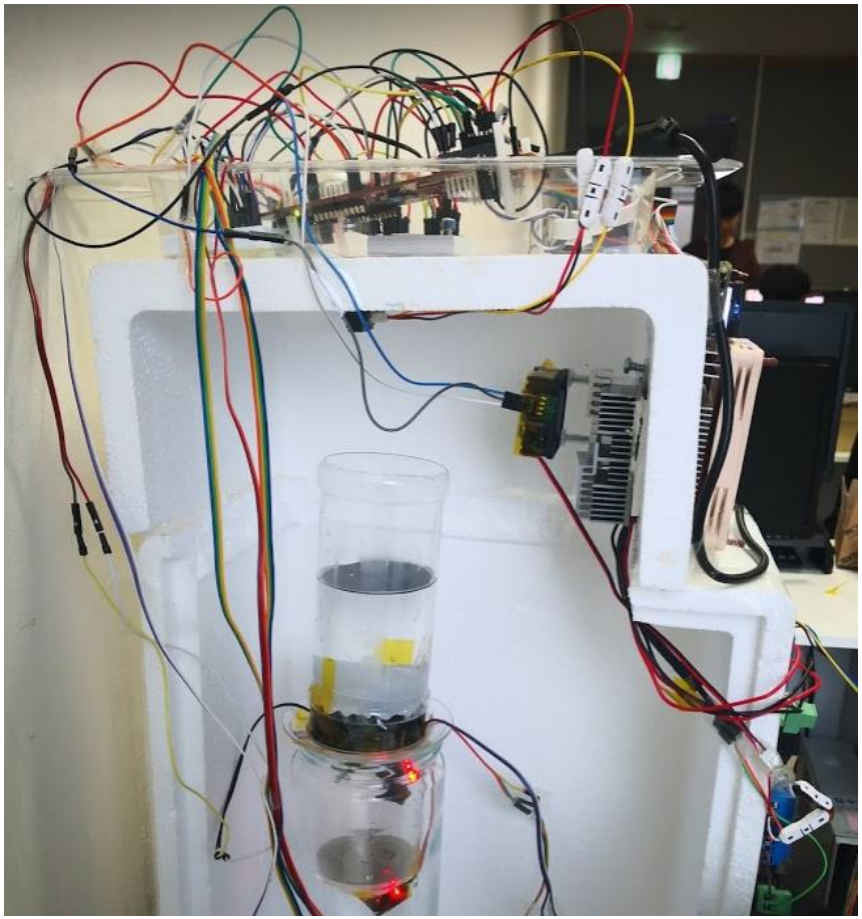


# [ 프로그램 구성 ]

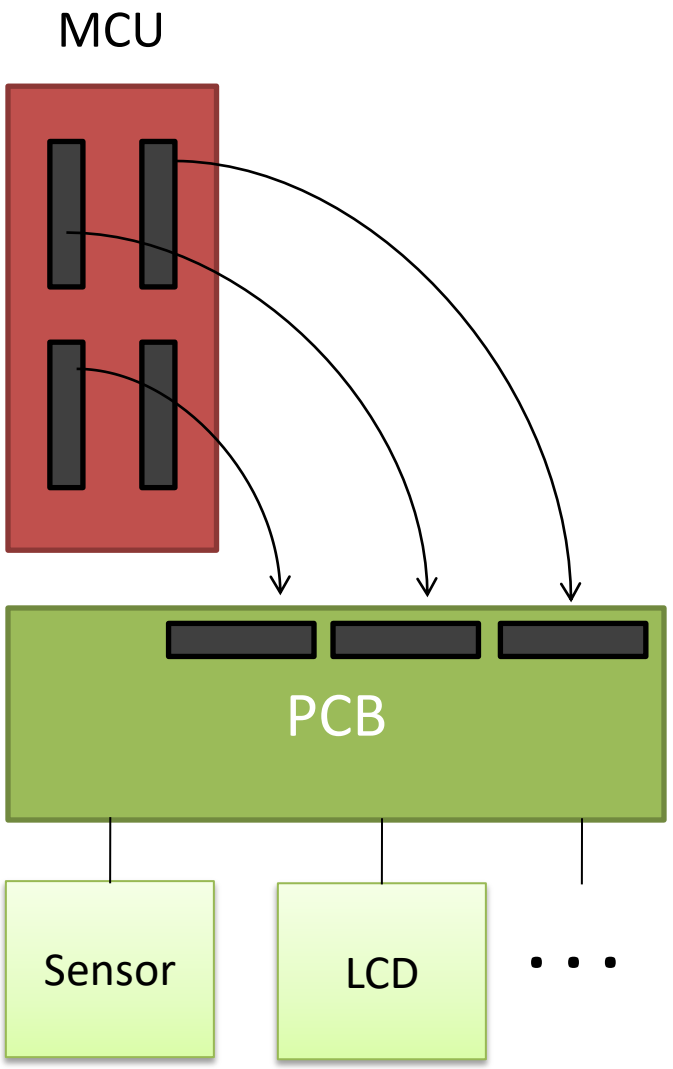

IR Remote Controller
Water Valve
FAN (DC)
TEC
16 x 2 LCD
Drop Sens
UV LED
IR Receiver
Weight Sensor
Temp Sensor
SWITCH
camera
RELAY
COLOR : 0~100
SIZE : 0~100
UTP
GPIO
ADC
EMAC
UTP
DSP
RTI
drop ctrl (every 10s)
RTI
drop Time Sense (every 10ms)
On If door
Decode _ir()
RTI
Drop_ interval_ calc()
once in MAIN LOOP
Twice in MAIN LOOP
once in MAIN LOOP
once in MAIN LOOP
once in MAIN LOOP
MCU

# [ WIRE , PCB 구성 ]

프로젝트 1차



프로젝트 2차



# [ 프로젝트 일정 ]

3/26~4/26

방향 설정, 자료 조사

부품 선정 및 구매

PCB ARTWORK / 발주

Peripheral 제어 코드 수정

Water Valve 기구 설계

Ethernet + freeRTOS 코딩

PCB 납땜, 테스트 + 기구

디버깅

| Mon | Tue | Wed | Thu | Fri |
|---|---|---|---|---|
| 25 | 26 | 27 | 28 | 29 |
| 1 | 2 | 3 | 4 | 5 |
| 8 | 9 | 10 | 11 | 12 |
| 15 | 16 | 17 | 18 | 19 |
| 22 | 23 | 24 | 25 | 26 |

[ WEEK 1 ]

## Water Valve Design


## Ethernet 기초 학습

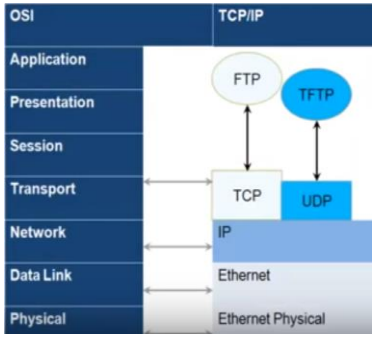
1. TI : ETHERNET TUTORIAL

   https://training.ti.com/hercules-how-tutorial-ethernet

   FIGURE – USING HALCOGEN or software

   Driver enable - EMAC

   PINMUX – MII module
   MDIO, MDCLK




2. lwip demo
