



Innovator Program (Home Automation) - Tier 1 Curriculum BEGINNER (Age 7-9 Years)

SESSION NO.	SESSION NAME	CLASS TOPICS	ACTIVITY
1	Introduction to LearnDash, Zoom and Tinkercad	- Activity Glow 5 LED's in Series and 5 LED's in parallel and series using a battery - Introduction to LED, resistor and battery. - Introduction to Series and parallel connection using LEDs.	- Connect 5 LEDs in Series with 9 V Battery - Connect 5 LEDs in Parallel with 9 V Battery - Connect a circuit having combination of Series and Parallel
2	Basic circuits	- Controlling LED with push button. - Controlling LED with slide switch.	-Build a circuit with a combination of slide switch and push button to control an LED. -Build a circuit to control two LEDs with a single slide switch.
3	Buzzer, Breadboard	- Activity Based on Breadboard and LEDs - Introduction to buzzer - Activity based on Buzzer and Breadboard.	-Build a circuit with a combination of slide switch and push button to control an LED. -Build a circuit to control two LEDs with a single slide switch.
4	Introduction to Arduino & Installation of IDE	- Installation of IDE or activation of online web editor -Creating a program to glow an LED -Creating a program to blink an LED	- Revision from previous topics - Use your creativity to build a circuit based on what you learnt till now
5	Introduction to ELB	- Interfacing LEDs on ELB with the Arduino UNO. - Blinking LEDs - Multiple LED pattern - Controlling Vibration Motor	- glowing specified patterns with LEDs (Pattern No. 1: Glowing Odd & Even positioned LED'S. Pattern No. 2: Counting from 1-8, 1 at 1st sec, 2 for next and so on)
6	Circuits and Switches	- How to check two points are connected or not? - Connected together, Mohm - Not connected) - concept of power rail - Fun activity with buzzer - LED brightness control using resistor/ potentiometer -Using multimeter to check resistance of variable resistor -Activity using variable resistor to control 2 LEDs brightness. - PIR Introduction"	- Volume Control of Buzzer using a Potentiometer on Breadboard - Use a PIR to turn on and off the LED in case of motion detection
7	Movement Record	Create a code to understand the working of PIR sensor and Judge the movement too.	Burgular Alarm, Raising an Alert for Intruder Action
8	Assesment	Problem Statement based on previous session learnings	Continue the same by introducing creative angle to it.
9	Intro to Serial Monitor (with Operators)	Printing the value of Push Button Input on Serial Monitor	Displaying the different texts on different conditions
10	Introduction to Digital Sensors(Push Button)	- Digital Sensors - Revision of digital values (HIGH/LOW) - Explaining digital sensors - Input for the microcontroller - Push Button: Active Low on ELB - Examples : Push button, switch - Use of digitalRead command	- Programming an arduino to glow an LED when the push button is pressed. - If else statements using text coding
11	Proximity Search	Creating an IR sensor + Buzzer based window alarm system.	Working of Conveyor Belts by using Position Controlled Motors and Object Detection
12	Introduction to Potentiometer(analogRead)	Brightness control of LED	Control the blinking speed of the LED
13	Introduction to LCD	Print your name or Hello world on lcd.	Screen 1 for 5 seconds: Welcome Fun with LCD Screen 2, for 5 seconds: My name is Anagh then after that for 5 seconds: I Love Arduino Note: screen 2 content will be in void loop.
14	Do Not Repeat Yourself (for with Serial monitor/LCD)	-for loop -print number from 1 to 10 using for loop -Use mod operator to show even and odd numbers	Display multiples of 7 within a range
15	Do Not Repeat Yourself (Use Loops)	-while loop -print 10 multiples of 3 using while loop -do-while loop - print numbers from 10 to 0 using do-while loop -entry controlled and exit controlled loops -difference between all the loops	printing 10 multiples of any number using do-while loop on LCD.
16	Debugging Assesment	Problem Statement based on previous session learnings	Continue the same by introducing creative angle to it.
17	Seven Segment	Making a Countdown from 9 to 0.	Display only even Numbers.
18	Introduction to LDR	Creating circuit of LDR Sensor to read it in Analog Mode and print on serial monitor , Learning the change of resistance based on light intensity , LDR sensor, Understanding the pinout of LDR Sensor	Creating an LDR based street light on ELB
19	PWM for LED brightness (fading)	Understanding PWM pins on Arduino Board, AnalogWrite command, Map command, Converting a value from one range to required range. Introducing PWM pins	Using PWM pins, Dimming the LED intensity.
20	Servo Motor	Sweeping Servo Motor, Providing the angle and Time in sync with each other.	Rotating Servo from 0-180 with hopping.
21	Digital Thermometer	Displaying temperature on LCD, Thermometer, Temp to be displayed in Fahrenheit/Celsius.	Temperature Meter on Serial Monitor.
22	Ultrasonic Sensor	Calculating distance by using ultrasonic sensor	For a specific distance range, turn on the Buzzer
23	Jackpot Machine	Coding push button and LCD to bring a jackpot number between a range	Introduce the LED's
24	Melody Tone	Happy Birthday tube synching with LED's	Innovate Yourself
25	Digital Dice	Random function to generate random values within a range, using a push button	Using buzzer controlled dice
26	Assessment		

