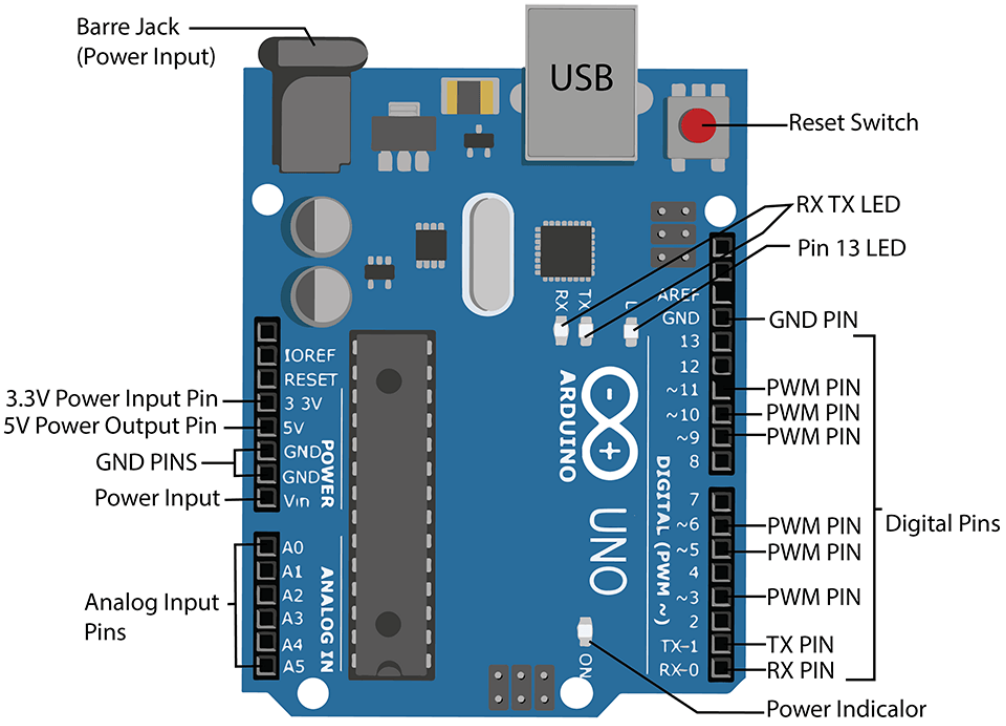
INNOVATION CELL PROJECT BASE ON ARDUINO RASPBERRY PI LORA

STUDY OF AURDUINO =



Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.

What is Arduino?

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.

Over the years Arduino has been the brain of thousands of projects, from everyday objects to complex scientific instruments. A worldwide community of makers - students, hobbyists, artists, programmers, and professionals - has gathered around this open-source platform, their contributions have added up to an incredible amount of accessible knowledge that can be of great help to novices and experts alike.

Arduino was born at the Ivrea Interaction Design Institute as an easy tool for fast prototyping, aimed at students without a background in electronics and programming. As soon as it reached a wider community, the Arduino board started changing to adapt to new needs and challenges, differentiating its offer from simple 8-bit boards to products for IoT applications, wearable, 3D printing, and embedded environments.

Why Arduino?

Thanks to its simple and accessible user experience, Arduino has been used in thousands of different projects and applications. The Arduino software is easy-to-use for beginners, yet flexible enough for advanced users. It runs on Mac, Windows, and Linux. Teachers and students use it to build low cost scientific instruments, to prove chemistry and physics principles, or to get started with programming and robotics. Designers and architects build interactive prototypes, musicians and artists use it for installations and to experiment with new musical instruments. Makers, of course, use it to build many of the projects exhibited at the Maker Faire, for example. Arduino is a key tool to learn new things. Anyone - children, hobbyists, artists, programmers - can start tinkering just following the step by step instructions of a kit, or sharing ideas online with other members of the Arduino community.

There are many other microcontrollers and microcontroller platforms available for physical computing. Parallax Basic Stamp, Net media's BX-24, Phi gets, MIT's Handy board, and many others offer similar functionality. All of these tools take the messy details of microcontroller programming and wrap it up in an easy-to-use package. Arduino also simplifies the process of working with microcontrollers, but it offers some advantage for teachers, students, and interested amateurs over other systems:

- **Inexpensive** - Arduino boards are relatively inexpensive compared to other microcontroller platforms. The least expensive version of the Arduino module can

be assembled by hand, and even the pre-assembled Arduino modules cost less than \$50

- **Cross-platform** - The Arduino Software (IDE) runs on Windows, Macintosh OSX, and Linux operating systems. Most microcontroller systems are limited to Windows.

- **Simple, clear programming environment** - The Arduino Software (IDE) is easy-to-use for beginners, yet flexible enough for advanced users to take advantage of as well. For teachers, it's conveniently based on the Processing programming environment, so students learning to program in that environment will be familiar with how the Arduino IDE works.

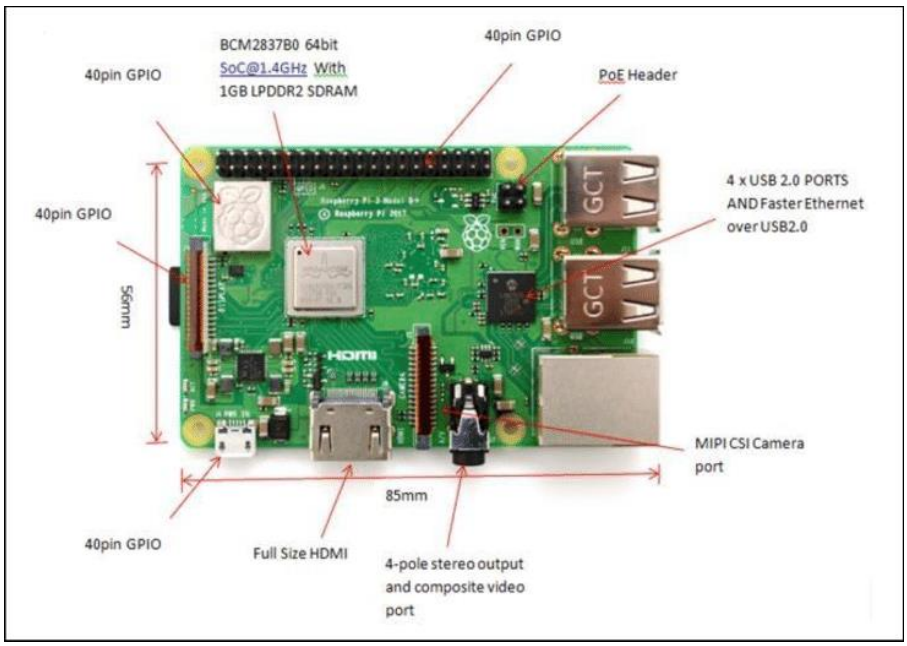
- **Open source and extensible software** - The Arduino software is published as open source tools, available for extension by experienced programmers. The language can be expanded through C++ libraries, and people wanting to understand the technical details can make the leap from Arduino to the AVR C programming language on which it's based. Similarly, you can add AVR-C code directly into your Arduino programs if you want to.

- **Open source and extensible hardware** - The plans of the Arduino boards are published under a Creative Commons license, so experienced circuit designers can make their own version of the module, extending it and improving it. Even relatively inexperienced users can build the breadboard version of the module in order to understand how it works and save money.

How to use Arduino?

See the getting started guide. If you are looking for inspiration you can find a great variety of Tutorials on Arduino Project Hub.

STUDY OF RASPBERRY PI=



Raspberry Pi is defined as a minicomputer the size of a credit card that is interoperable with any input and output hardware device like a monitor, a television, a mouse, or a keyboard – effectively converting the set-up into a full-fledged PC at a low cost. This article discusses the Raspberry Pi models available today, their key features, and use cases.

What Is Raspberry Pi?

Raspberry Pi is defined as a minicomputer the size of a credit card that is interoperable with any input and output hardware device like a monitor, a television, a mouse, or a keyboard – effectively converting the set-up into a full-fledged PC at a low cost.

The first generation of computers came as massive processing systems built with vacuum tube technology. Over the years, more compact and less expensive versions of what a computer would come to look like sprung up. Today, we have minicomputer gadgets such as smartphones in our pockets. Even though computers have become so commonplace, they are still not widely accessible in developing countries. This imbalance in access to computers and programming technology led to the development and creation of the Raspberry Pi computer.

Raspberry Pi is a small, low-cost, single-board computer the size of a credit card that allows people from different backgrounds and levels of expertise to experience and learn to

compute. It is an enhanced motherboard developed in the United Kingdom by the Raspberry Pi foundation, now widely accepted as a part of evolving computer technology. The minicomputer can connect with other peripheral hardware devices such as a keyboard, mouse, and monitor.

One can use Raspberry Pi for various purposes, including learning programming languages and orchestrating network management. It is multifunctional and gained even more popularity in the past few years than initially projected.

How does Raspberry Pi work?

Raspberry Pi is a programmable device. It comes with all the critical features of the motherboard in an average computer but without peripherals or internal storage. To set up the Raspberry computer, you will need an SD card inserted into the provided space. The SD card should have the operating system installed and is required for the computer to boot.

Raspberry computers are compatible with Linux OS. This reduces the amount of memory needed and creates an environment for diversity.

After setting up the OS, one can connect Raspberry Pi to output devices like computer monitors or a High-Definition Multimedia Interface (HDMI) television. Input units like mice or keyboards should also be connected. This minicomputer's exact use and applications depend on the buyer and can cover many functions.

See More: What Is Network Management? Definition, Key Components, and Best Practices

Top 6 Models of Raspberry Pi

For anyone interested in getting one of these single-board computers, the myriad models and generations released can be difficult to sort through. Nonetheless, the most notable models of Raspberry Pi available on the market are:

1. Raspberry Pi Zero

This is the cheapest Raspberry model produced by the company. One can get it for as low as $5, which is quite impressive considering the extent of its functionality. Although not the first model to be released, it boasts a smaller, more compact size than the Raspberry Pi 1.

Raspberry Pi Zero has the same processor and RAM (512 MB) as the Pi 1 Model B+. The

Raspberry Pi Zero does not come with Wi-Fi or Bluetooth, but it can be made internet accessible via USB.

Its slightly more expensive version, Raspberry Pi Zero W, comes with Bluetooth 4.0 and a built-in 802.11n Wi-Fi connectivity. For projects that require GPIO pins, other versions of Raspberry Pi may be more suitable.

2. Raspberry Pi 1

Raspberry Pi 1 Model B was released in 2012. It served as a baseline in size for future releases. Initially, it had 26 GPIO pins, 256MB RAM capacity, and a single CPU core. You couldn't use it for heavy tasks with high processing needs. In 2014, the Raspberry Pi B+ was released with a starting RAM capacity of 512MB and 40 GPIO pins, becoming standard across all other models. Raspberry Pi Model B+ is sold at $25 and comes with four USB ports and an Ethernet connection. Pi 1 Model A+ ($20) can be considered for faster CPU processing speed, but it comes without an Ethernet connection.

3. Raspberry Pi 2 B

In February 2015, Raspberry released the 2B model. Compared to the prior releases, Raspberry Pi 2 B significantly improved, specifically in memory and speed. The RAM capacity was increased to 1GB. Pi 2B comes in the standard size, with 4 USB ports. It is currently priced at about $35, which is pretty affordable.

4. Raspberry Pi 3

Raspberry Pi 3 B was released in 2016. The B+ version, which came out in 2018, can boast a faster processing unit, Ethernet (802.11ac), and Wi-Fi than the earlier version. Generally, Raspberry PI 3 offers the user a wide range of use. It comes with the standard HDMI and USB ports, 1GB RAM, and Wi-Fi and Bluetooth connections in addition to the already functional Ethernet. One remarkable thing about this model is that it doesn't generate much heat or consume too much power. This makes it suitable for projects that require passive cooling and can be acquired at $35.

5. Raspberry Pi 4B

Released in 2019, Raspberry 4B is a vast improvement from its predecessors, with a varying memory capacity from 2GB RAM to 8GB RAM. It also has a faster 1.5GHz processor and a good mix of 2.0 and 3.0 USB ports. Pi 4B is an ideal Raspberry model as it is suitable for virtually every use case with higher RAM capacity to satisfy even the most dedicated programmers. Depending on memory, the price ranges from $35 to $75, but each comes with all connectivity options.

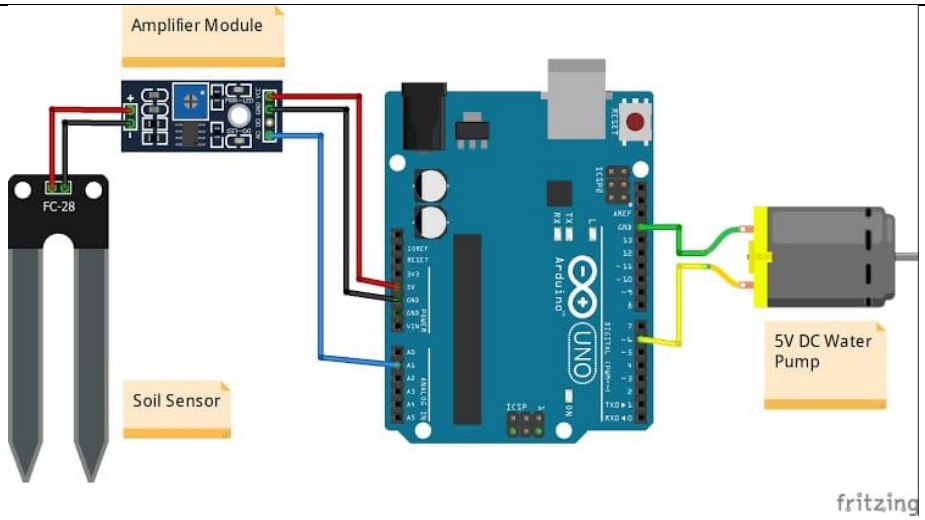
6. Raspberry Pi 400

This model is unique as it comes in the form of a keyboard. It was launched in 2020 and operated with 4GB RAM. It comes with standard USB ports and needs just a monitor and mouse to make it a home computer set. Pi 400 costs $70 and can be used effectively in classrooms.

