

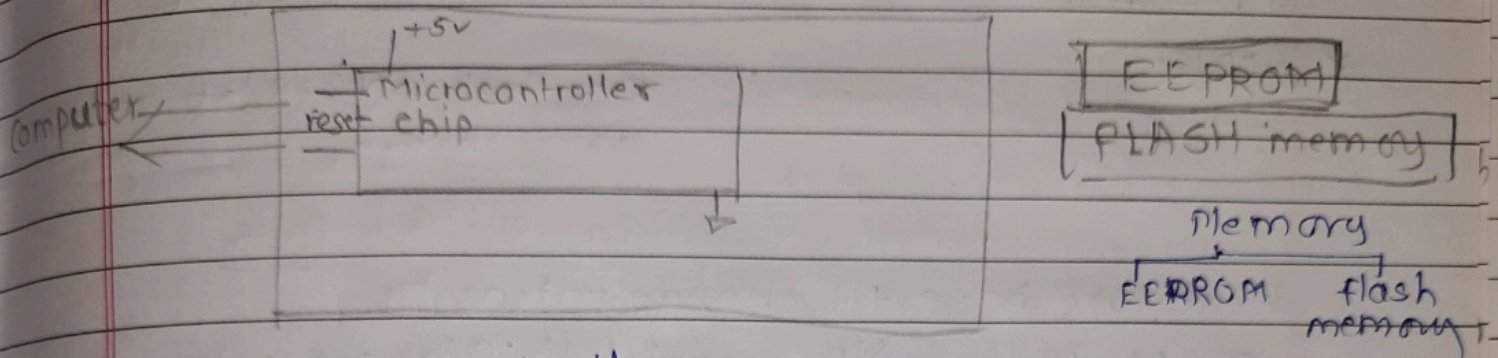
Part A Arduino Based System.

DATE 20/4/21

* Arduino Board. *

- consists microcontroller chip.

Microcontroller = microproc chip +
Memo + 1/2 codes of lines.

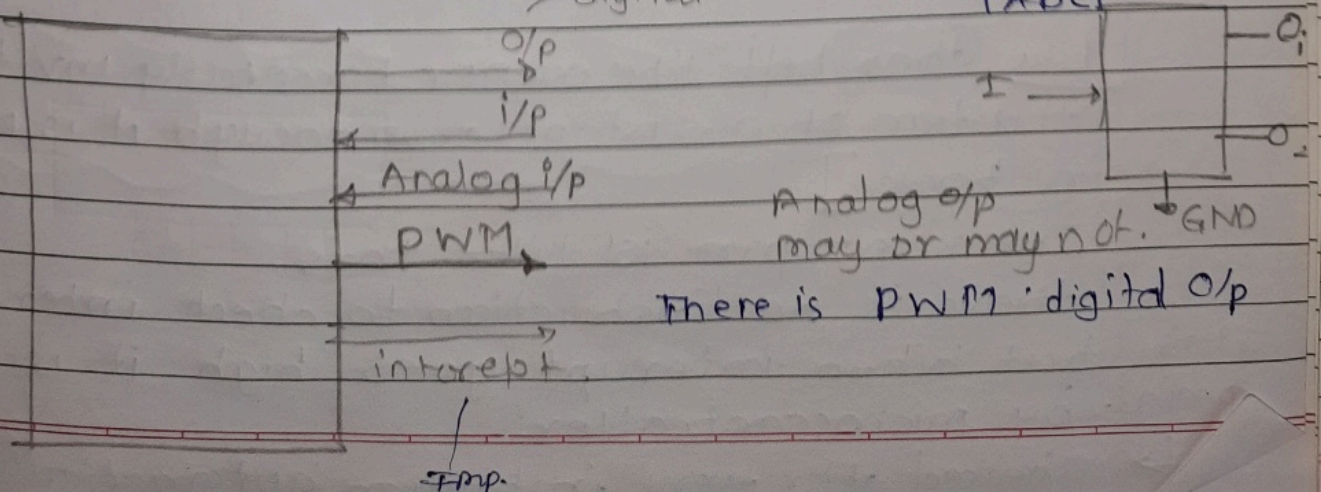


- microprocessor inside
- Microcontroller starts executing program which is in memory (which is inside chip from address chip 0). ~~After reset~~.
- PROM programming (stored in memory)
- E-PROM (erasable) E^2 -PROM (electrical erasable) can write; can erase & erase again (if power not)

In two switch circuit microprocessor does (it reads the switches (S_1, S_2)) continuously check inputs.