STUDENT'S JOURNEY





Innovator Program (Home Automation) - Tier 1 Curriculum INTERMEDIATE (Age 10-12 Years)

SESSION NO.	SESSION NAME	CLASS TOPICS	ACTIVITY
1	Introduction to LearnDash, Zoom and Tinkercad Series parallel and resistors	- How to Use Learndash to access - Use of Zoom(share Screen, Breakoutroom,Audio,etc) - Use of Tinkercad - introduction of LED, resistor and battery - Introduction to circuits, series and parallel	- Activity Glow 5 LED's in Series and 5 LED's in parallel and series using a battery - Introduction to LED, resistor and battery. - Introduction to Series and parallel connection using LEDs.
2	Circuits and Switches	Introduction to simple circuit and circuit components Analogy of electric circuit. Activity on open and close circuits using slide switch. Introduction to pushbutton and its internal mechanism.	- Controlling LED with push button. - Controlling LED with slide switch.
3	Buzzer, Breadboard	Introduction to breadboard, Reemphasizing Series and Parallel connections on Breadboard. Connecting loose components on breadboard, connecting battery and powering the circuit	- Activity Based on Breadboard and LEDs - Introduction to buzzer - Activity based on Buzzer and Breadboard.
4	Introduction to analog and digital signals	Introduction to breadboard, Reemphasizing Series and Parallel connections on Breadboard. Connecting loose components on breadboard, connecting battery and powering the circuit	- How to check two points are connected or not? - Connected together, M ohm - Not connected) - concept of power rail - Fun activity with buzzer - LED brightness control using resistor/ potentiometer -Using multimeter to check resistance of variable resistor -Activity using variable resistor to control 2 LEDs brightness. - PIR Introduction'
5	Introduction to Arduino Installation of IDE Testing Program	-Understanding History of Arduino -Understanding the basic components of an Arduino Board -Learning about Digital Data -Learning about digital I/O Pins on Arduino -Understaning about Wait/Delay statement and its usage	- Installation of IDE or activation of online web editor -Creating a program to glow an LED -Creating a program to blink an LED
6	Introduction to Embedded Learner Board	-Introduction to Embedded Learner Board. -Pin Outs of ELB -Types of Wire - M-M, M-F, F-F -Interfacing the ELB with the Arduino UNO	- Interfacing LEDs on ELB with the Arduino UNO. - Blinking LEDs - Multiple LED pattern - Controlling Vibration Motor
7	Introduction to Digital Sensors	- Digital Sensors - Revision of digital values (HIGH/LOW) - Explaining digital sensors - Input for the microcontroller - Push Button: Active Low on ELB - Examples : Push button, switch - Use of digitalRead command	- Programming an arduino to glow an LED when the push button is pressed. - If else statements using text coding - Introduction to Variable and Data Types
8	Introduction to LCD	- introduction to LCD(16*2) - introduction to the Libraries and including them in the code functions: lcd.print() lcd.setCursor() lcd.clear()	-Print Students name on LCD. - Print the name at the Centre of LCD - Print on two screens - Welcome Screen - Main content
9	Loops	-for loop -print number from 1 to 10 using for loop -while loop -print 10 multiples of 3 using while loop -do-while loop - print numbers from 10 to 0 using do-while loop -entry controlled and exit controlled loops -difference between all the loops	-print number from 1 to 10 using for loop -print 10 multiples of 3 using while loop - print numbers from 10 to 0 using do-while loop -entry controlled and exit controlled loops -difference between all the loops
10	Introduction to serial monitor & Debugging	- need of serial monitor -Understanding Serial.begin() command -Understanding Serial.print & Serial.println() command -delay() -Understanding Serial.Read() command -Char datatype	-Printing on Serial monitor student name withSerial.print() -Printing on Serial monitor student name withSerial.println() -adding the delay() - Headings and spaces in Serial printing - Variable Value printing - Serial Read()
