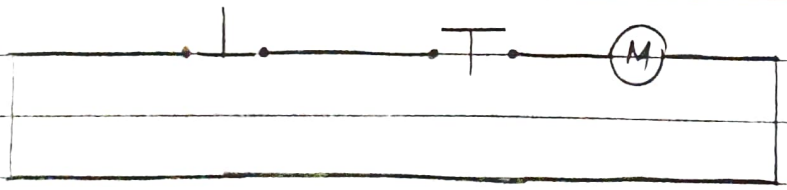
Arduino Programming

- Arduino board is a microcontroller having some inbuilt program put in to ~~communicate~~ communicate with computer.

- General purpose I/O pins -
These allow user to avail
1) SWITCH → Manual switch
The pin which is made high or low by the user or by some automatic circuitary & will be read by the arduino to sense the external activity is an input (I/O) pin.
2) READ
3) INPUT

- Output pins -
They will be made Logic 1 or Logic 0 based on the input of microcontroller.
Logic 1 ⇒ SET / WRITE
Logic 0 ⇒ RESET / OUTPUT

- STARTER in motors -



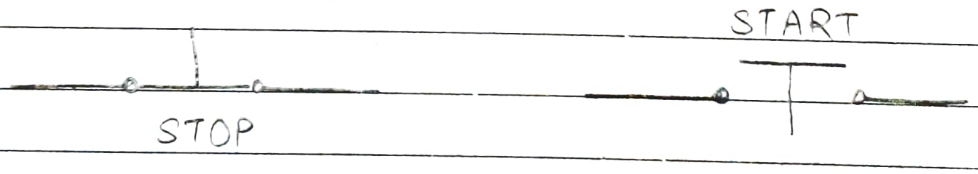
- Programming of Arduino:

sensory ↔ input pin of a switch is a manual switch.
Ⓗ or Ⓛ
output is based on instruction.
↓
LOGIC 1 or LOGIC 0 by microcontroller of arduino.

e.g. SET P12 Possible through many ways.
RESET P21 to make output pins.
WRITE (P13, FLAG) 1 or 0 (High or Low) using
OUTPUT (P32.0) specific instruction in program

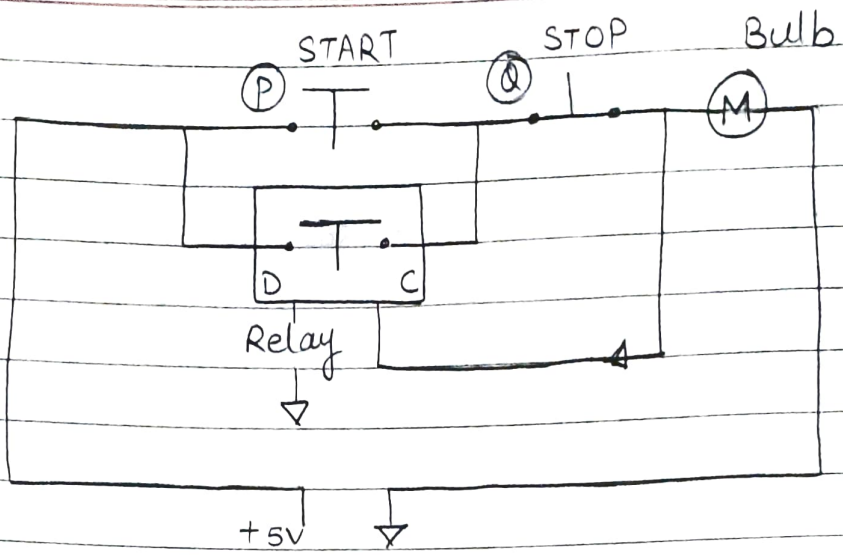
- Digital Circuit :- Deciding status of output pins depending upon input state of micro controller.

e.g. Starters in Motors :



(NO) pressed START (ON) then motor is started. Even START (switch) released then motor still start.

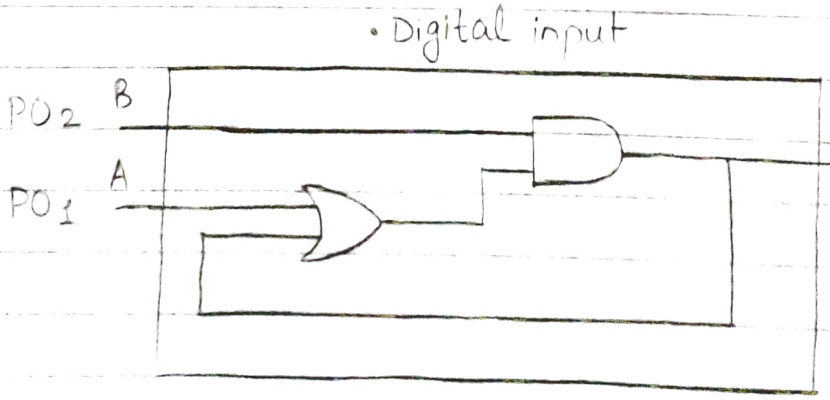
If STOP pressed then motor stops & even released START, motor stops.



$M = (P+M)\bar{Q}$ JUMP table.

START	STOP	M
1	0	1
1	1	0
X	1	0
0	1	1
0	0	(0,1)

* For the bulb to ON, keep relay ON.



$Y = C \cdot B$

$Y = (A+Y) \cdot B$

B^0 B^1 B^2 ← Internal register

↓ ↓ ↓

A B Y

RESET B2
B0 = RFAD P01
MOV = B0 · P01.
MOV, B1, P02 or B2, B0
and B2, B1 MOV P0, P02

* Micro controller instructions are arithmetic logic instructions.

Below is a simple microcontroller program of a given circuit in which Y = (A+Y) B obtained.
In a program there is always JUMP begin.

* Analog I/P (PWM O/P)
↓
these are inbuilt analog to digital converters
e.g. 5V convert to FF (max)
e.g. 8 BTT ⇒ 00 0 ← 0V analog
| |
FF 255 ← 5V : 1V

Analog to digital conversion cannot be accurate.
It is always approximate.

e.g. P.2.0 P2.1 ⟶ A I/P
MOV (R1, P.2.0)
1 bit P2.0 is register in 1 bit of R1 of 8 bit

* User sets SET P. ⟶ Read by Arduino.
System changes process (P.V) ⟶ Read by Arduino
switch o/p pin or relay ← controlled by Arduino