PROJECT NO.1

SUBJECT	**PLANT WATERING SYSTEM USING ARDUINO (POLYTECHNIC)**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN ,HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**PLANT WATERING SYSTEM USING ARDUINO (POLYTECHNIC)**
HARDWARE	Arduino Pro Mini F3 EVO Controller LIDAR Module Buzzer LED Chaoli CL-615 59000RPM Coreless Motor 2xCW 2xCCW 2xCW 2xCCW 55mm (2.2inch) Blade Propeller Propeller for 6x15mm 1S Lipo Battery 3.7V 1200mAH (Lithium Polymer) Lipo Rechargeable Battery for RC Drone Buttons & Switches Electrical & Wirings Carbon Fiber 100 mm Wheelbase Cup Rack Brushed Mini Drone Frame Battery Connectors (Female/Male)
SOFTWARE	Arduino IDE

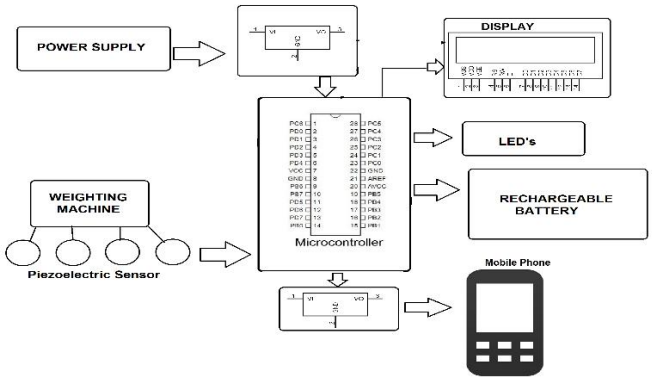
DIAGRAM	
PROCEDURE	There are four pins on the module: AO: Analog Output DO: Digital Output VCC: 'VCC' stands for Voltage Common Collector. We'll connect the VCC pin to 5V on the Arduino GND: In electronics, we define a point in a circuit to be a kind of zero volts or 0V reference point, on which to base all other voltage measurements. This point is called ground or GND. Step 1: start Step 2: command the Arduino using Arduino software Step 3: connect VCC on the relay to 5V pin on Arduino Step 4: Connect GND on the relay to negative power rail of breadboard Step 5: Connect IN on relay to Pin 3 on Arduino Step 6: Connect the '-' black wire from battery pack to the negative power rail on the breadboard Step 7: Next, connect the black wire of pump to negative power rail Step 8: Connect two F-F jumper wires from the soil moisture sensor probe to the comparison module included in the kit. Step 9 :Connect a F-M jumper wire from AO on the module to A0 on Arduino Step 10 :Connect a F-M jumper wire from GND on the module to GND on Arduino Step 11: Connect a F-M jumper wire from VCC on the module to 3.3V on the Arduino Step 12:

	Connect red wire of pump to NC. You may need to use a small jewellers Phillips screwdriver to loosen the holding before plugging in the wire, and then tightening it again. Step 13: Connect the '+' red wire from battery holder to COM on the relay. You may need to use a small jewellers Phillips screwdriver to loosen the holding before plugging in the wire, and then tightening it again. Step 14 : Connect a M-M wire from the negative power rail of breadboard, to GND pin on Arduino Next, we will get started with programming the Arduino, so connect it to a computer with the Arduino IDE installed. Step 15: Now that you have connected the kit with an Arduino, the 'moisture' threshold value found in the sketch above may need to be modified based on what values your sensor outputs when the sensor is completely dry, compared to when the sensor is completely submerged in water.
CONCLUSION	Hence we learned how to create a plant watering system using ardiuno
REFERENCE	https://youtu.be/VPrHSuVRZeg

PROJECT NO.2

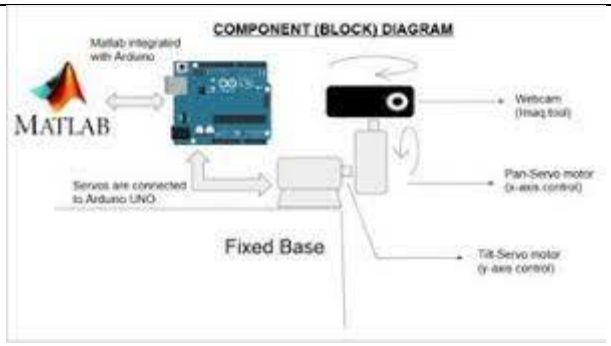
SUBJECT	**Foot Step Power Generation using Arduino(POLYTECHNIC)**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN ,HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**Foot Step Power Generation using Arduino(POLYTECHNIC)**
HARDWARE	ARDUINO UNO R3 EXPERTPOWER EXP12120 12V 12AMP RECHARGEABLE BATTRY VOLTAGE REGULATOR *2 16*2 LCD DISPLAY PIEZOELECTRIC SENSOR *10 CHARGING POINT PCB DIODE *2 CAPACITOR *2 10K VER RESISTOR TRIMPOT *1 JUMPER CABLES GLASS SLAB *2 PACK OF RESISTORS
SOFTWARE	Arduino IDE

DIAGRAM	
PROCEDURE	In this project, we are using a piezoelectric module to the generator power and the power should be stored in the battery. we are using a more piezoelectric module to create power by footstep and we have a lot of methods for generating power using piezoelectric. The piezoelectric generates an electric charge in response to applied mechanical stress. The mechanical stress is converting into electrical energy the energy is stored in the battery to use the generated power in electrical appliances without storing the energy we can't use the generated power in these methods. The piezoelectric module power generating range is 10mV to 100mV. Piezoelectric energy also is known as the piezo effect, is that the ability of certain materials to generate an AC(alternating current) voltage once subjected to mechanical stress or vibration, or to vibrate once subjected to an AC voltage, or both. the foremost common piezoelectric material is quartz. PZT could be a crystalline material that contains lead, zirconium, and Ti, and is that the best electricity material well-known. Still, creating it into nanowires needs a decent catalyst and that they haven't found it yet. And we are using to display the voltage value of battery form battery get the stored voltage and we connected the regulator power circuit in the battery. We get the mobile phone charging point. This process is done by Arduino Uno microcontroller
CONCLUSION	Its an Interesting project it can solve many electricity problems.

PROJECT NO.3

SUBJECT	**Face tracking robot (POLYTECHNIC)**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN ,HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

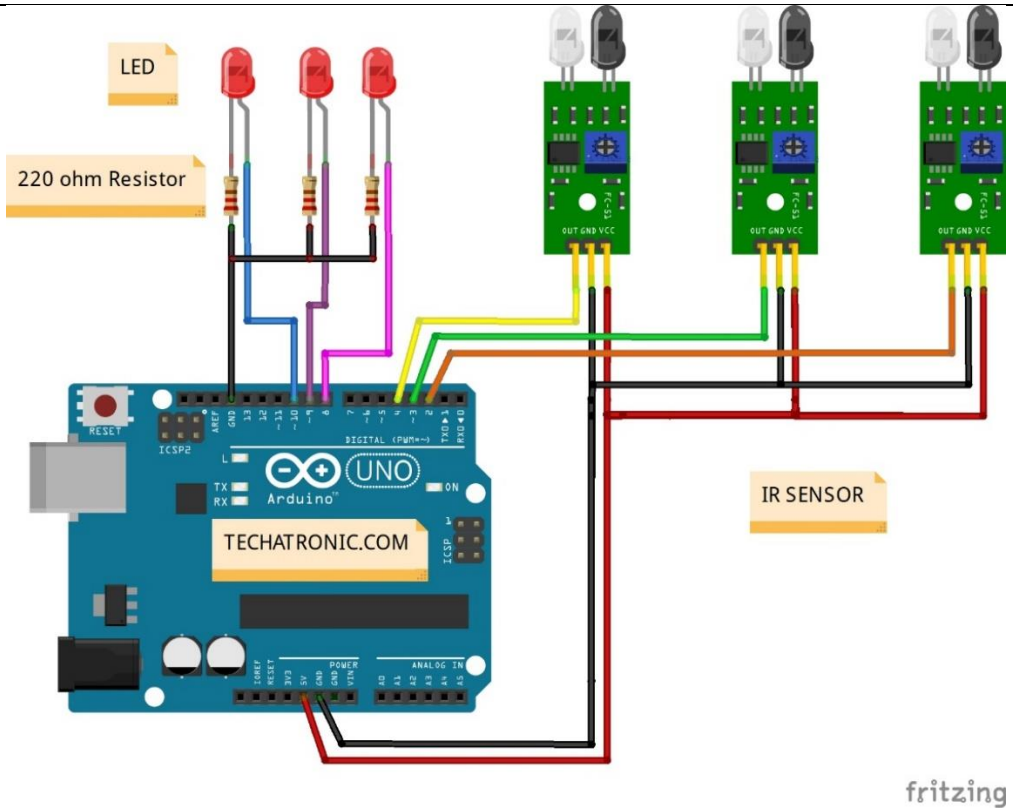
STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**Face tracking robot (POLYTECHNIC)**
HARDWARE	MU vision sensor Meconium Wheel 80mm (4 units) TT gear motor (4 units) Arduino Uno (with cable) L293D Motor Driver Shield Li-ion Battery 18650 (4 pack) 2200 MaH Li-ion Battery 18650 and holder
SOFTWARE	Arduino IDE
DIAGRAM	
PROCEDURE	The main objective of this project is to perform detection and tracking of faces from the real-time input video. 1- The input video stream is obtained using a webcam or any other live video acquisition device.

	2- The video is processed by dividing them into frames. Each frame is examined for a face. 3- Once the face is spotted, a bounding box is drawn around it. 4-The coordinates of the box are obtained. The first stage is executed on MATLAB software. 5-MATLAB is a multi-archetype numerical computing programming language that uses the Viola-Jones algorithm for face detection. 6- The coordinates obtained after detecting the face in a frame is written onto the Arduino microcontroller. 7-Viola-Jones algorithm is an object detection technique focusing on the faces in an image or video. 8- It is operative only on frontal faces. 9-The tracking of the face is done with the help of an Arduino microcontroller. 10- Arduino is an open-source platform with both hardware and software applications. 11-The microcontroller is connected to two servo motors. The servos are centered before tracking begins. 12-The coordinates obtained from the bounding box is used to track the face in the subsequent frames. 13-The motors control panning and tilting the webcam mounted on it.
CONCLUSION	We have proposed a low cost, lightweight efficient robot for face detection and tracking. It is able to detect human faces until a distance of 350cm with appropriate lighting conditions. It makes use of the Viola-Jones algorithm and KLT tracker. This can be used for various applications like security and surveillance systems, drowsy driver detection systems,human-computer interaction systems, etc.

PROJECT NO.4

SUBJECT	**Public utility Automation(Smart street light) [POLYTECHNIC]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN ,HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

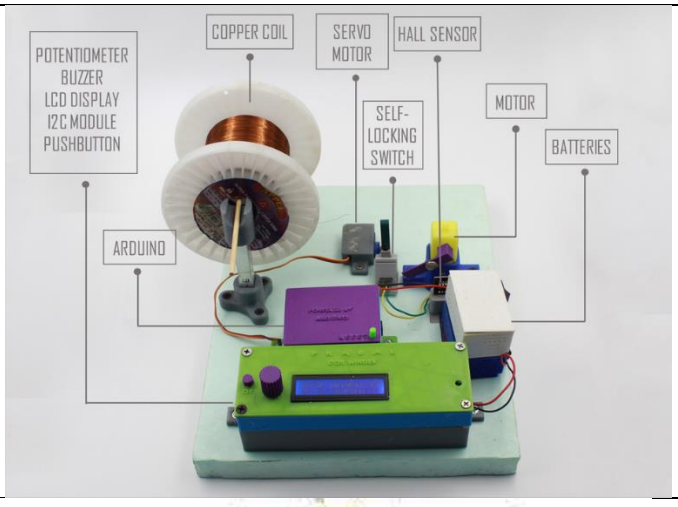
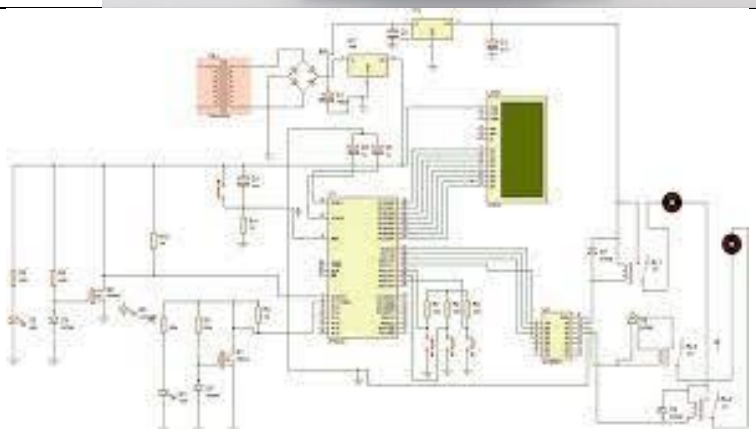
STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**Public utility Automation(Smart street light) [POLYTECHNIC]**
HARDWARE	ARDUINO UNO WITH CABLE IR SENSOR *2 LED *100` RESISTORS JUMPER WIRES LDR *6
SOFTWARE	Arduino IDE

DIAGRAM	
PROCEDURE	STEP 1: Install Arduino ide from Arduino website-https://www.arduino.cc/en/software STEP 2- Connect the jumper wire to Arduino to IR sensor through breadboard STEP 3- Connect the LDR Sensor through jumper wire to breadboard with a resistor STEP 4- Calibrate all the components with Arduino Uno. Step 5- Create an attractive model for the project STEP 6- Upload the code on Arduino ide and connect it to Arduino uno. And attact an power bank to give power to the
CONCLUSION	It was very easy and Interesting. Hence we Constructed Smart street light.

