

PRE-LAB QUESTIONS:

An LED emits only one whose as a RGTB LED and RGB LED

An LED emits only one whose as a RGTB LED can emit these different colours, normally sad, green and blue, which in together gives 8 possible colours in general.

2) State the difference between a pull up resister and a pull down resister in a push button.

PULL DOWN RESISTOR	· Servected between input · Servected between Input Pin and the Supply pin and ground.	. When button " Preled, . When button & presed,	pulls the voltage	level to Jow State.
PULL UP RESISTOR	. Sennected between input pin and the supply	. When butten " Prelead,	pulls the voltage level	to high state

What happens if we do not use a pull up resister in a push button?

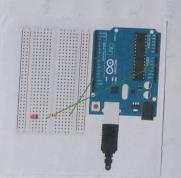
In it absence, the input will be in a floating state when the button is not pressed which can lead to unpractical behaviours like wrontic modings.

It is a phenemenen that occurs when a switch is beggled frequently. The noise that occurs while townsitioning from one state to another can cause corose in the circuit. Avitch debenning in an electronic design ensures that the device that is sampling the switch waveform does not misinterpret a single button press as many.

Is it necessary to put a quesister to a LED? What will happen if a low value and a high value quesisters are used with a LED!

Stis necessary to put a societar to a LED to provent excessive current flow that could alamage the LED.

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pin Made (LED, OUTPUT); rold setup() f #define LED 13

delay (1000); digital Warte (LED, HIGH); digital write (LED, LOW); Jest loop 1) { delay (1000);

EXERCISE:

1) Blink of an external LED

that is connected externally. To blink an LED

COMPONENTS REQUIRED:

Archino UNO, USB - B Cable , ILED, Breadboard 1 220 D resistor, words

CONCLUSION:

Thus, an LED is made to blinks externally

Corrected.

BLINK of RGB LED

To blink a RGB LED

REQUIRED: COMPONENTS

RGB LED, Breadboard, Andwine UND, USB-B able,

CONCLUSIONS

Thus, an LED of RGB Type is made to blink

must glow. When button is not prograd the LED must 3) Push butten +LED (When buttern is pressed the LED

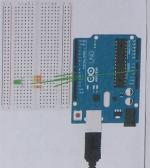
gemain LOW)

AIM: implement a win cuint wing push button and HD

CAMPONENTS REQUIRED that toggles state each time.

Andrino UNO, USB-B Cable, 1 LED, I push button, Breadboard, wines, 1 220 so resistor

Thus, togging of concent using push button and LED is implemented.



define GIRFEN 10 # define BLUE 9 # define RED 11

PINMODE (BLUE, OUTPUT); Pin Mode (GREEN, OUTPUT); PINMode (RED, OUTPUT), f (14whas bion

3 Void Rop() f digital Waite (BLUE, LOW), digital White (GREEN, LOW); digital Weite (RED, HIGH); delay (roos),

digital Write (GREEN, HIGH), digitalwhite (GREEN, LOW); digital Waite (BLUE, 111941) digital White (BLUE, LOW); oligital Waite (RED, LOW); digital Waito (RED, LOW); do lay (1000);

button is pressed 1st time the LED must glow, when the buttern is pougsed the 2nd time LED 4) Push butter + LED (without debouncing) (when must remain in Low state) To implement a eincid using push butter and LED that toggles each time the state, the button is pressed (without debouning)

COMPONENTS REQUIRED.

butten, Breadboard, work , 1 220 on resistor Anchine UNO, USB-B Cable, 1 LED, 1 push

Thus, the wincit for toggling states without debouncing using push bulben and LED implemented. CONCLUSION:

5) push butten + LED (with obserning)

To implement a circuit using push button and LED that toggles each time the state, the button is pressed (with debouncing)

COMPONENTS REQUIRED:

Andrine UNO, USB-B cable, 1 LED, 1 Puch butten, Breadboard, wines, 1 220 D. resister

Thus, the circuit for togiting states with debouncing using push button and LED is implemented

define BUTTON 7 # define LED 13

PIN HOOLE (BUTTON, INPUT_PULLUP). PINHODE (LED, DUTPUT); void softwor) {

void Loop () {

int digitallet - digitalRead (BUTTON);

digitalwhite (LED, LOW); if (HIGH == digital/al) f

else f

digital Weste (LEP, HIGH),

Push butter + RGB LED (with debeuncing)

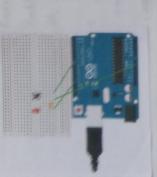
To implement a circuit wing push butter and RGIB LED that staggles to red, green and blue each time the butten is pressed.

COMPONENTS REQUIRED.

of push button, Breachoard, wives, 1220 2 results Andruine UNO, USB-B cable, 1 RGB LED,

CONCLUSION

Thus, the would for reggling to red, green and blue with debouncing using push butten and ROB LED'Y implemented.



#define BUTTON 7

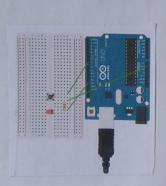
4

PINMODE (BUTTON, INPUT - PULLUE);

void leop() f buttenstate = digital Read (BUTTON); buttenstate == HIGH && last Buttenstate == 10m)f iy (buttenstate == 11edstate; ledstate = 11edstate; digital Write (LED, ledstate);

Jast Butten State = butten State,

4



#obline BUTTON 7 # define LED 13

int buttenstate = 0;

1 Last Butten State = LOW; the Led State = HIGH;

unsigned long last Debounce Time =0; Unsigned long debounce Deloy = 50;

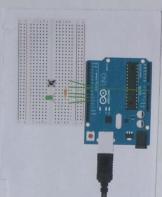
PINMOOR (BUTTON, INPUT - PULLUP) Void Setup() {
pintlode (LED,OUTPUT);

veid Leop() {

ind seading = digital Read (BUTTON); is (reading != last Butten State) { last Debounce Time = millis (); ing ((millis () - Last Debouna Timo) > de bounce Delay) {

is (greading != buttenState), buttenState = greading;

lay By Hosely ; of (butten State = + High) f



int buttenstate = 0, lost Butten State = 10w, celous Index = 0, unsigned long last Debounce Time =0, debounce Dolay = 50, # define GREEN 10 # define BLUE 9 # define BUTTON 7 reid Setup() { # define RED !!