   http://processors.wiki.ti.com/index.php/LAUNCHXL2_570LC43:_lwIP_Demo
   halcogen setup + web led on/off
3. http://processors.wiki.ti.com/index.php/HALCoGen_Ethernet_Driver_and_lwIP_Integration_Demonstration

   기초 구성 설명

4. 알아야 할 개념 정리
   https://www.youtube.com/watch?v=R_h5rDIvBOE
   VeEX YOUTUBE : Ethernet Networking Fundamentals (1/2 ~ 2/2)

   a. RJ-45 : connector, UTP(Unshielded Twisted Pairs) : cable,
   b. SFP(Small Form-factor Pluggable) : =AGBIC?but smaller. electrical -> optical
      LC Connector : used to connect fiber optics to XFP
      tx+ tx- rx+ rx- (~100Mbps)
   c. OSI Model? (Open System Interconnection)
      Designed to connect ANY 2 systems connected on a network can communicate with each other(regardless of s/w used)

      Has 7 layers each with headers trailers and interface layer

부품 구매 : 진행 중
BOM 작성 : 금일 내 완료 예정.

**[ WEEK 1 ]**

## 계획 : TO-DO'S

< 커피 원두 관련 >
* 색 판별 기계, 농도 측정 기계 구비
* 로스팅 – 색 관계
* 로스팅색 – 분말 두께 – 추출농도 관계 실험 방법

< 기구 관련 >
Water Valve 부 : 모터, shaft, Drop sensor, valve 를 분리할 박스 제작

< 부품 관련 >
TEC 모듈 필요 전력 테스트. 10분 내에 20도 -> 10도 쿨링. 12V 0.8A부터.

<회로>
(차후 넣는다면..) 220VAC 회로 + 보호 회로

< MCU >
- freeRTOS 로 변경
- ETHERNET LWIP
- IR SENSING : 전방일치 검토하기 -> 일부 검토 + 조건문 (SWITCH 문)으로 어떤 버튼인지 확인