PROJECT NO.5

SUBJECT	**AUTOMATIC STATOR/ COIL WINDING UUSING ARDUINO[POLYTECHNIC]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN, HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**AUTOMATIC STATOR /COILWINDING UUSING ARDUINO [POLYTECHNIC]**
HARDWARE	Arduino uno Hall sensor Servo motor 16*2 LCD display 12C module Pushbutton Male to female jumper wire x6 Male to male jumper wire x6 Self locking button switch 10k potentiometer 1k resistor Single core wire Dual shaft motor Passive buzzer Copper coil 6*3/4 inch screws x13 Aluminium rods 10mm*10mm*150mm x2 1000 mAh lipo battery x5 High density foam 30mm*30mm
SOFTWARE	Arduino IDE

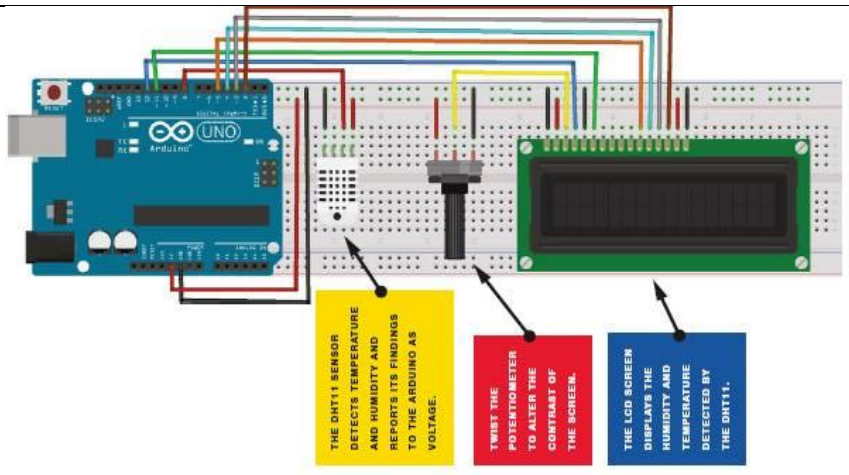
DIAGRAM		
		
PROCEDURE	Step 1 Connecting the Hall Sensor I have used a hall sensor module to count the number of windings. The hall sensor is a device that is designed to detect the hall effect. There are two different types of hall sensors - analogue and digital. I have used the latter. Each time the magnet attached to the motor goes past the hall sensor, it goes HIGH. An interrupt function is used to count the number of times the hall sensor goes HIGH (thus counting the number of windings). The image shows how the hall sensor is connected to that Arduino.	

	Step 2: Connecting the LCD The LCD display is coupled with the I2C module and connected to the Arduino. The image shows how the LCD display is connected to the Arduino. Step 3: Connecting the Servo Motor The servo motor distributes the copper coil evenly across the 3D printed part. The image shows how the servo motor is connected to the Arduino. Step 4: Connecting the Push Button The pushbutton is used to confirm the input given through the potentiometer. The image shows how the pushbutton is connected to the Arduino through a pull-up resistor. Step 5: Connecting the Buzzer The buzzer gives a beep sound as soon as the winding is done. There are two different types of buzzers, active and passive buzzers. I have used a passive buzzer. The image shows how the buzzer is connected to the Arduino. Step 6: Connecting the Potentiometer The potentiometer knob is used to give the input regarding the amount of coil to be wound around the 3D printed part. I have used a 10KOhm potentiometer. You can use a different potentiometer. Use the schematics to connect the potentiometer to the Arduino. Step 7: Connecting the Motor, Battery and Self-locking Switch Use the schematics to connect the motor to the battery through the switch. Make sure to get the exact same switch. If you don't find it, you can always get a different switch and use the continuity testing feature of the multimeter to figure out how to connect it, to perform the same action. Step 8: Connecting the Arduino Use the schematics to connect the Arduino to the battery. I have used a battery pack made of three Lipo cells. The total voltage of the battery pack is 11.1V (3.7V x 3). The Vin pin allows an input between 7-12V. You can use a 9V battery, commonly available at stores. Step 9: Code
CONCLUSION	ELECTRICAL COIL WINDING MACHINE ARE USED TO WIND COIL OF MOTORS TRANSFORMER INDUCTORS AND CHOKES. COIL WINDING EQUIPMENT IS USED IN A VARIETY OF WIRE WINDING, WIRE WELDING , AND WIRE BONDING APPLICATION

REFERENCE	https://www.instructables.com/Coil-Winder-Using-Arduino/

PROJECT NO.6

SUBJECT	**ARDUINO WEATHER STATION [POLYTECHNIC]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN, HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**ARDUINO WEATHER STATION[POLYTECHNIC]**
HARDWARE	1)Arduino board 2) Breadboard 3) Jumper wires 4) 50k-ohm potentiometer 5) 16×2 LCD screen (Hitachi HD44780 compatible) 6) DHT11 humidity sensor
SOFTWARE	Arduino IDE
DIAGRAM	
PROCEDURE	Building Arduino Weather Station

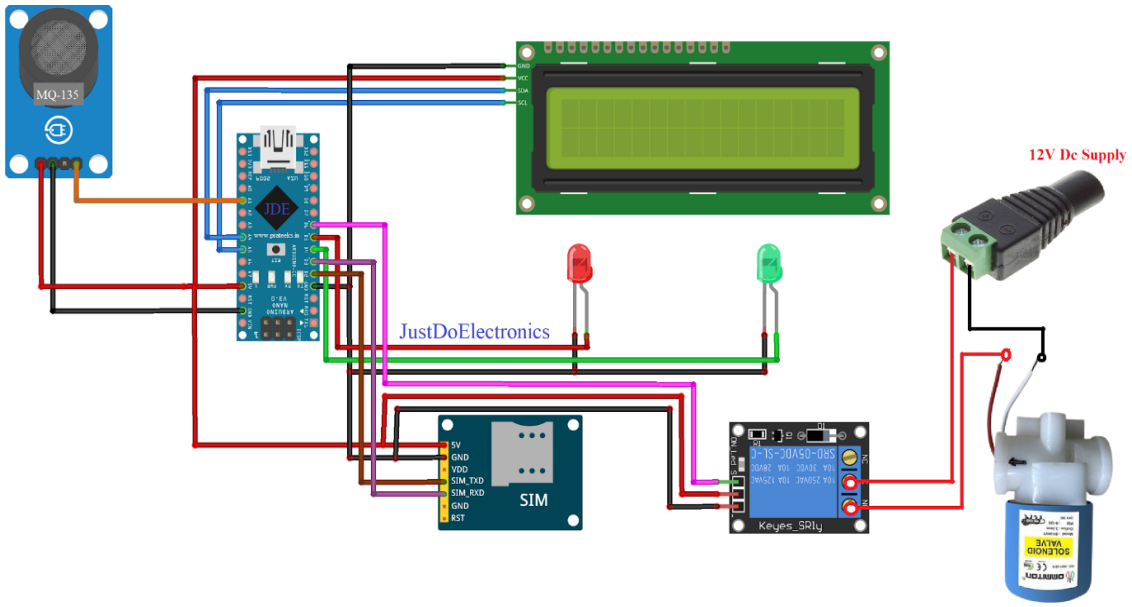
	Step 1: Prepare the LCD screen The LCD screen will probably require a bit of assembly. The screen should come with 16 holes and a separate strip of header pins. Break off a row of 16 pins from the strip of pins. Pins should be inserted into LCD holes with their shorter sides facing up. In order to attach them, you'll need to solder them. To hold the strip in place, solder the far-right and far-left pins first and wait for them to set. After that, solder each pin one at a time, holding the soldering iron and solder to the pins as you go. It is only necessary to solder the pins for a few seconds; if you hold the iron for too long, they will be damaged. Step 2: Connecting DHT11 Sensor Start by preparing the LCD screen as directed above. Place the DHT11 sensor on your breadboard. As you look at the front of the DHT11, the pins are numbered 1 to 4 (or 3) from the left. Connect pin 1 directly to the +5V rail, pin 2 directly to Arduino pin 8, and pin 4 directly to GND. DHT11 Arduino Pin 1 +5V Pin 2 Pin 8 Pin 3 Not used Pin 4 GND Step 3: The LCD screen must be inserted into the breadboard and connected to the Arduino via the pins shown in table and Figure. Multiple connections will be made to the GND and +5V rails. LCD Screen Arduino 1 VSS GND 2 VDD +5V 3 VO contrast Potentiometer centre pin 4 RS Pin 12 5 R/W GND 6 Enable Pin 11 7 D0 Not used

	8 D1 Not used 9 D2 Not used 10 D3 Not used 11 D4 Pin 5 12 D5 Pin 4 13 D6 Pin 3 14 D7 Pin 2 15 A BcL + +5V 16 K BcL – GND Step 4: Insert a potentiometer into the breadboard as shown in Figure 13-3 and connect the centre pin to LCD pin 3. Connect one outer pin to the +5V rail and the other to the GND rail Step 5: Remember to connect the power rails of the breadboard to Arduino GND and +5V. Confirm that your setup matches the circuit diagram
CONCLUSION	Weather stations are facilities on land or at sea that measure atmospheric conditions to provide weather forecasts and to study the weather. In this project the Arduino Weather Station measures temperature and humidity using DHT11 sensor and displays these values on an LCD display

PROJECT NO.7

SUBJECT	**GAS LEAKAGE DETECTOR USING GSM AND ARDUINO SMS [POLYTECHNIC]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN, HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

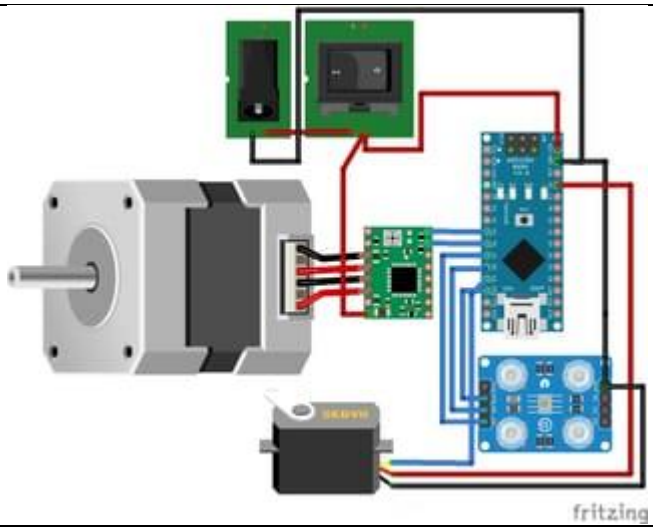
STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**GAS LEAKAGE DETECTOR USING GSM AND ARDUINO SMS [POLYTECHNIC]**
HARDWARE	ARDUINO UNO R3 WITH CABLE SIM800/900 GSM MODULE 16*2LCD DISPLAY 10K POT MQ-135 GAS DETECTOR SENSOR 5V DC ADAPTOR 12V DC ADAPTOR JUMPER WIRES AND CABLES BREADBOARD
SOFTWARE	Arduino IDE

DIAGRAM	
PROCEDURE	STEP NO.1 First get all the components to make the circuit. STEP NO.2 Then Connect the Components as per the circuit diagram. STEP NO.3 Open Arduino IDE and upload the code. STEP NO.4 Then Powerup the circuit to test it's working.
CONCLUSION	Here we have learned how to use GSM Module and to make project on Gas Leakage protection System.