11	Analog Input with potentiometer	- Analog inputs -Understanding Potentiometer -Understanding the pinout of potentiometer - Analog Values 0 - 1023 - Understanding PWM, Understandin PWM pins on Arduino Board - Mapping function and converting a value from one range to required range - analogWrite() and analogRead() - Brightness control of LED	-using MAP function to change the LEDs brightness as per POT value -Using the POT value to increase or decrease the blinking speed of LED
12	Movement Record	Introduction to the PIR Sensor, pin outs, Basic Working principle.	Create a code to understand the working of PIR sensor and Judge the movement too.
13	Counter	Introduction to 7 Segment Display, Understanding the Segments and Pin out.	Making a Countdown from 9 to 0.
14	Motors	Understanding DC and AC, Understanding DC Motors,Understanding Driver Circuit.	Read for a signal that you would manually type into the Serial monitor. When either 1 or 2 is entered, the motor would turn either clockwise or counterclockwise for a short period of time.
15	Position Control	explaining Int datatype, if-else command, Random Numbers, Introducing DC Motors, understanding position controlled motors, Pinout of servo motor , installing Servo.h libraries	Sweeping Servo Motor
16	Tilt Check	Learning about Tilt Sensor, Types of it, Mechanism and Principle, how Tilting is recognized, Pinouts of Tilt Sensor, Complete description of various Parts of it. Understanding How Orientation is used in mobile phones, to disable or enable some applications.	Controlling servo motor with the digital inputs of Tilt sensor. speed or movement has to be controlled from Tilt sensor inputs using servo motor.
17	Remote Control	Introducing IR Remote , working and Pin out of the same, What IR is and how it works, Introduction of IR Receiver Modules, How to use an IR module with Arduino, Controlling keyboard with IR remote control, Understanding Matrices	Creating an IR Remote Based , Decoding of every button of IR remote using Serial Monitor
18	Digital Thermometer	Understanding LM35 Temp Sensor, Understanding the pinout of temperature sensor, Understanding the wiring of temperature sensor to circuit, AnalogRead command. Understanding Analog Sensors.	Recording the temperature and displaying it on Serial Monitor
19	Smart Home	Understanding working of Photoresistor, Potential Divider Circuit, Pin out of LDR	Creating circuit of LDR Sensor to read it in Analog Mode and print on serial monitor , Learning the change of resistance based on light intensity , LDR sensor, Understanding the pinout of LDR Sensor
20	Controlling Knob	Understanding Potentiometer , Understanding the pinout of potentiometer, Visualizing the relevance of POT value to increase or decrease the LCD brightness, Understanding PWM.	Using MAP function to change the LEDs brightness as per POT value, Using the POT value to increase or decrease the blinking speed of LED
21	Dimming the Lights	Understanding PWM pins on Arduino Board, AnalogWrite command, Map command, Converting a value from one range to required range. Introducing PWM pins	Use the PWM pins to rotate the Servo Motor to different angles.
22	Simple Battery Tester	Utilizing and Understanding Breadboard.	Take the usefulness of breadboard and LED's to a next level by judging the battery power
23	Distance Meter	Understanding how bat produces ultrasound waves to detect objects, Understanding the working of SONAR to detect objects, Introducing Ultrasonic Sensor, Understanding Pinout of Ultrasonic Sensor, Working Principle of Ultrasonic Sensor.	For a specific distance range, turn on the Buzzer
24	Stopwatch	Explaining the Concept of Function and implementing them by Using an LCD. Activity Complex coding using multiple Local Functions in the main Code to display a Clock/Stopwatch on LCD screen.	Using functions, based on the slide switch input, Display 2 different time zones
25	Digital Clock	Implementing the learning by making use of LCD ,Push buttons to create a Digital Clock.	Revising
26	Assessment		

STUDENT'S JOURNEY





Innovator Program (Home Automation) - Tier 1 Curriculum

ADVANCED (Age 13+)