- Program in ~~EEPROM~~ EEPROM.
- Program written in initial part of microcontroller of arduino board which will establish communication with computer.

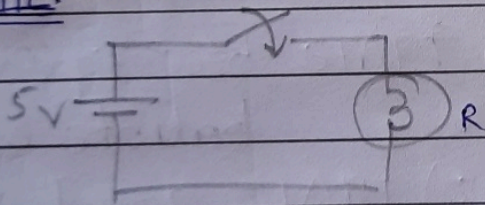
Pins
12B Digital i/p pins (on & off) & Digital o/p pin (user control microspare. use it)





Analog input ~~is~~ of 0 to $5V$ is converted into 8 bit digital output 00 to FF
ADC ~~output~~ is inside microcontroller.

* Applic.



Do fast on/off of switch can change.

Here we have to change intensity.

PWM (Pulse width modulated) o/p generate a square wave where Duty cycle can be from 0% to 100%.

PWM o/p provides square wave.

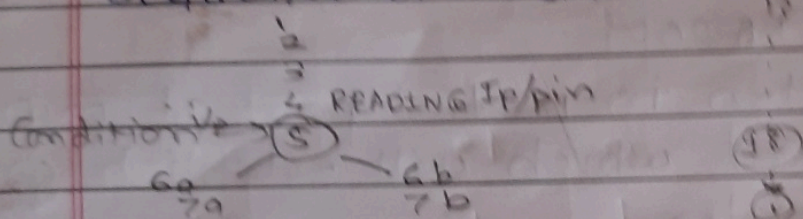
(↓ comes programed it can auto 1 or 0.)

By some ~~Be~~ Filter (eg RC Filter) analog o/p.

* **A13** -

* Interrupt input *

Sequence of instruction repeatedly



Program should do reading i/p pins if some condition set by 'programmer activating o/p pins.

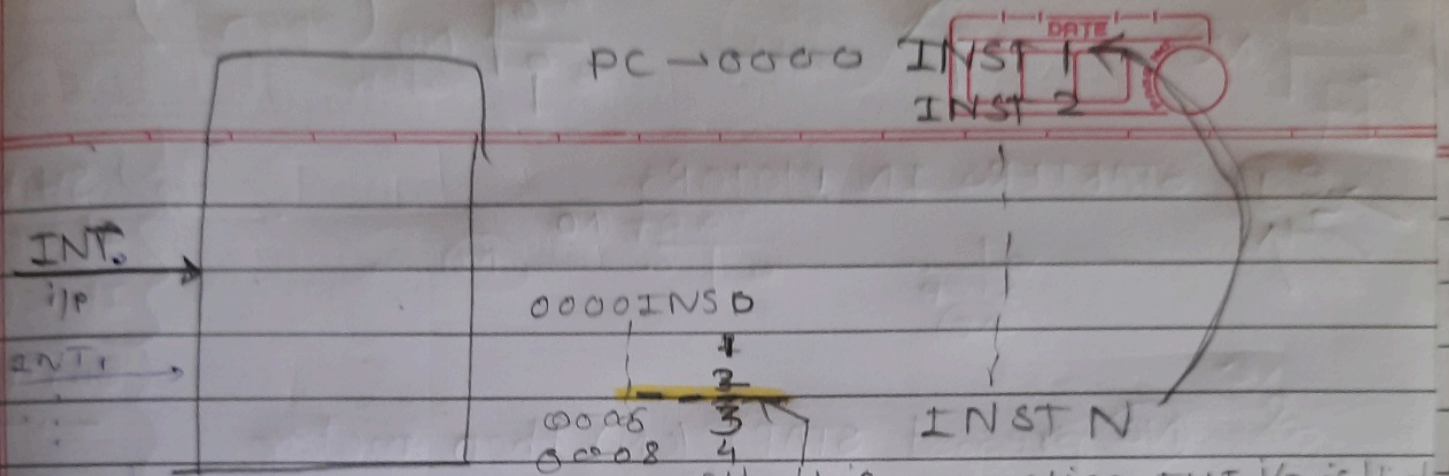
Like door bell the owner forcefully invite the attention of assistant even though it is not written in book