PROJECT NO.8

SUBJECT	**COLOUR SORTRING MACHINE [POLYTECHNIC]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN, HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**COLOUR SORTRING MACHINE[POLYTECHNIC]**
HARDWARE	Arduino nano Nemma 17 stepper motor TCS2300 colour sensor Micro servo 20 x 20 Aluminium profile (2 units) A4988 drive module MDF board circle 3mm MDF board square 8mm plexi glass Sandpaper 20 mm Aluminium rod Aluminium profile Basket (2 units) Rubber cap (4 units) PCB 12V cooling fan Switch plastic tube header pins (4 units) PCB
SOFTWARE	Arduino IDE

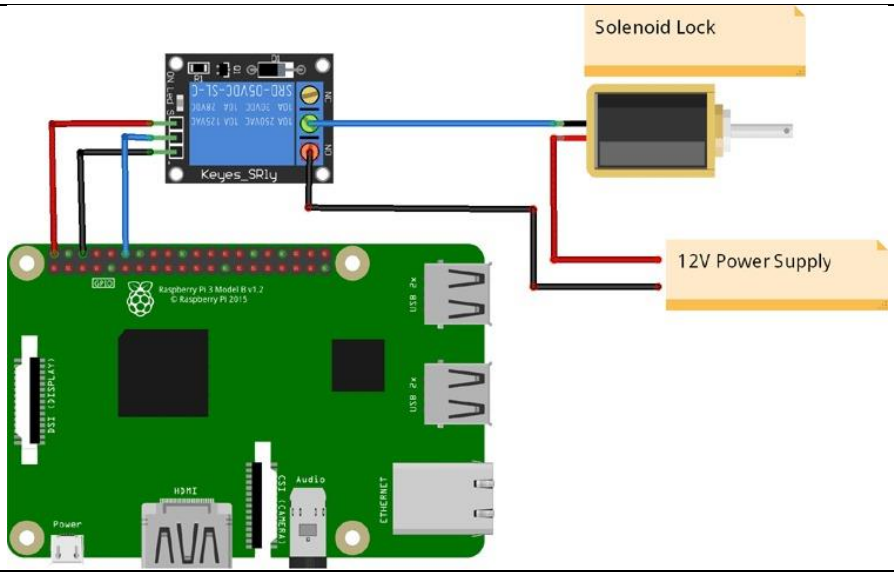
DIAGRAM	
PROCEDURE	Connect the circuit as shown in the drawing,TCS3200 can be connect to Arduino in multiple ways you can change the circuit as per your convenient Step 1- Basics of Colour Sensor TCS230,3200 The TCS230 programmable colour light-to-frequency converter combines configurable silicon photodiodes Anda current-to-frequency converter on single monolithic CMOS integrated circuit. STEPNO.2 The output is a square wave (50% duty cycle) with frequency directly proportional to light intensity (irradiance). The full-scale output frequency can be scaled by one of three present values via two control input pins. Digital inputs and digital output allow direct interface to a microcontroller or other logic circuitry. Output enable (OE) places the output in the high-impedance state for multiple-unit sharing of a microcontroller input line. The light-to-frequency converter reads an 8 x 8 array of photodiodes. Sixteen photodiodes have blue filters, 16 photodiodes have green filters,16 photodiodes have red filters, and 16 photodiodes are clear with no filters. The four types (colours) of photodiodes are interdigitated to minimize the effect of non-uniformity of incident irradiance. All 16 photodiodes of the same colour are connected in parallel and which type of photodiode the device uses during operation is pin-selectable. Photodiodes are 120 µm x 120 µm in size and are on 144-µm centres. Step 3: Final Step (Loading Code & Sensor Data Study) Before going further we must know what vale will sensor gives when different colours are take in front of the sensor So first wire the sensor and Arduino as shown in picture you may skip to attached those servo at this point of time. Load the code attached here to your Arduino board open the serial monitor You are getting some value like R= * G= * B= * * are any numbers now bring colour sheet in front of the sensor you will see the RGB numbers are change and keeps repeating as soon as you keep that colour sheet in front of that sensor. You will get different set of RGB numbers for different, so it is clear that sensor detect different colours and gives different value. now we have to write down the RGB value for the colour which are going to use in project for example when i

	bring YELLOW colour in front of sensor i get R=22 G=29 B=32 so i can say that if (R>17 & R<27 & G>25 & G<34) COLOR=YELLOW; here i kept margin of +-5 for RGB values to compensate the fluctuate sensor values. in this way take the readings of different colours which you need to use and add those values in code at this place if(R<25 & R>15 & G<33 & G>23) {colour = 1; // YELLOW } if(R<55 & R>45 & G<49 & G>39) {colour = 2; // GREEN } if(R<70 & R>60 & G<10 & G>20){colour = 3; // PINK } if(R<7 & R>11 & G<21 & G>35){colour = 4; // Red and upload the code connect the both servos fix all the required components load the colour candy in tube and your machine is ready to short the candy of different colours.
CONCLUSION	Colour sorting machines are most commonly used in the sorting of agricultural grain and rice, as well as in the processing of food products, such as coffee, nuts and oil crops. The optical sorter separates any stones, mouse droppings and discoloured, toxic or otherwise unacceptable items.

PROJECT NO.9

SUBJECT	**Smartphone connected Door Lock[POLYTECHNIC]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN, HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	***Raspberry Pi is defined as a minicomputer the size of a credit card that is interoperable with any input and output hardware device like a monitor, a television, a mouse, or a keyboard – effectively converting the set-up into a full-fledged PC at a low cost. This article discusses the Raspberry Pi models available today, their key features, and use cases.***
AIM	**Smartphone connected Door Lock[POLYTECHNIC]**
HARDWARE	1× Raspberry Pi 3 Model B 1× High Torque Servo, Tower Pro MG995R 1× Red, 3 mm LED Light 1× Mini Pushbutton Switch 5× Jumper Wires 1× Glue 1x Outdoor Mounting Tape 1× 1/4" MDF Board (optional)
SOFTWARE	Arduino IDE

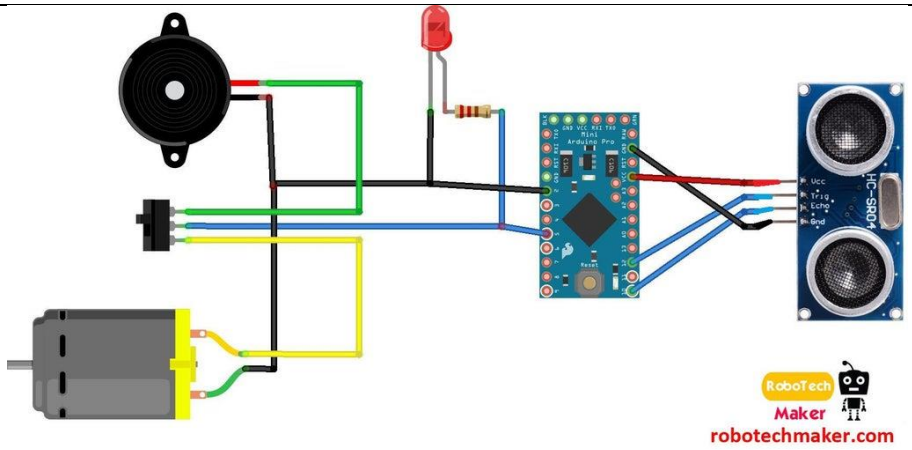
DIAGRAM	
PROCEDURE	Step 2: Making of the Lock All the components that we need to make a locking system are made up using 3D Printing Technology. Take the latch and the latch holder. Insert the latch into the latch into the holder. Step 3: The Opening and the Closing Mechanism We are using the Metal Servo for the same purpose. Take the servo and insert it into the space given in the latch holder and fix it using Hot Glue. You will notice the free servo head. Upon this, we will be fixing our Gear. Make sure the teeth of the gear matches the ones on the latch. Step 4: Connection Connect the Metal Servo to the Servo Channel 1 i.e. S1 of evive. Connect the Bluetooth Module Step 5: The Working Normally break-in occurs because the intruder breaks the lock which is on the front door. If the lock would be on the back of the door, possibilities of break-in reduce. Now, if the door is locked from inside, how are we going to open. Guess what? You have your Smartphone which will be able to do it.

	The Dabble app helps us to do that. Open the app and connect your Bluetooth Module. Choose the option of Terminal. Here you can either give commands by typing it or voice command. Once you send 'open the door', evive asks for the password. The password should already be set by you in the code. If the password entered by you is Correct, the door opens. But for a short duration of time. If the password entered is wrong, the door will remain closed. Step 6: Code
CONCLUSION	With this, you once an ordinary door is now going to be a smart one! Psst! We have something really exciting to tell you before you leave. We're going to launch an amazing STEM product this month that is going to make electronics, programming, and robotics child's play! Head over here to know more about it and perhaps even reserve one for yourself as well to get some super special perks!

PROJECT NO.10

SUBJECT	**Third Eye for the Blind [POLYTECHNIC]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN, HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**Third Eye for the Blind [POLYTECHNIC]**
HARDWARE	• 5 x Arduino pro mini • 5 x Ultrasonic sensor • 5 x Perfboard • 5 x Vibrating motor • 5 x Buzzers • 5 x Red LEDs • 5 x Switches • Male and female header pins • 4 x Jumper cable • One power bank • One 3.3 volt old mobile battery • Some elastics and stickers(to make it as a band for wearing)
SOFTWARE	Arduino IDE

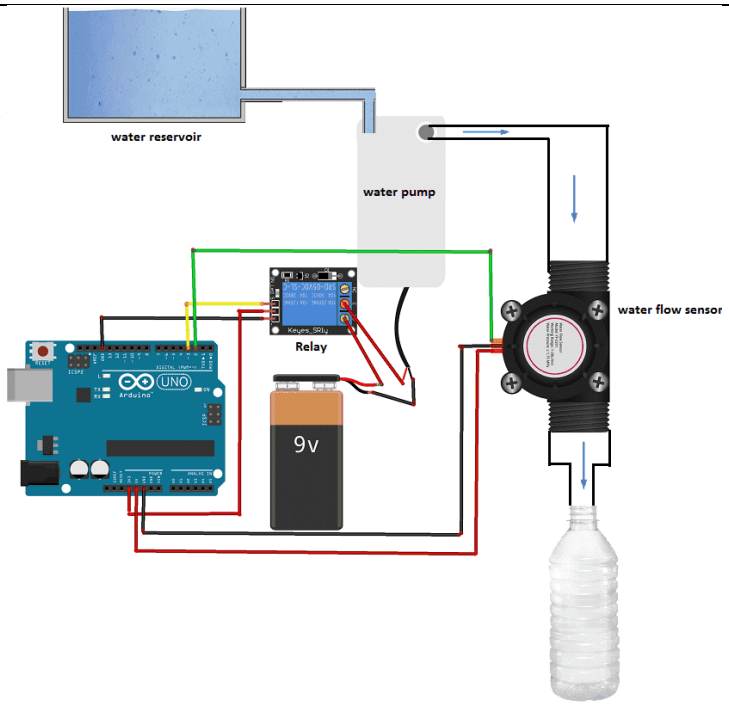
DIAGRAM	
PROCEDURE	Step 1: Making the Modules 1. First cut the pref board in 5 X 3 cm dimension and solder the female headers for the Arduino to the board. 2. Then solder the buzzer. 3. Then connect the vibrating motor using the glue gun and solder wires to it. 4. Then connect the LED. 5. Then connect the switch. 6. Then connect header pins for ultrasonic sensors and for battery input. 7. Then solder everything as shown in the circuit diagram. 8. Now connect the Arduino and ultrasonic sensor to the board Also connect the elastic band to all the modules. ***3 more modules are to be made in the same way us described above, but for the one in the hand, there is a little difference. visit the next step before making that last module.*** Step 2: Code + Making the Module for the Hand 1. Connect the ultrasonic sensor to the board by using 4 jumper cables. 2. Then connect a 3.7 volt mobile battery to this module. 3. Then connect the elastic band as shown in the figure.

	At last upload the code to each Arduino board and power the 4 other modules using a power bank.
CONCLUSION	Third eye for blinds is an innovation which helps the blinds people to navigate with speed and confidence by detecting the nearby obstacles using the help of ultrasonic waves and notify them with buzzer sound or vibration.

PROJECT NO.11

SUBJECT	**Bottle filling station using Arduino [POLYTECHNIC]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN, HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**Bottle filling station using Arduino [POLYTECHNIC]**
HARDWARE	Water Pump 100ml Water Bottles Large Pulley Small Pulley Gear Remover 8mm Shaft 8mm Pulley Belt Stepper Motor Stepper Motor Driver 20x4 LCD Transistor bc547 5V Buzzer LM7805CV DC Jack DC Pin Terminal Blocks Tactile Button Male Female Header Pins Jumper Wires Heat Sink Spacers Air Pump + Valve Arduino nano
SOFTWARE	Arduino IDE

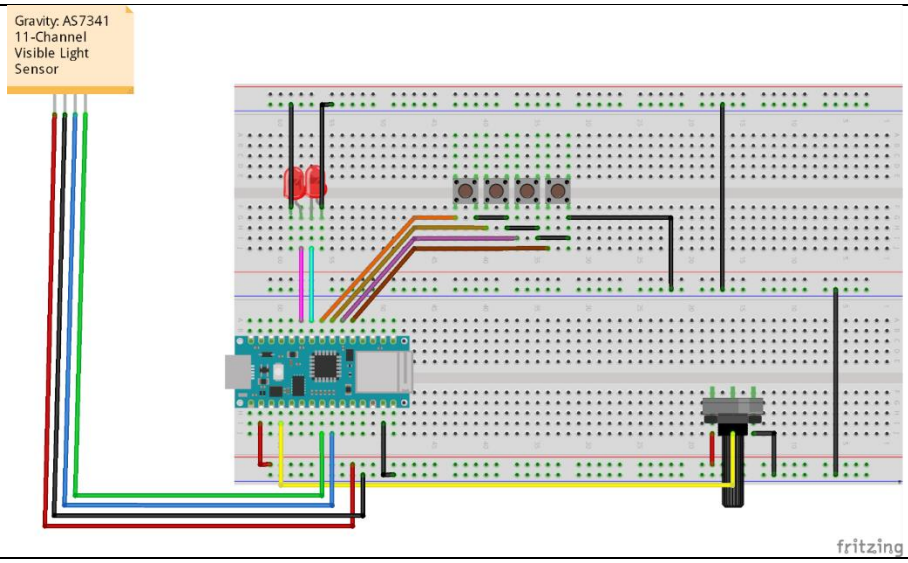
DIAGRAM	
PROCEDURE	Step 1: Electronic The electronic part is pretty easy, you even don't need any skill to do it, just know how to solder. Some explanation about the fritzing schematic: Green wires are for the overfull. There is not really pushbutton on the green wires, you just have to let each pair of wires on the top of the bottle, when the liquid will make contact, the flow is stopping. Orange wires are connected to pushbutton and pushbuttons are actually here to say to the Arduino "I've got a bottle right here, let's flow the beer'". Yellow wires are connected to solenoids. Solenoids needs 12v dc to works, that's why we need TIP to drive them with the Arduino! White wire are just connected to the 12v pump, it's work the same than solenoids. Some explanation about the eagle schematic: This one is the same than fritzing one, but i don't figure out the peripheric, i replace them by plugs. RJ11 plugs to connect each valve's captor : pushbutton, and overfull. Terminals plugs to connect every 12v devices. Step 2 Here is my code! there is not much to say about, it's really simple if you used to program with Arduino, for the others here some explanations :There is 3 big part in this code ;The "head" is the first part, i declare all variables i will use in the programme. In this case i use 3 kind of variables'" is for number storage, the value can change during the program"const int" is like int variable, but "const" means that the value can't change during the prgram"boolean" holds one of two value, true or false The "setup" part is the part where you tell to the machine what to do when it starts, this action is made once. In this part i just declare each pin IN or OUT. The "loop" part is the body of the program. The loop will be executed until you stop the machine. I will try to explain what happened with this. First I ask the program to check if one of the valves is open, if there is, it can power on the pump

	Then I check if the push button of each valve is pushed AND if there is no contact between the two overfill wires, if it's ok the program open the valve I also print all the values on the serial monitor, it's very useful to debug. Step 3: Nothing special to say, just set everything together an be careful to be waterproof. To fix the pushbutton you can use tie zip, or food grade silicon. Plumbery and Sensor Mounting
CONCLUSION	It aims to eliminate problems faced by small scale industries which involve filling of bottles. With the help of this system that is automated every process can be done effortlessly and the cost be reduced and the production will be more efficient.