SESSION NO.	SESSION NAME	CLASS TOPICS	ACTIVITY
1	Introduction to LearnDash, Zoom and Tinkercad Series parallel and resistors	- How to Use Learndash to access - Use of Zoom(share Screen, Breakoutroom,Audio,etc) - Use of Tinkercad	- Activity Glow 5 LED's in Series and 5 LED's in parallel and series using a battery - Introduction to LED, resistor and battery. - Introduction to Series and parallel connection using LEDs.
2	Circuits and Switches	Introduction to simple circuit and circuit components Analogy of electric circuit.Activity on open and close circuits using slide switch.Introduction to pushbutton and its internal mechanism.	- Controlling LED with push button. - Controlling LED with slide switch.
3	Buzzer, Breadboard	Introduction to bread board, Re emphasizing Series and Parallel connections on Breadboard.Connecting loose components on breadboard,connecting battery and powering the circuit.	- Activity Based on Breadboard and LEDs - Introduction to buzzer - Activity based on Buzzer and Breadboard.
4	Introduction to analog and digital signals	Introduction to digital and analog system. Difference between analog and digital Introduction to variable resistor and its working.	- How to check two points are connected or not? - Connected together , M ohm - Not connected) - concept of power rail - Fun activity with buzzer - LED brightness control using resistor/ potentiometer -Using multimeter to check resistance of variable resistor -Activity using variable resistor to control 2 LEDs brightness. - PIR Introduction
5	Introduction to Arduino Installation of IDE Testing Program	-Understanding History of Arduino -Understanding the basic components of an Arduino Board -Learning about Digital Data -Learning about digital I/O Pins on Arduino -Understanding about Wait/Delay statement and its usage	- Installation of IDE or activation of online web editor -Creating a program to glow an LED -Creating a program to blink an LED
6	Introduction to Embedded Learner Board	-Introduction to Embedded Learner Board. -Pin Outs of ELB -Types of Wire - M-M, M-F, F-F -Interfacing the ELB with the Arduino UNO	- Interfacing LEDs on ELB with the Arduino UNO. - Blinking LEDs - Multiple LED pattern - Controlling Vibration Motor
7	Introduction to Digital Sensors	- Digital Sensors - Revision of digital values (HIGH/LOW) - Explaining digital sensors - Input for the microcontroller - Push Button: Active Low on ELB - Examples : Push button, switch - Use of digitalRead command	- Programming an Arduino to glow an LED when the push button is pressed. - If else statements using text coding - Introduction to Variable and Data Types -Active High State
8	Counter	Introduction to 7 Segment Display, Understanding CC and CA devices, Understanding the Segments and Pin out.	Making a Countdown from 9 to 0, Start the Counter only when Push Button is Pressed on Breadboard.
9	Introduction to LCD	- introduction to LCD(16*2) - Introduction to the Libraries and including them in the code functions: lcd.print() lcd.setCursor() lcd.clear()	-Print Students name on LCD. - Print the name at the Centre of LCD - Print on two screens - Welcome Screen - Main content
10	Loops	-for loop -print number from 1 to 10 using for loop -while loop -print 10 multiples of 3 using while loop -do-while loop - print numbers from 10 to 0 using do-while loop -entry controlled and exit controlled loops -difference between all the loops	-print number from 1 to 10 using for loop -print 10 multiples of 3 using while loop - print numbers from 10 to 0 using do-while loop -entry controlled and exit controlled loops -difference between all the loops
11	Introduction to serial monitor & Debugging	- need of serial monitor -Understanding Serial.begin() command -Understanding Serial.print & Serial.println() command -delay() -Understanding Serial.Read() command -Char datatype	-Printing on Serial monitor student name withSerial.print() -Printing on Serial monitor student name withSerial.println() -adding the delay() - Headings and spaces in Serial printing - Variable Value printing - Serial Read()
12	Analog Input with potentiometer	- Analog inputs -Understanding Potentiometer -Understanding the pinout of potentiometer -Analog Values 0 – 1023 - Understanding PWM, Understandin PWM pins on Arduino Board - Mapping function and converting a value from one range to required range - analogwrite() and analogRead() - Brightness control of LED	-using MAP function to change the LEDs brightness as per POT value -Using the POT value to increase or decrease the blinking speed of LED
13	Embedded Learner Board Activity 1	-Understanding LM35 Temp Sensor -Understanding the pinout of temperature sensor -Understanding the wiring of temperature sensor to circuit -analogRead command	-Displaying temperature on LCD. -Creating circuit of LDR Sensor to read it in Analog Mode and print on serial monitor -Learning the change of resistance based on light intensity -LDR sensor -Understanding the pinout of LDR Sensor