Interrupt pin is like this.

there is no instruction to check interrupt pins

It is special. but when interrupt goes high it is noticed by microcontroller.

↳ Checked after every instruction automatically



after this m.c notice INT i/p is High
 it will come to another instruction (Interrupt branch)
 Also it doesn't consume a time. (e.g. 80000)

Task which execute after interrupt is
 interrupt service routine after this ^{go} to main program
 To go to specific main program.

* It is written in SCRATCH PAD [0008] ^{multiple location.}
 There are multiple interrupt, (Here priority is imp)
 multiple level scratch PAD \Rightarrow is STACK

Special purpose i/p which take m.c programme
 counter to specific location when i/p is high
 with beigh written. Able to force to draw
 attention of m.c.



*

* Programming of Arduino *

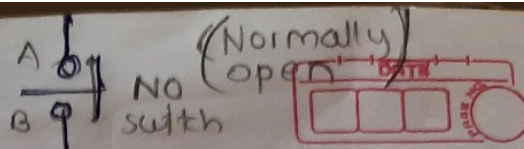
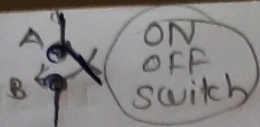
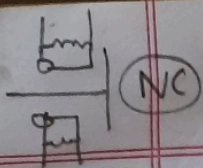
sense → I/p pin ^{of A} → SWITCH → Manual switch. (H or L) can made
o/p → → is Based on instruction
→ MADE LOGIC 1 OR LOGIC 0 by (microcontroller)
(by instructions) (or Arduino)

eg

SET P12
RESET P21
WRITE (P13, FLAG)
OUTPUT (P32, 0)

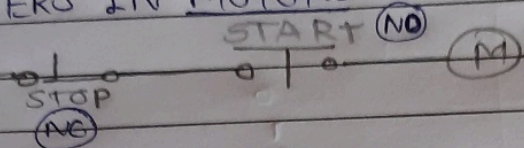
By many ways it is possible
to make output pins
1 or 0 (High or low) using
specific instruction in
program

Digital circuit : Deciding status of o/p pins
depending upon i/p & state of microcontroller.



e.g.

STARTERS IN MOTORS.

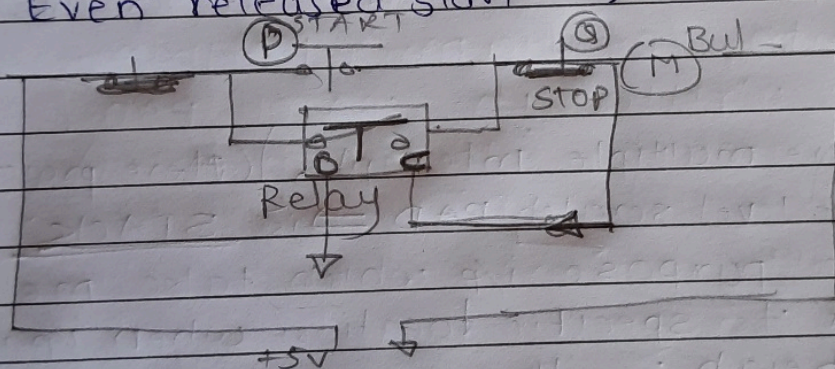


Example

No pressed START (ON) then motor is started

Even START (switch) Released then motor still start.

- IF STOP press \Rightarrow Motor stops. Even released start \Rightarrow stoped.



Bulb on keep Relay on

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

JUMP label

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