PROJECT NO.12

SUBJECT	**Ripeness meter for fruits and vegetables [POLYTECHNIC]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN, HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**Ripeness meter for fruits and vegetables [POLYTECHNIC]**
HARDWARE	Arduino Nano 33 IoT DFRobot AS7341 11-Channel Visible Light Sensor Raspberry Pi 4 Model B 10K Potentiometer (Long-Shaft) Potentiometer Knob Spark Fun Button (6x6 5 mm LED: Green 5 mm LED: Red Solderless Breadboard Full Size
SOFTWARE	Arduino IDE

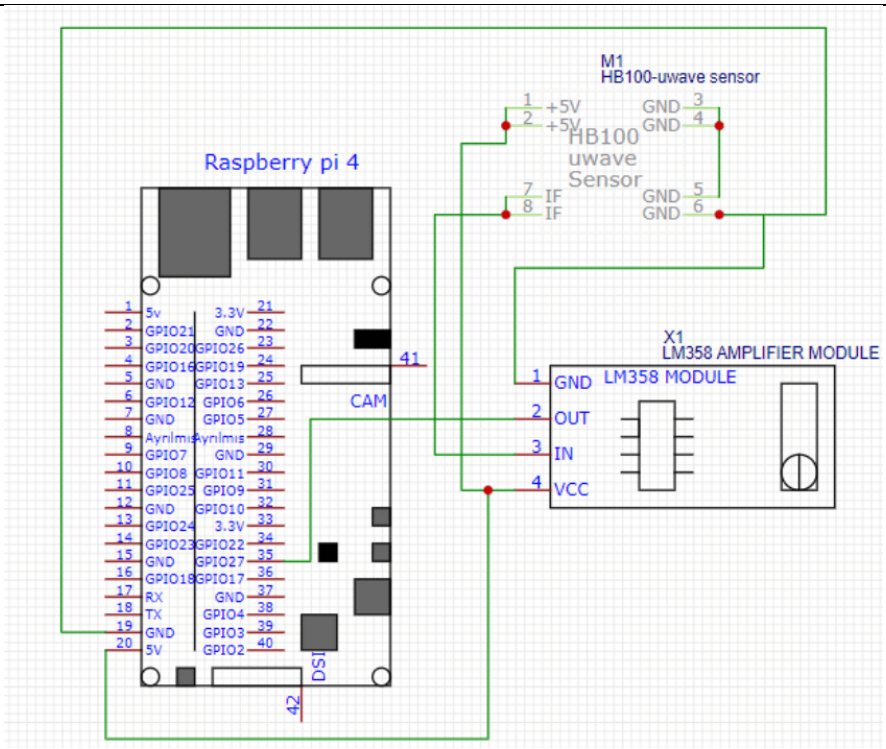
DIAGRAM	
PROCEDURE	Step 1: Developing a web application in PHP to collate spectral colour data of fruits and vegetables **Step 1.1: Setting up the web application on Raspberry Pi** **Step 2: Setting up the Arduino Nano 33 IoT** **Step 3: Programming the Arduino Nano 33 IoT to obtain the required parameters and send them to the web application** **Step 4: Creating the ripening stages data set based on spectral colour** **Step 5: Building an Artificial Neural Network (ANN) with TensorFlow** **Step 5.1: Visualizing the ripening stages data set based on spectral colour** **Step 5.2: Assigning labels (pre-defined ripening stages) and scaling (normalizing) the input data** **Step 5.3: Training the model (ANN) on the ripening stage classes based on spectral colour** **Step 5.4: Evaluating the model**

	Step 6: Experimenting with the model by making predictions on ripening stages
CONCLUSION	Through these changes, fruits ripen and become sweet, coloured, soft, and good-tasting. It is good for the plant to invest its resources into the fruit and its ripening because **a ripe fruit attracts the consumers that help the seeds to be spread far and wide, which is important for the plant's survival and regrowth**.

PROJECT NO.13

SUBJECT	Vehicle Speed Detection[**POLYTECHNIC]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN, HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	***Raspberry Pi is defined as a minicomputer the size of a credit card that is interoperable with any input and output hardware device like a monitor, a television, a mouse, or a keyboard – effectively converting the set-up into a full-fledged PC at a low cost. This article discusses the Raspberry Pi models available today, their key features, and use cases.***
AIM	Vehicle Speed Detection[**POLYTECHNIC]**
HARDWARE	**RASPBERRY PI 4, ZERO (SBC)-** **HB100 RADAR (DOPPLER RADAR) -** **RPi camera (FOR VIDEO CAPTURING)-** **amplifier module(SIGNAL AMPLIFIER)-**
SOFTWARE	Raspberry Pi

DIAGRAM	
PROCEDURE	1-First write a code for the device to read the radar sensor data and convert the data to speed, and then use the camera to capture the picture and video when high speed is detected. 2-We need to install the latest version of the Python 3 IDE and then install the OpenCV library to process the video and frames from the camera. 3-Now capture the video and pictures of the high-speed vehicle. To install those modules, open the terminal and then run the following command- sudo pip3 install OpenCV Now write the code. CODE STEPS:- 1-In the first part of the code, we import the libraries for using the GPIO of the Raspberry Pi to take the doppler radar sensor data. 2-Then we import the OpenCV library to capture the video and save the video frames and then process them with high-speed detection by doppler radar. 3-Now we import the time library for calculating the time and speed of the vehicle based on the doppler radar signal. 4-Next, we will devise the GPIO pin number for the doppler radar signal input. Here you can use any free GPIO. I have used pin number 27.

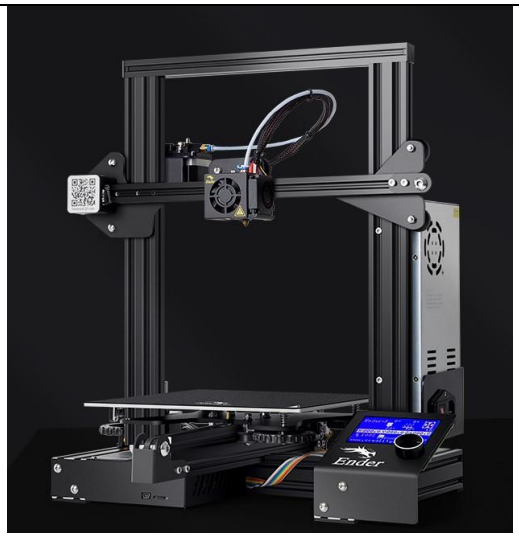
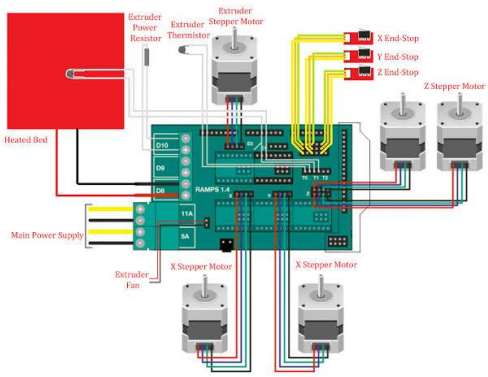
	5-Further, we need to set the GPIO as input and also set the GPIO pin number as board pin number, as we are using the pin numbering as board pin numbering. 6-Now we will check the signal of the doppler radar and extract the frequency that changes with proportional to the doppler radar wave. 7-After that, we convert the frequency to the speed. Here, according to the doppler radar datasheet, the wave speed is 31.36, so we divide the frequency of the radar with 31.36 and we obtain the speed of a moving vehicle. 8-Now we create a while loop where we continuously check the speed of the vehicle. Here you can set any desired speed that you want to limit, and if the vehicle speed is greater than the set speed limit, we will capture the video and save it to a file where the code is saved. 9-Next, we will display the live video from a camera and then we will overlay the speed of the vehicle on the video using OpenCV on each frame. We can see the live video output from the camera with the detected speed data on the video. Now we create a while loop where we continuously check the speed of the vehicle. Here you can set any desired speed that you want to limit, and if the vehicle speed is greater than the set speed limit, we will capture the video and save it to a file where the code is saved. Next, we will display the live video from a camera and then we will overlay the speed of the vehicle on the video using OpenCV on each frame. We can see the live video output from the camera with the detected speed data on the video. After completing connections, we fix the camera of the Raspberry Pi in any custom-designed case and then the radar over the case. Here I have designed the case for our device with a small hole behind the case for the camera. Now power the Raspberry Pi and run the code. Move your hand very fast so the speed is detected and also shown on the camera output video. Now keep the radar near the road. Whenever it detects the speed exceeding the speed, set in the code, it will automatically capture the video and pictures of the high-speed vehicle.

CONCLUSION	The designed detection system continuously monitors the speed of the approaching vehicle. It minimizes the difficulties of traffic department and make ease to control the rash driving / over speed vehicles on highways.

PROJECT NO.14

SUBJECT	**3D PRINTER [UNIVERSITY AND POLYTECHNIC]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN ,HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**3D PRINTER [UNIVERSITY AND POLYTECHNIC]**
HARDWARE	RAMPS1.6 Arduino Mega 2560 500 mm 20X20 4T Slot Aluminum Extrusion Profile (Silver) stepper motor nema 17 (6 motors) J-Head Hotend 1.75mm 3.0mm Filament Nozzle Fan 24V 10A SMPS - 240W - DC Metal Power Supply PLA Filament (1KG) MK8 Extruder GT2 Pulley Belt (6pics) SC8UU Bearings Aluminum 5mm 8mm Flexible Coupling for 3D Printer GT2 Timing Belt Length 200mm Wide 6mm Closed Loop Rubber Belt for CNC 3D Printer I Set of 2 pcs 2 x Lead Screw + Flange Nut Smooth Rods
SOFTWARE	STEP 1 : Install MARLIN FIRMWARE

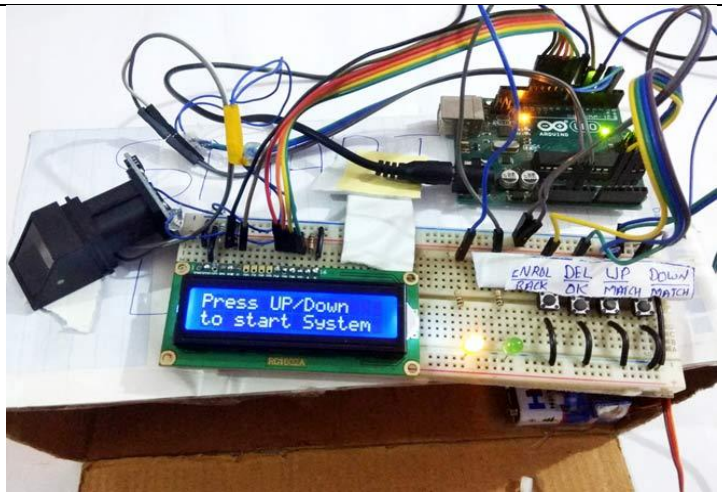
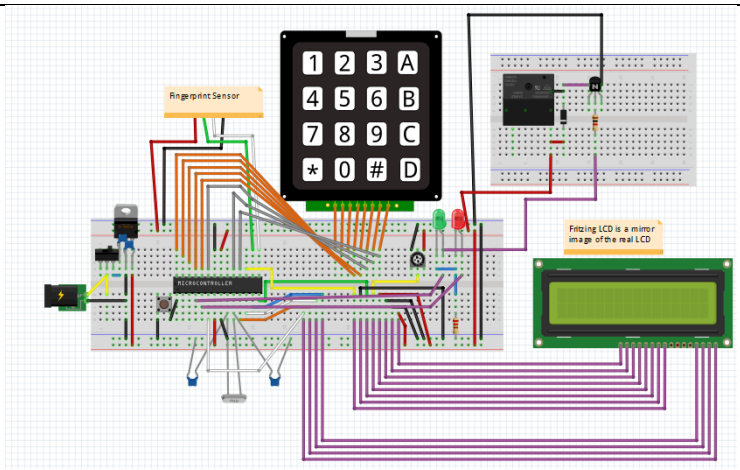
	STEP 2 : Install latest version of ARDUINO IDE STEP 3 : Compiling MARLIN FIRMWARE using ARDUINO IDE. STEP 4 : Install PRONTERFACE software to print our 3D designs. STEP 5 : Upload the model and Print it.
DIAGRAM	 
PROCEDURE	STEP 1: Upload program to Arduino mega 2560 rev. STEP 2: Install RAMPS 1.4 3d printer controller board to Arduino mega. STEP 3: Make printer`s body, Fix movable stepper motor to a body on X, Y and Z axis. STEP 4: Fix Hotend on the Z axis of a body, and set the Extruder. STEP 5: Check the movement of stepper motors and add the filament. STEP 6: Upload the model and get printed by our arduino based 3d printer
CONCLUSION	Flexible Design. 3D printing allows for the design and print of more complex designs than traditional manufacturing processes. ... 1. Rapid Prototyping. ... 2. Print on Demand. ... 3. Strong and Lightweight Parts. ... 4. Fast Design and Production. ... 5. Minimising Waste. ... 6. Cost Effective. ...

