COAL Lab Project Groups - Section C

Group #	Reg. No	Name	Project Title
G1	2021-CS-133	AREEBA WAHEED	Obstacle Avoidance System
	2021-CS-136	SYEDA MAHRUKH ZAHRA	
	2021-CS-137	ABDUL SAMI	
	2021-CS-156	RAMEEZ ALI	
G2	2021-CS-117	FARHEEN IRFAN	RGB LED Colors Controlling using Push Buttons
	2021-CS-146	ALEENA ABID	
	2021-CS-155	ARSALAN ALI	
	2021-CS-157	MUHAMMAD ABDUR REHMAN	
G3	2021-CS-129	MUHAMMAD BURHAN	Human Motion Detection and Alarm System
	2021-CS-139	MUHAMMAD AJMAL	
	2021-CS-148	ALI HASSAN	
	2021-CS-154	AMMAD BIN SHAHID	
	2021-CS-165	NASEEB AMJAD	
G4	2021-CS-122	MUHAMMAD FARAZ ALI	Encrypting and Decrypting the Text
	2021-CS-130	MUHAMMAD AFFAN MAQSOOD	
	2021-CS-142	MUHAMMAD USMAN BIN FARID	
	2021-CS-143	MUHAMMAD WAQAS RASHID	
	2021-CS-151	UMER FAROOQ	
G5	2021-CS-113	ABDULLAH NASIR	Traffic Light Controller using Timers to turn ON/OFF Red, Yellow and Green Lights
	2021-CS-115	MUHAMMAD AFTAB ASLAM	
	2021-CS-120	SAFIULLAH SOHAIL	
	2021-CS-123	DANISH AKRAM	
	2021-CS-149	MUHAMMAD JAWAD HAIDER	
G6	2021-CS-118	MUHAMMAD YAQOOB	Smart Streetlights Controller using LDR
	2021-CS-134	IQRA RAFIQ	
	2021-CS-158	UMM E FARWA	
	2021-CS-161	AHMED RAZA	
G7	2021-CS-112	RABIA	Fire Detection and Alarm System
	2021-CS-131	SUMAN SHAHZAD	
	2021-CS-135	SANA RASHID	
G8	2021-CS-114	SYED MUHAMMAD ABUHURAIRA BIN AHSAN	Smart Irrigation System
	2021-CS-124	YASIR MAHMOOD	
	2021-CS-127	SULTAN NOOR UD DIN	
	2021-CS-132	MUHAMMAD FARMAN	
	2021-CS-164	HUZAIFA MUMTAZ	
G9	2021-CS-116	SAMEE UL REHMAN	Count-down Timer using 7-Segment LED
	2021-CS-121	HUSSNAIN AHMAD	
	2021-CS-125	CHUDHRAY AHMAD FRAZ SAEED	
	2021-CS-126	HUSSAIN IFTIKHAR	
	2021-CS-147	HUSNAIN MAZHAR MUMTAZ	
G10	2021-CS-128	SAMIA LIAQAT	Flammable Gas Detection and Alarm System
	2021-CS-138	EMAN ZUBAIR	
	2021-CS-144	MUHAMMAD UMAIR SHAHID	
	2021-CS-145	OSAID MASOOD	
G11	2021-CS-159	AHMAD SHOAIB MUSLIM	Environment Light Intensity Meter
	2021-CS-160	MUHAMMAD SHAHEER KHALID	
	2021-CS-162	NOMAN	
	2021-CS-163	KHOSHAL	
	2021-CS-166	AFTAB ALI	

Details and Guidelines for Each Group

Group: G1

Project Title: Obstacle Avoidance System

Description: Write an assembly program to detect the obstacles using IR obstacle detection sensor and of it detects obstacle then turn on a Red LED. And if the obstacle is cleared then Turn off the Red LED and turn on a Green LED.

Also display a message “Obstacle Detected” on 16x2 LCD when obstacle is detected, and display message “Obstacle Cleared” when the obstacle is cleared in front of the IR obstacle detection sensor.