14	Embedded learners board Activity 3	-Learning about Passive and Active Sensors -Working of an IR sensor -Understanding the concept of Infrared Rays -Understanding pinout of IR sensor -Applications of IR sensors -understanding motors -understanding position controlled motors -Pinout of servo motor -Installing Servo.h libraries	-Creating an IR sensor + Buzzer based window alarm system.
15	Let's Move	Understanding DC and AC, Understanding DC Motors,Understanding Driver Circuit.	Controlling the speed of the motor using push buttons on Tinkercad read for a signal that you would manually type into the Serial monitor. When either 1 or 2 is entered, the motor would turn either clockwise or counterclockwise for a short period of time
16	Remote Control	Introducing IR Remote , working and Pin out of the same, What IR is and how it works, Introduction of IR Receiver Modules, How to use an IR module with Arduino, Controlling keyboard with IR remote control, Understanding Matrices	Creating an IR Remote Based , Decoding of every button of IR remote using Serial Monitor, Based on Codes of the individual buttons in sync with Switch Case Statement controlling different LED's .Tune in the Buzzer to produce different melodies on different keys.
17	Smart Home 1	Understanding LM35 Temp Sensor, Understanding the pinout of temperature sensor, Understanding the wiring of temperature sensor to circuit, AnalogRead command, Understanding Analog Sensors.	Displaying temperature on LCD, Thermometer, Temp to be displayed in Fahrenheit/Celsius.Make a Circuit using Temp Sensor and 2 LED's on breadboard and Indicate the Hot and Cold Conditions.
18	Smart Home 2	Understanding working of Photoresistor, Potential Divider Circuit, Pin out of LDR, Connecting LDR to Arduino through Breadboard, Pull up and Pull Down Resistors	Creating circuit of LDR Sensor to read it in Analog Mode and print on serial monitor , Learning the change of resistance based on light intensity , LDR sensor, Understanding the pinout of LDR Sensor,Creating an LDR based street light on ELB
19	Day and Night	Understanding Potentiometer , Understanding the pinout of potentiometer, Visualizing the relevance of POT value to increase or decrease the LCD brightness, Understanding PWM	Using MAP function to change the LEDs brightness as per POT value, Using the POT value to increase or decrease the blinking speed of LED,Making a colourfull lamp using RGB LED and POT.
20	Digital to Analog Conversion	Understanding PWM pins on Arduino Board, AnalogWrite command, Map command, Converting a value from one range to required range, Introducing PWM pins, Understanding the logic behind DAC and ADC, How many bits of ADC or DAC are there on Arduino.	Using PWM pins, Displaying different hues or shades on RGB LED, Understanding the range of 0-255 and using the different values how to create different shades on RGB LED, Use the PWM pins to rotate the Servo Motor to different angles.
21	Distance Alert	Understanding how bat produces ultrasound waves to detect objects, Understanding the working of SONAR to detect objects, Introducing Ultrasonic Sensor, Understanding Pinout of Ultrasonic Sensor, Working Principle of Ultrasonic Sensor.	Printing the distance of object from Ultrasonic Sensor on serial monitor, Creating a Visitor Count Code,Using different values of the distances, switch diff colors of RGB LED
22	Combination Lock	Utilizing multiple push buttons together, Undetsanding if/else if Statements, Declaring and calling functions.	Creating a Combination Door Lock on Tinkercad,Making the same circuit using Breadboard.
23	Linear Orientation	Understanding the concept of Acceleration, How to measure the acceleration, PinOut of Accelerometer	Describing the coding and connection process to show how to make the accelerometer sense vibration and tilt shifting in all the axes, X,Y and Z.Based on the acceleration values, move the servo motor to different degrees.
24	Ping Pong Game	Understanding Neo pixels, Importing Library for Neo Pixel, Applying all the concepts learnt creating a game	Creating a PING PONG Game using Push Buttons and LCD ,Completing the game, Innovate Yourself
25	Automatic dispenser/ Dustbin	Sensing the distance, bin will open itself using Ultrasonic sensor and servo motor	Add two leds, where when bin is shut, green led remains on and when bin open it produces sound with red led turned on
26	Password protected Lock- Part 1	Lock based on keypad and LCD	Keypad activated servo motor as lock
27	Password protected Lock- Part 2	Lock based on keypad and LCD	Keypad activated servo motor as lock
28	Challenge activity/ Assessment		

STUDENT'S JOURNEY