	7. Ease of Access.

PROJECT NO.15

SUBJECT	**Making of fingerprint and password security system using Arduino[UNIVERSITY AND POLYTECHNIC]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN ,HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**Making of fingerprint and password security system using Arduino [UNIVERSITY AND POLYTECHNIC]**
HARDWARE	1. Arduino uno 2. 16*2 LCD display with I2c 3. Fingerprint sensor 4. 4*4 matrix keypad 5. SPDT switch 6. 5V 1amp adaptor 7. Push button 8. 16MHz crystal 9. Diode 10. NPN BJT (to-92) 11. Solenoid lock 12 v 12. Relay 5v 13. 12v 1amp adaptor
SOFTWARE	Arduino IDE

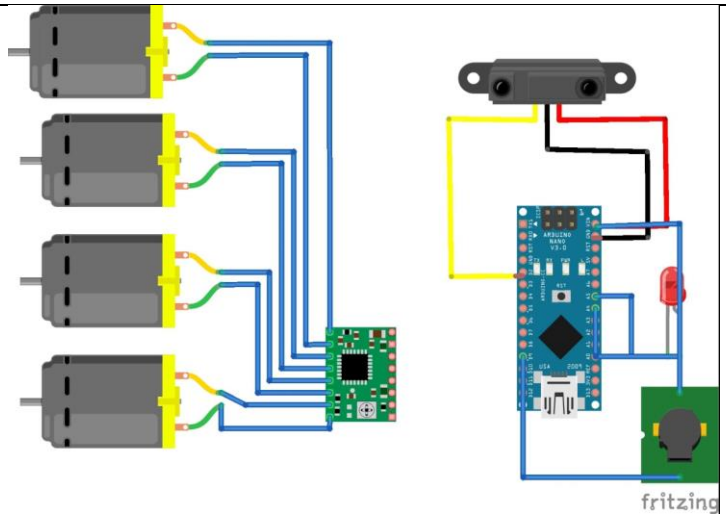
DIAGRAM	
DIAGRAM	
PROCEDURE	Step 1: MATERIAL REQUIRED Step 2: ARDUINO CODE Step 3: SETTINGS Enrol New Finger ID :- 1.Press Enrol button. 2.Use Up Button To Change Location from 1 to 127 to store finger ID. 3.Place Finger on sensor. 4.Again place same finger on sensor. (We need to place finger twice because R307 sensor works on 1:1 ratio) 5.LCD Shows Finger ID Stored ! Delete Finger ID :- 1.Press Delete Button. 2.Use Up or Down button to locate finger ID Location. 3.Then press OK Button. 4.LCD print Finger ID delete successfully.

	Open Door Lock :- 1.Press Match button. 2.Place Finger On Sensor. 3.Servomotor rotate & wait for 3-4 seconds & it'll get automatically lock. STEP NO.4 https://youtu.be/33rJ1j2G0Ac
CONCLUSION	This is how we make a fingerprint opening and door locking system arduino.

PROJECT NO.16

SUBJECT	**ARDIUNO BASED DRONE[UNIVERSITY AND POLYTECHNIC]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN ,HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

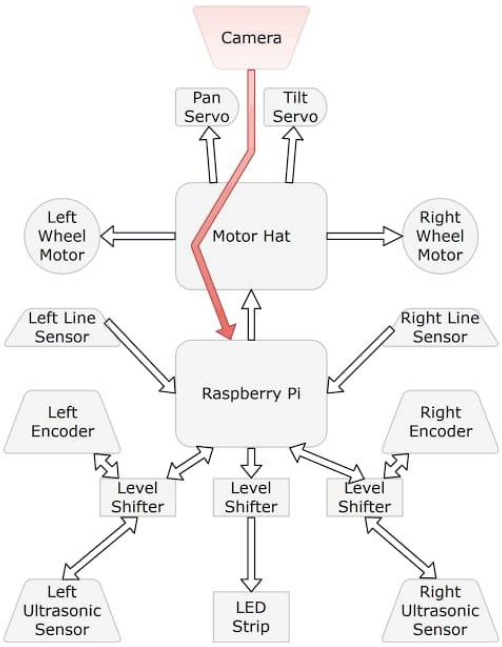
STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**ARDIUNO BASED DRONE [UNIVERSITY AND POLYTECHNIC]**
HARDWARE	Arduino Pro Mini F3 EVO Controller LIDAR Module Buzzer LED Chaoli CL-615 59000RPM Coreless Motor 2xCW 2xCCW 2xCW 2xCCW 55mm (2.2inch) Blade Propeller Propeller for 6x15mm 1S Lipo Battery 3.7V 1200mAH (Lithium Polymer) Lipo Rechargeable Battery for RC Drone Buttons & Switches Electrical & Wirings Carbon Fiber 100 mm Wheelbase Cup Rack Brushed Mini Drone Frame Battery Connectors (Female/Male)
SOFTWARE	Arduino IDE

DIAGRAM		
PROCEDURE	1:The mini drone consists of 4 drone motors with propellers with Arduino Pro Mini F3 EVO controller and a lidar sensor and buzzer. 2:The lidar sensor uses IR for detecting any obstacles in front of it. 3:If any obstacle is detected the lidar signal are decoded by controller to operate a buzzer and led for indication of obstacle proximity alert. 4:The small drone uses 4 motors to lift off and control the flight. 5:The RC controller commands are interpreted and used by flight controller through the rf receiver to achieve desired flight movement. 6:The drone makes use of a Arduino Pro mini to sense the proximity using LIDAR and the operate the led and buzzer accordingly. 7:Thus we get a lightweight micro drone that can take off from anywhere, fly indoors or in forests or gardens and sense obstacles using LIDAR proximity sensing.	
CONCLUSION	This is how we make arduino based drone	

PROJECT NO.17

SUBJECT	**LINE FOLLOWING CAR/ROBO FOR TRASPORTING ITEMS [UNIVERSITY AND POLYTECHNIC]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN ,HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	***Raspberry Pi is defined as a minicomputer the size of a credit card that is interoperable with any input and output hardware device like a monitor, a television, a mouse, or a keyboard – effectively converting the set-up into a full-fledged PC at a low cost. This article discusses the Raspberry Pi models available today, their key features, and use cases.***
AIM	**LINE FOLLOWING CAR/ROBO FOR TRASPORTING ITEMS [UNIVERSITY AND POLYTECHNIC]**
HARDWARE	RASPBERRY PI 4 LORA RYLR896 BO MOTORS 300 RPM *4 WHEELS *4 L298 MOTOR DRIVER MULTI PURPOSE SCREW DRIVER JUMPER WIRES ALL EACH 5 SET CAMERA MODULE 3 IR SENSORS 12V RECHARGEABLE BATTERY *3 GPS MODULE
SOFTWARE	RASPBERRIEN OS

DIAGRAM	
PROCEDURE	Step 1: Assembling the Chassis The material used is a standard 3-millimeter MDF board and was cut using a laser cutter. We used hot glue to attach the side, bottom, and middle plates as shown. Four 30mm standoffs were used to connect the upper plate to the lower plate. We used four bolts and nuts to mount the caster wheel in place. Step 2: Electrical Schematic The schematic is fairly simple, with an Arduino Nano MCU, an H-Bridge, 2 motors, and 5 IR sensors. Step 3: Mounting Electronics We started by using hot glue to mount the motors to the chassis as shown. Using the 5 20mm standoffs and 10 6mm bolts, we mounted the sensors to their respective mounting points. We also added two Neo pixel strips to the bottom of the vehicle. This was solely for looks (and to mimic the original KITT car from Knight Rider). Finally, we mounted the Arduino and H-bridge and connected all components using jumper wires. Step 4: Software The robot uses a 32-state finite state machine to navigate various lines/intersections. Each sensor is treated as a digit in a binary number. When the sensor detects a line, it outputs a high signal (1). The program encodes the sensor inputs into a binary number, which is used to determine required motor control sequences. The software used is attached below.

	Step 5: Testing With the robot complete, we moved on to testing. We put together a test track with several twists, turns, and intersections. With trial and error, we refined our algorithm enough that it could pass 96% of our test cases. While the algorithm worked for us, different tracks and sensors may yield different results. Feel free to tweak our code to meet your needs!
CONCLUSION	We have studied how create a line follower robot for transporting items.

PROJECT NO.18

SUBJECT	**Fire Detection System using Raspberry Pi [UNIVERSITY AND POLYTECHNIC]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN, HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	***Raspberry Pi is defined as a minicomputer the size of a credit card that is interoperable with any input and output hardware device like a monitor, a television, a mouse, or a keyboard – effectively converting the set-up into a full-fledged PC at a low cost. This article discusses the Raspberry Pi models available today, their key features, and use cases.***
AIM	**Fire Detection System using Raspberry Pi [UNIVERSITY AND POLYTECHNIC]**
HARDWARE	Raspberry Pi 3 Pi Camera= module v2 Buzzer=5v LCD Display=20*4 Resistors=100 Capacitors =100 Transistors= Cables and Connectors=USB TO MICRO Diodes=DIODES INCORPORATED 1N4007-T PCB and Breadboards=4*6 LED=RGB Transformer Push Buttons=ABB MP1-10R

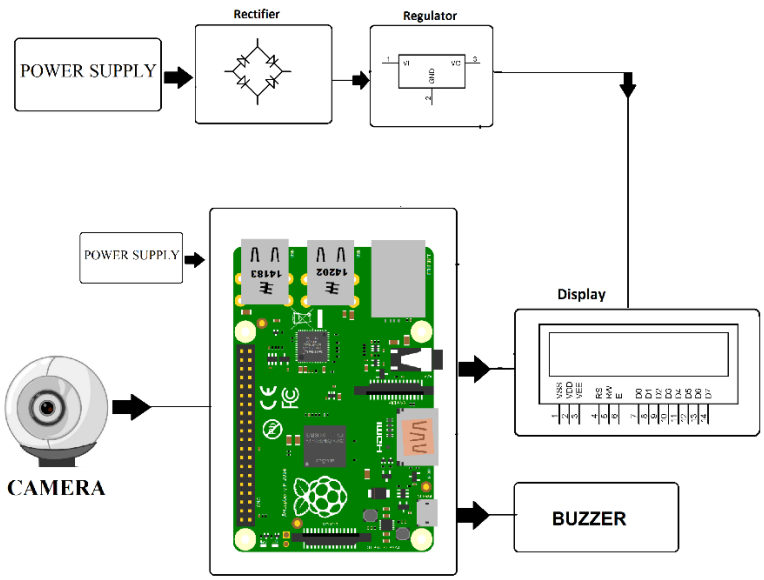
	Switch IC=RP2040 IC Sockets Adapter=DESTINIO PREMIUM
SOFTWARE	RASPBERRIEN OS
DIAGRAM	
PROCEDURE	Step 1: Start Step 2: Image is captured on real time • Step 3: Camera captured video continuously on real time • Step 4: The image frame is acquired from the real time live video feed • Step 5: Captured image is sent to Raspberry Pi on the real time • Step 6:

	Image processing is done on images • Step 7: If valid , then go to emergency mode or generate an alert on server • Step 8: Android Application Start and receives an alert • Step 9: Send notification message to all user which are registered to Android Application • Step 10: Stop
CONCLUSION	The Raspberry Pi controller processes the camera input and **detects fire using heat signatures**. By using image processing method, the report is automatically generated and sends to the person immediately after the fire is being detected using Wi-Fi.