PINMAR (BLUE, OUTRUT); PINMAR (BUTTON, INPOT PULLU) Pintlade (RED, OUTPUT); PINTLODE (GREEN, OUTPUT);

void Leap() {

int reading = digital Read (BUTTON); last DebouraTine = millis (); ing (Acading != last Buttenstate) f

if ((milliu()-last Debounce Time)> debounce Delay) f iy (seading != butten state) {
butten State = reading;

in (button State == HIGH) & = neading; Last Butten State

digitalWrite (RED, LOW); digitalWrite (GREEN, LOW) is (Colourshop x ==0) { digitallibrite (RED, HIGH)] { digital Wate (BLOE, HIGH); ? celostygrdex = (celour Index +1) % 3;

#define BUTTON 7

obgine LED 10

unsigned long Jost Debeuna Time = 0, debeunce Delay = 50; int butten State = 0, last Butten State = 20W, court = 0; void sechupi) {

PINMODE (LEBIOUTPUT)

PIN Made (BUTTON, INPUT_PULLUP);

void leap() &

int seading = digital Rad (BUTTON),

ing (meading != last Butten State) {

last Debounce Time = millis ();

in ((millis() - last Debounce Time) > debounce Delay) {

} (HOTH== applyman) for is (seeding 1 = button State) & butten State = seading;

glow LED (count); Count ++;

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for (int i=0; is count; 1++) {

veid glowLED (introduct) f

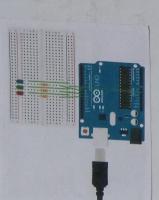
digital White (LED)

13 delay (500);

last Bulton State = proaching;

POST-LAB QUESTIONS:

- 1) White an Andrine statch to perform the following
- a) count the # of times the push butten is pressed
- 6) Basad on the court value the external LED corrected must glow (e.g) when the push butten is processed for the 1st time LED must glaw twice (we the debounce logic)
- c) Draw the necessary circuit diagram.



PINMOCLE (LEDZ, CUTPUT); PIN Made (LED 1, OUTPUT) pin Made (LEDS, BUTPUT); void setupi) { # define LED 3 to #define LED 3 # define LED29

for (id 1-0; 1<=7; 1++) { display Binasy (i); delay (1000); void loop() &

objected Write (LED2, (me 2>>1) 2 oboot); digitalisate (LED3, (i>>2) & oboos); digital Write (LEO1, 12 Obco1); void display Binasy (inti) f

2) Write an Andrino sketch to peoplesm the following

a) Connect an assay of 3 LEDS.

equivalent of numbers from a tat using these b) Design a counter to display the binosy

c) When the number 7 is seached, the value must again 1-LED in High state and offices in Low state. start with 6 690 for all LED in LOW state.

d) Draw the recessary wount diagram.

PINMODE (LEP2, OUTPUT); PINMODE (LEP3, OUTPUT); PINMODE (LED1, DUTPUT); #define LED 1 12 # define LED3 a # defire LFD2 10 void schupes?

doloy (2000); digital White (LED1, Low); oligital White (LED4, HIGH); 3 Charles bion

ovigited Wate (LED2, HIGH), delay (2000), digital Write (LED2, LOW); digitallusite (LEDS, HIGH) digital Write (LED3, LOW); delay (2000);

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Waite

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- a) Correct 2 RGB LEDS
- The colours display of book the LEDS must be follows

-	1	- 1	
Delay	2.8	28	85
LED2	Blue	Green	Red
LED1	Red	Blue	Green

veid leop() {

for (int i=s; i>=2; i--) {

digital Write (i, HIGH);

delay (1000); digital White (1, 10w);

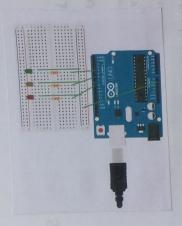
4) White an Andruine sleetch to peoplern the following

a) Cornect on asseay of 7 LEDS.

b) Perform Llink of LEDS as stated. Set the delay as 15.

HED I LED 2 LED 4 LED 5 LED 1 LED 7 LED 1 LED 7 LED 1 LED 7 LED 7

c) Draw the necessary concent diagram.



define R-LEDS # define Y-LED 6 # define GILED 4

PINMEDE (GILED, OUTPUT); PINMEDE (Y-LED, OUTPUT); PINMOR (R-LED, OUTPUT); void sehup() f

origital white (Y-LED, HIGH), digital White (GI-LED, LOWS; digital Write (G-LED, HIGH); arightel White CR_LED/LOW) digital Write (R-LED, HIGH), digital waite (Y-LED, LOW); dolay (45 *1000); delay (50 *1000) delay (5 +1000); roid book() {

5) Write an Andriano Sketch to perform the Lollowing

- a) tennect LEDS of Colous next, yellow and green
- 6) Simulate a triaffic central eystern in such a way that
 - i) stact with med light. Make it glow for 45 Seconds
 - is) After 45 seconds, glow yellow LED for 5 seconds
 - iii) After 5 Seconds, glaw freen LED for so seconds.
 - c) Drow the receptory wincing diagram.