Components Required:

Components	Quantity	Image Link
Arduino UNO with USB Cable	1	Link
Breadboard (Half Size)	1	Link
Pin-to-Hole Jumper Wires	10	Link
Pin-to-Pin Jumper Wires	30	Link
IR Obstacle Detection Module	1	Link
Red and Green LEDs	2	Link
100-ohm resistance	2	Link
16x2 LCD (with Backlight)	1	Link
Female Header Pins Strip for LCD	1	Link

Group: G2

Project Title: RGB LED Colors Controlling using Push Buttons

Description: Write an assembly program to control an RGB LED. It has three LEDs combined in a single LED. It has Red, Green and Blue colored LED. We you can control individual LED. Now use 5 push buttons to control this RGB LED in the following way:

By pressing Button#1, the Red LED will turn ON.

By pressing Button#2, the Green LED will turn ON.

By pressing Button#3, the Blue LED will Turn ON.

By pressing Button#4, all the LED will turn ON and OFF in a loop. With delay of 0.5 second between each LED.

By pressing Button#5, all the LEDs will turn OFF.

Components Required:

Components	Quantity	Image Link
Arduino UNO with USB Cable	1	Link
Breadboard (Full Size)	1	Link
Pin-to-Pin Jumper Wires	30	Link
Push Button 12x12mm	6	Link
RGB LED Module	1	Link
100-ohm resistance	2	Link

Group: G3

Project Title: Human Motion Detection and Alarm System

Description: Using PIR motion detection sensor detect the movement of a person in the room and then turn on an alarm if it is night time. Detect the night and day by using LDR module. If it is Day, then only turn on the Red LED and do not turn on the alarm. But if it is Night then turn of both the Red LED and Alarm.

Attach a push button to the project to turn off the alarm by force. Attach this push button to the interrupt pin of Arduino. And write interrupt procedure to turn off the alarm forcefully.

Components Required:

Components	Quantity	Image Link
Arduino UNO with USB Cable	1	Link
Breadboard (Full Size)	1	Link
Pin-to-Hole Jumper Wires	10	Link
Pin-to-Pin Jumper Wires	20	Link
Push Button 12x12mm	2	Link
Red and Green LED	2	Link
100-ohm resistance	2	Link
Buzzer Module	1	Link
LDR Module	1	Link
PIR Motion Sensor	1	Link

Group: G4

Project Title: Encrypting and Decrypting the Text

Description: Write an assembly program to display a text message on the 16x2 LCD (e.g., “COAL LAB Project”) then sypher that text using Keys using XOR. And display the encrypt text on LCD screen.

Attach 3 push buttons in such a way that:

- By pressing Button#1, it should encrypt the text by using a Key
- By pressing Button#2, it should encrypt the text using another Key.
- By pressing Button#3, It will decrypt the text to its original form.

Components Required:

Components	Quantity	Image Link
Arduino UNO with USB Cable	1	Link
Breadboard (Half Size)	1	Link
Pin-to-Pin Jumper Wires	30	Link
Push Button 12x12mm	5	Link
16x2 LCD (with Backlight)	1	Link
Female Header Pins Strip for LCD	1	Link

Group: G5

Project Title: Traffic Light Controller using Timers to turn ON/OFF Red, Yellow and Green Lights

Description: Write a program to control the traffic light module. It has 3 color LEDs, Red, green, and Yellow. Write the Assembly program to turn on the Green LED for 30 seconds then after 30 seconds also turn on the Yellow LED. Then after 5 seconds turn off the Green and Yellow LEDs and turn ON the Red LED and keep it turned ON for 30 seconds.

Also attach a push button. At boot time of Arduino, the program should wait for the button pressing. By pressing that button, the code will start working the whole program only if the push button is pressed.

Note: Use non-blocking delay method for the above-mentioned delays.

Use obstacle detection sensor on the road, if anybody cross the road while Red light is on then turn on the Alarm.

Components Required:

Components	Quantity	Image Link
Arduino UNO with USB Cable	1	Link
Breadboard (Half Size)	1	Link
Pin-to-Hole Jumper Wires	10	Link
Pin-to-Pin Jumper Wires	20	Link
Push Button 12x12mm	2	Link
Traffic Light LED Module	1	Link
IR Obstacle Detection Sensor	1	Link
Buzzer Module	1	Link

Group: G6

Project Title: Smart Streetlights Controller using LDR

Description: Write the assembly program to control the Streetlights automatically based on the day and night. Use LDR module to detect the intensity of the light in the environment. When the light intensity is very low (it means it is evening) then turn on some LED in a row working as streetlights. And when the intensity of the light in environment is high (it means it is day) then the system should turn off the LEDs. Also show the Intensity of light on a 7-segment LED in such a way that if the light intensity is high then display 1 and if the light intensity if low then display 0 on the 7-segment LED module.