PROJECT NO.19

SUBJECT	**Conveyor belt [UNIVERSITY AND POLYTECHNIC]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN, HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

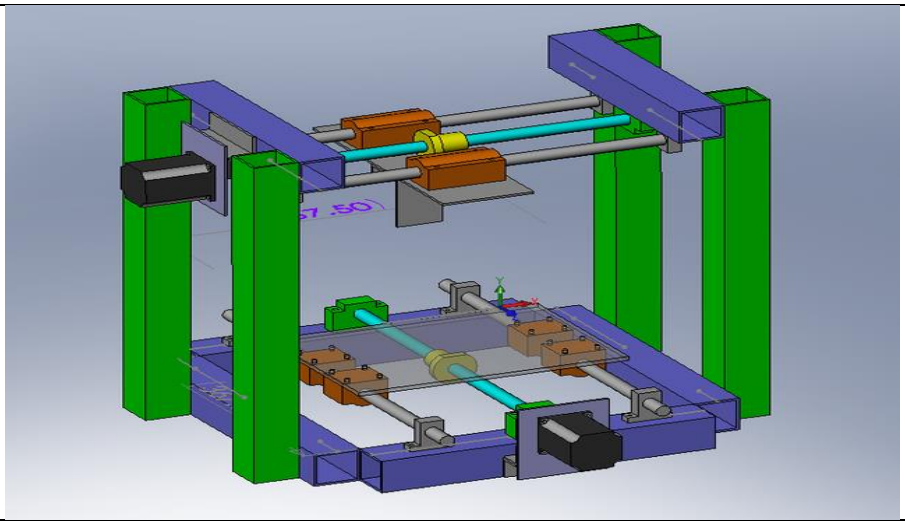
STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**Conveyor belt [UNIVERSITY AND POLYTECHNIC]**
HARDWARE	2 long pieces of steel bar or L-bar, preferably with 8 mm holes or slots. This should be wider than 30 mm - I used 38 mm L bar. Lengths of 25 mm outer diameter PVC tube often sold in 2 meter lengths with a tulip end. Roller skate bearings - cheap ones are fine 8 mm nuts n bolts 8 mm threaded rod. 1 m was enough for me. 2 cable tighteners with 8 mm holes Some 'waxed' table cloth cut to size Some sandpaper or anti-slip sticky tape Some wide sticky tape or a needle and thread A 22 mm rubber bung with no hole, or a hole <8 mm Some plywood A stepper motor and suitable controller PVC Tube Steel L-Bar Roller bearings 22 mm Rubber Bung / wash Anti-slip sticky tape 'Waxed' Table cloth Stepper motor and control ATMEGA ARDUINO
SOFTWARE	Arduino IDE

DIAGRAM	
PROCEDURE	Construction Tune your motor controller . Once assembled, you should tune your motor controller for low acceleration, as there may be much weight on the conveyor. Find a common steel L bar which has 8 mm slots Avoid the stepper motor being above the belt (not below either, nor should it be higher than the L bar) Avoid the use of cogs and drive belts (hollow 8 mm tube with stepper shaft through the middle?) Find a way to attach an 8mm threaded rod via a bearing directly to the steel bar without the need for plywood adapter
CONCLUSION	THE MAIN PROPUSE OF A CONVEYOR BELT IS TO MOVE OBJECT FROM ONE LOCATION TO ANOTHER

PROJECT NO.20

SUBJECT	**LASER ENGRAVER USING ARDUINO [UNIVERSITY AND POLYTECHNIC]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN, HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**LASER ENGRAVER USING ARDUINO [UNIVERSITY AND POLYTECHNIC]**
HARDWARE	• MGN15H Linear Rail • GT2 Belt + Tooth Pulley • Stepper Motor- NEMA 17 • GT2 Idler Pulley • Spacer nuts • DRV8825 Stepper Drive • Arduino CNC Shield • Arduino Uno • Limit switch • DC power supply • Laser Module • Laser safety googles
SOFTWARE	Arduino IDE

DIAGRAM	
PROCEDURE	STEP 1- FRAME DESIGN The **y-axis** is on the **bottom** of the machine, and provides a moving base for the engraved piece. The **x-axis** is on the **top**, and moves the laser assembly (the laser isn't shown in the model). **Step 2: Linear Motion Method** The machine uses **ball screws** and **linear bearings** to control the position and motion of the X and Y axes Step 3: Frame Construction The ball screw supports and shaft supports are mounted on 50mm x 50mm **hollow aluminium posts**. These posts are used for all major structural parts of the machine, and are actually aluminium fence posts. These posts are easy to cut and drill, and also hold their shape well when supporting heavy loads. In addition, because they are square, they provide excellent reference surfaces to make sure things are parallel / perpendicular. The holes were drilled using a cordless drill, and the posts were cut using a mitre saw. (It is also possible to cut the aluminium posts with a hacksaw). Step 4: Stepper Motors + Drivers Strong stepper motors also require strong drivers to get the most out of them. For each axis, the motor **directly drives** the ball screw through a **motor coupler**. The motors are mounted to the frame using two aluminium angles and an aluminium plate. The aluminium angles and plate are 3mm thick, and are strong enough to support the 1kg motor without bending. Step 5: Laser Diode + Driver The laser diode requires a **heatsink**, when running at high power levels. The intensity of the laser output is **dependent on the current** that goes through it. The diode by itself cannot regulate current, and if connected directly to a supply, it will draw more and more current until it destroys itself. So, a regulated current circuit is required to protect the laser diode and control its brightness. This circuit requires at least a 10V

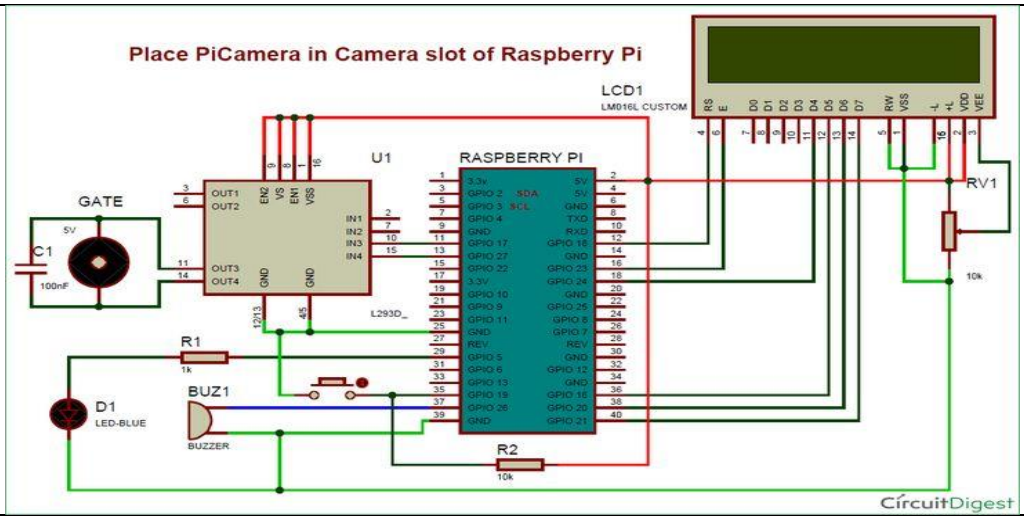
	DC supply, and has a simple on/off signal input, which is provided by the Arduino. The LM317T chip is a linear voltage regulator, which has been configured as a **current regulator**. A **potentiometer** is included in the circuit to allow the regulated current to be adjusted. The values of the resistors are: R1 - 1 ohm (3W) R2 - 5 ohm (15W) potentiometer R3 - 180 ohm (0.5W) (R1 and R2 need to have sufficient power ratings to support the power that is dissipated through them)

	The **NPN transistor** is used as a **switch**. When there is a 5V output from the Arduino, the circuit will turn on the laser. When there is a 0V output from the Arduino, the circuit will switch off the laser. Heatsinks were also installed on the LM317T and NPN transistor. **Solid core 22 AWG wire** was used for connections between different points on the Veroboard. Step 6: Power Supplies The machine has **two separate power supplies**, due to different voltage requirements. The stepper motor drivers can accept a 20V-50V DC supply. Each stepper motor has a maximum current of 3.0A, but in normal operation, the motors don't need 3.0A Step 7: Microcontroller + Electrical Connections An **Arduino** provides the brains for the machine. It outputs step and direction signals for the stepper drivers, and a laser enable signal for the laser driver. In the current design, only **5 output pins** are required to control the machine. Step 8: Software (Raster Engraving) **C# Program (Generates "instruction" text file)** **Processing IDE Sketch (Streams instruction data)** **Arduino Sketch (Interprets instruction data and controls hardware)** The Arduino sketch interprets each instruction block. There are a number of instruction characters: 1 - Move RIGHT by one pixel FAST (blank pixel) 2 - Move RIGHT by one pixel SLOW (burnt pixel) 3 - Move LEFT by one pixel FAST (blank pixel 4 - Move LEFT by one pixel SLOW (burnt pixel) 5 - Move UP by one pixel FAST (blank pixel) 6 - Move UP by one pixel SLOW (burnt pixel) 7 - Move DOWN by one pixel FAST (blank pixel) 8 - Move DOWN by one pixel SLOW (burnt pixel) 9 - Turn laser ON 0 - Turn laser OFF r - Return axes to start position With each character, the Arduino runs a corresponding function, to write to the output pins. Step 9: Software (Vector Mode) The machine is compatible with the very cool **Grbl** Arduino software. Grbl has been designed to control **3-axis CNC milling machines**. It interprets **G-code** instructions, and outputs control signals for X/Y/Z axis stepper motor drivers and the spindle.

CONCLUSION	This project proposes the technique used to develop a Computer Numeric Controlled Laser Engraver. The specialty of this machine is the user can modification the tool simply whenever he/she desires to perform several operations like an engraving object (Materials-Acrylic, MDF board, Foam sheets, etc.,) and conjointly turn out a 2D drawing for specific object in A5 size sheet. laser engraver responds to G Codes which can be generated by the software. Frame of the machine and the working of the components will be based on the Cartesian type. It is a commercially viable and cost-effective machine. Some of the advantages of CNC machine use are high processing quality and the speed of the final machining of the product.

PROJECT NO.21

SUBJECT	**Making a pocket Pc using Raspberry PI[UNIVERSITY AND POLYTECHNIC]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN, HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

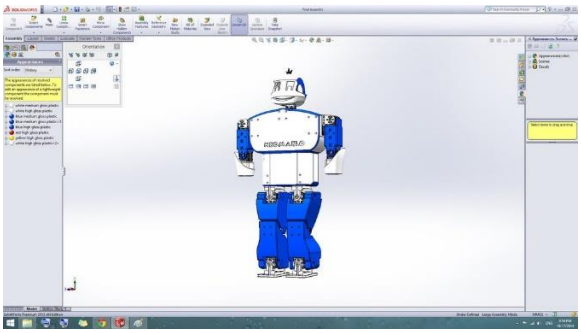
STUDY	***Raspberry Pi is defined as a minicomputer the size of a credit card that is interoperable with any input and output hardware device like a monitor, a television, a mouse, or a keyboard – effectively converting the set-up into a full-fledged PC at a low cost. This article discusses the Raspberry Pi models available today, their key features, and use cases.***
AIM	**Making a pocket Pc using Raspberry PI [UNIVERSITY AND POLYTECHNIC]**
HARDWARE	Raspberry PI 3 B+, 3.5-inch touchscreen display
SOFTWARE	Raspberry PI Operating system, Windows Operating System
DIAGRAM	
PROCEDURE	**Step 1: Gather all the required materials. Mainly needed 2 – a 3.5-inch display and raspberry pi 3b+**

	Step 2: **First, all of all place 5-inch display on the backside at the top.** **Then connect pin of raspberry to display.** **Then check it with charging adapter it works or not.** **Step 3:** Take parts of the frame as required Then stick all parts accordingly Step4: Take one 18650 battery and charging module as required Place this inside frame of the laptop. Then take one on-off switch to give power to the raspberry pi. Step 5: Select any one operating system. In my case, I select windows operating system
CONCLUSION	**Hence we have built a pocket pc using raspberry pi 3 b+**
REFERENCE	: https://www.instructables.com/POCKET-LAPTOP/

PROJECT NO.22

SUBJECT	**MINIATURE HUMAINOID ROBOT ON RASPBERRY PI[UNIVERSITY]**
FACULTY IN-CHARGE	S.R.KASTURE
MENTOR	DEEPAK GUPTA, SAVIO MACWAN ,HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

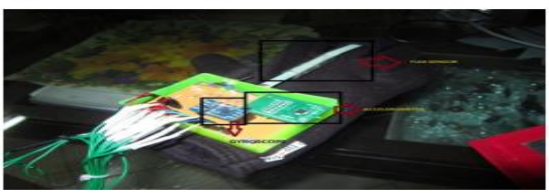
STUDY	***Raspberry Pi is defined as a minicomputer the size of a credit card that is interoperable with any input and output hardware device like a monitor, a television, a mouse, or a keyboard – effectively converting the set-up into a full-fledged PC at a low cost. This article discusses the Raspberry Pi models available today, their key features, and use cases.***
AIM	**MINIATURE HUMANOID ROBOT ON RASPBERRY PI [UNIVERSITY]**
HARDWARE	RASPBERRY PI 3B+ SERVO MOTOR MG995 12 PIECE PCA9685 SERVO DRIVER 2 PIECE NODE MCU ESP8266 3 PIECE ESP32 DEV MODULE 2 piece 128X64 OLED DISPLAY 2 piece 3D FILAMENT 4 PIECE different colour Raspberry pi V2 NOIR camera 8 MP 2 PIECE
SOFTWARE	RASPBERRIEN OS /LINUX

DIAGRAM	
PROCEDURE	**STEP NO.1** Motors: 19 smart servo Herkulex motor. For interacting: 1 webcam. 2 speakers. microphone. 1Sheeld is used for a remote control through the mobile phone. Micro-controllers: Arduino Mega: it's used to control the servo motors for the movements of the robot. Raspberry Pi : it's used for the image processing and voice interaction. You can find all the component you need in Robot shop. **STEP NO.2** 

	Now you take your design to a 3D software designer (solid-works / inventor...) and turn it to a 3D model ready top be printed. **STEP NO.3** Choosing the printing material that is strong, cheap and light in the same time like plastic ABS. **Step 4: Coding** This is the Arduino code for controlling the robot using 1Sheeld The Forward and Inverse Kinematics of our Robot is not discussed here but As an Alternative Solution we controlled each Servo with his own angle to get him to the Required Position. you'll need the following libraries installed in your computer: Herkulex & 1Sheeld
CONCLUSION	It uses a Raspberry Pi Pico module as the brain of the robot. The main objective of this build is to prove that robots can easily be made in very low cost using some basic to little advance instruments, machinery etc.