Components Required:

Components	Quantity	Image Link
Arduino UNO with USB Cable	1	Link
Breadboard (Half Size)	1	Link
White LED	5	Link
Pin-to-Pin Jumper Wires	20	Link
100-ohm resistance	5	Link
LDR Module with Analog Output	1	Link
7-Segment LED (Common Anode)	1	Link

Group: G7

Project Title: Fire Detection and Alarm System

Description: Write the assembly program to detect the flame and then turn on the alarm and turn on a Red LED as the indication of danger.

Then if the flame is vanished then the system will go to standby mode by turning off the alarm and LED. And turn on a Green LED as an indication of safe environment.

Components Required:

Components	Quantity	Image Link
Arduino UNO with USB Cable	1	Link
Breadboard (Half Size)	1	Link
Pin-to-Hole Jumper Wires	10	Link
Pin-to-Pin Jumper Wires	20	Link
Flame Sensor	1	Link
Red and Green LEDs	2	Link
Buzzer Module	1	Link
100-ohm resistance	2	Link

Group: G8

Project Title: Smart Irrigation System

Description: Develop a system for automatically watering the plants when their soil has low water. Write assembly program to detect the soil moisture levels using soil moisture sensor then when the level of water is less than a threshold value, then turn on the water pump motor to provide water to the plants. When the water level in the soil if high then turn off the water pump. Display the soil moisture level on the LCD screen too.

Components Required:

Components	Quantity	Image Link
Arduino UNO with USB Cable	1	Link
Breadboard (Half Size)	1	Link
Pin-to-Hole Jumper Wires	10	Link
Pin-to-Pin Jumper Wires	30	Link
16x2 LCD (with Backlight)	1	Link
Female Header Pins Strip for LCD	1	Link
Soil Moisture Sensor	1	Link
RED LED (simulating water pump)	1	Link
100-ohm resistance	2	Link

Group: G9

Project Title: Count-down Timer using 7-Segment LED

Description: Write assembly program to control a 7-segment LED module and show count down from 9 to 0. Start displaying the count down by pressing a push button. Then when the countdown reaches to zero then start generating tune on a buzzer module at the 0.5 second interval.

Components Required:

Components	Quantity	Image Link
Arduino UNO with USB Cable	1	Link
Breadboard (Half Size)	1	Link
Pin-to-Pin Jumper Wires	20	Link
Push Button 12x12mm	2	Link
Red and Green LEDs	2	Link
Buzzer Module	1	Link
7-Segment LED (Common Anode)	1	Link
100-ohm resistance	5	Link

Group: G10

Project Title: Flammable Gas Detection and Alarm System

Description: Write the assembly program to detect the LPG/Methane gas and then turn on the alarm and turn on a Red LED as the indication of danger.

Then if the gas is vanished then the system will go to standby mode by turning off the alarm and LED. And turn on a Green LED as an indication of safe environment.

Components Required:

Components	Quantity	Image Link
Arduino UNO with USB Cable	1	Link
Breadboard (Half Size)	1	Link
Pin-to-Hole Jumper Wires	10	Link
Pin-to-Pin Jumper Wires	20	Link
MQ2 Gas Sensor	1	Link
Red and Green LEDs	2	Link
Buzzer Module	1	Link
100-ohm resistance	2	Link

Group: G11

Project Title: Environment Light Intensity Meter

Description: Write a program to measure the amount of light in the room and then display the results on a 16x2 LCD. If the light intensity is high, then turn on a Green LED. If it is darkness, then turn off the Green LED and Turn on a Red LED.

Components Required:

Components	Quantity	Image Link
Arduino UNO with USB Cable	1	Link
Breadboard (Half Size)	1	Link
Pin-to-Pin Jumper Wires	30	Link
LDR Module	5	Link
Red and Green LEDs	2	Link
16x2 LCD (with Backlight)	1	Link
Female Header Pins Strip for LCD	1	Link
100-ohm resistance	2	Link