PROJECT NO.23

SUBJECT	**Creating Gesture Controlled Robot (Prosthetic Arm) [UNIVERSITY]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN ,HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**Creating Gesture Controlled Robot (Prosthetic Arm)[UNIVERSITY]**
HARDWARE	Sg 90 micro servo motor *6 Tower pro MG996R high torque metal gear Flex sensor 2.2 inch 9v battery *2 Battery socket USB cable with Arduino UNO Breadboard Switch Cables and wires Glove Accelerometer sensor Carbon film resistor Rechargeable battery 2400MAH Bluetooth module HC05 Arduino nano
SOFTWARE	Arduino Integrated Development Environment
DIAGRAM	

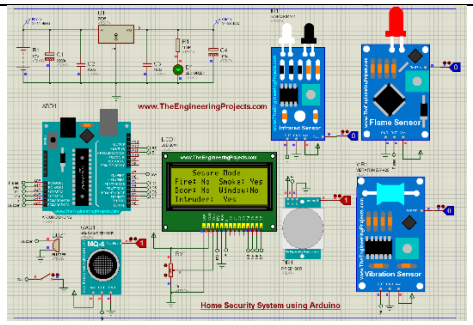
PROCEDURE	**Step 1-** Boards: Two microcontroller boards were taken up as per the requirement for the project: 1. Arduino Duemilanove : It contains At mega AVR 328p micro controller. It has 14 digital Output/Input pins (of which 6 can be used as PWM signals), 6 analog inputs, a 16 MHz crystal oscillator. Operating voltage of the micro controller is 5V. Contains 32 KB of flash memory enough to store the data for this particular project. 2. Arduino Mega : It contains Atmega AVR 2560 R3 micro controller. It has 54 digital Output/Input pins (of which 15 pins can be as PWM output) , 16 analog inputs, 4 UART (hardware serial port), a 16 MHz crystal oscillator. Operating voltage of the micro controller is 5V. **Step 2-** Sensors: In order to have proper mechanism and response from the robot , proper readings had to be taken for it. In this I have used 3 sensors: ADXL335 : It is a 3- axis accelerometer sensor, which can measures the forces applied on to the sensor in all the 3 directions X, Y and Z axis. Further the raw data from the sensors are converted into acceleration by using some complicated equations. The advantage of the accelerometer was that the values do not change unless there is a change in position. But the problem with the accelerometer was that it contained high level of noise which makes the values inaccurate. So, to make these values accurate Gyroscope sensor was used. L3G4200D: It is a 3- axis Gyroscope sensor which can measure the degree of rotation in all the 3 axis in form of alpha, beta and gamma. The values provided by the Gyroscope are very accurate but values do not remain static and tend to drift to the position Zero. To make the readings accurate as well as static both the values from the Accelerometer and Gyroscope were combined by using Kalman filters. Flex Sensor : Flex is basically a strip of carbon material having metal pads inside it. As the sensor is flexed, the resistance across the sensor increases. The resistance of the flex sensor changes when the metal pads are on the outside of the bend. Straight (un-flexed) resistance: 9000 ohm, 90 degree bend resistance : 14000 ohm and at 180 degree bend resistance 22000 ohms. This resistance was calibrated and converted into angles and further used for the for the grabbing purpose in the Robotic Arm. **Step 3-** Communication: To get the most out of the system, it was better to transfer the data wirelessly. This was done with the help of RF module communication between the Robotic Arm and glove. The APC-220 Module was used in the process, which is highly integrated semi-duplex low power transceiver module with high speed MCU and capability RF IC. It has high sensitivity and strong interference circumstance as well. Characteristics: • 1000 meter of communication distance (2400bps) • Output power is 20 milli-watts. • Frequency is from 418 MHZ to 455MHZ • More than 100 channels • UART/TTL interface • Exceeds 256 bytes of data transfer **Step 4-**

	It's a basic robotic arm mounted on a surface Controlled with the help of Arduino development board. Each joints of the robotic arm is connected to the servo motors. Robotic arm contains 2 joints , total of 6 servo motors were used, 4 servo motor were used in order to control these joints,1 servo motor to control the rotation of the surface of the robotic arm and 1 more servo motor to control the lock of the grabber.
CONCLUSION	THIS IS HOW WE MAKE GESTURE CONTROL ROBOT USING ARDUINO .THIS ROBOT CONTROL ACCORDING HUMAN GESTURE.
REFERENCES	www.bildlr.com http://www.arduino.cc http://bildr.org/2011/06/l3g4200d-arduino http://www.billporter.info/2011/05/30/easyt transfer-Arduino-library

PROJECT NO.24

SUBJECT	**IOT Home Security System Using Arduino [UNIVERSITY]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN ,HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**IOT Home Security System Using Arduino[UNIVERSITY]**
HARDWARE	SMOKE SENSOR LM 35 TEMPERATURE SENSOR IR SENSOR LPG SENSOR LCD DISPLAY ESP8266 WIFI MODULE BUZZER KEYPAD DC MOTOR ARDIUNO UNO R3
SOFTWARE	Arduino IDE SOFTWARE

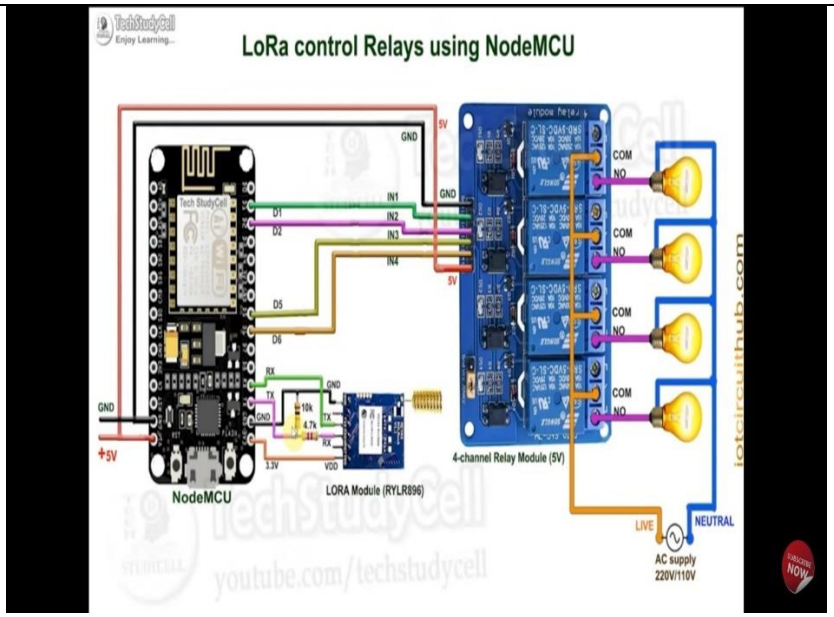
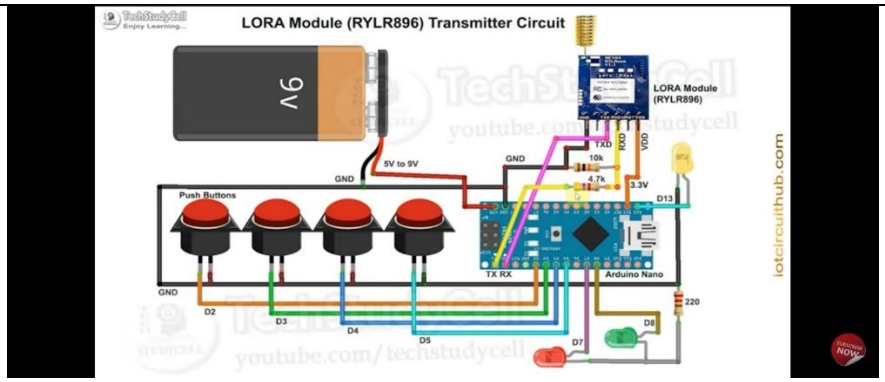
DIAGRAM	
PROCEDURE	Step 1:PARTS AND TOOLS REQUIRED Step 2: TRANSMITTER The **transmitter** is consists of 1. PIR sensor to detect the human motion 2.Arduino to process the data from PIR sensor 3. RF transmitter to transmit the data to the receiver Passive infrared sensors work by measuring incoming infrared from human or animal. They do not emit energy themselves, which is why they are called "passive". Humans and animals both release infrared energy. Passive infrared sensors(sometimes called pyro electric detectors) detect this energy and give a signal to the ARDUINO. For working of the PIR sensor. For transmitter I used a Arduino Nano board to reduced the cost. Of course your Arduino Uno also works fine. You can also use a Arduino mini Pro which cheaper than nano. As now I do not have a FTDI module to program the mini board I choose the nano board. Before going to make the entire transmitter module check the PIR sensor and have a fun. Step 3: Connect the RF Transmitter In the previous step you confirmed that your PIR sensor is working fine. Now lets add the RF transmitter to the board. The RF transmitter has 3 pins(VCC, GND, and Data). Connect the VCC pin to the 5V pin of the Arduino board that you are using (In my case it is Nano). Connect the GND to the GND of the Arduino board. Connect the data pin to the pin number 12 of the Arduino board. Step 6: BREAD BOARD TEST After uploading the code to both transmitter and receiver board ,now it is time to check whether every thing works correctly or not. Remove the Usb cable from both the board Provide external power (battery) to the both the board.(positive terminal goes to Vin

	)Then shake your hand in front of the PIR sensor. If the buzzer in the receiver board starts to make noise then every thing works fine. Now it is time to make a portable device for practical use. In the next two steps I will show you how to make a beautiful gadget for your home security.
CONCLUSION	This is how, IOT based Home security system using the Arduino project is designed to **help an individual secure his/her house from theft, fire, and LPG gas leakage** – all in one. This project uses four different sensors, from which data is sent over a website through IOT.

PROJECT NO.25

SUBJECT	**LORA BASE AUTOMATION[UNIVERSITY]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN ,HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

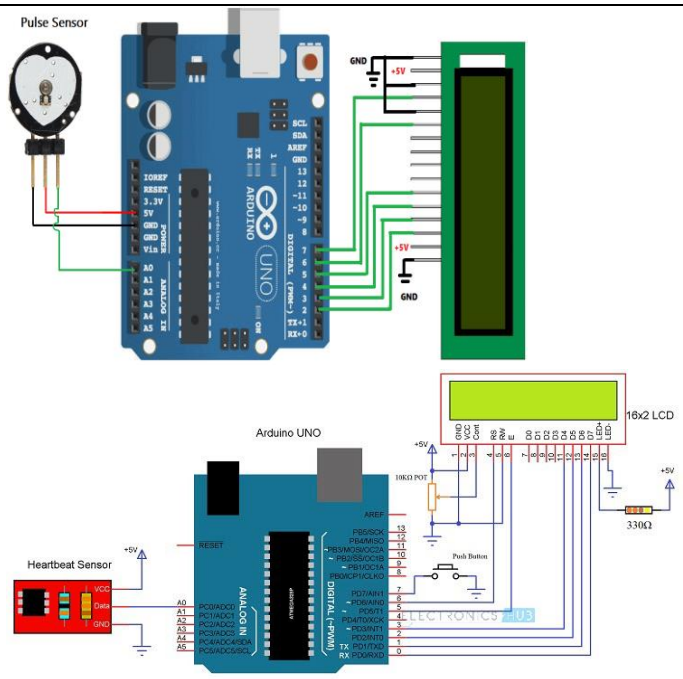
STUDY	LoRa is **a wireless audio frequency technology that operates in a license-free radio frequency spectrum**. LoRa is a physical layer protocol that uses spread spectrum modulation and supports long-range communication at the cost of a narrow bandwidth.
AIM	**LORA BASE AUTOMATION[UNIVERSITY]**
HARDWARE	LORA RYLR896 MODULE ESP-32 TFT DISPLAY TP4056 CHARGING MODULE *2 E3SP 8266 (FOIR TRASMITTER) WIRES PCB BATTERY LIPO 3000MAH *2 VOLTAGE BOOSTER *2
SOFTWARE	LoRa Alliance

DIAGRAM	
	
PROCEDURE	**STEP NO.1** First get all the required Components for the Project. **STEP NO.2** Connect the Circuit for transmitter and receiver as per the Circuit diagram. **STEP NO.3** Open the Arduino IDE after that Program both Arduino Nano and Node MCU Board. **STEP NO.4** Then Powerup the Circuit and do the testing,.
CONCLUSION	Given the wide range of benefits it offers, LoRa has been considered as a promising technology at the edge of technology. It enables secure two way mobile communication at low cost for IoT applications. It is rapidly gaining popularity and is a preferred technology for IoT systems due to its long range, high network node capacity and long life. It is reputed and accepted in the home automation market. In addition, opensource modules exist to implement this protocol. For all these reasons, LoRa was used in this study to implement the smart home solution.

PROJECT NO.26

SUBJECT	**Heart beat detector using Arduino. [UNIVERSITY]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN ,HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**Heart beat detector using Arduino. [UNIVERSITY]**
HARDWARE	ARDUINO UNO WITH CABLE PULSE SENSOR ESP 8266 HERAT BEAT SENSOR (GREENEASY PULSE) ATMEGA 328 MICROCONTROLLER ESP 8266 ONLY WIFI MODULE LCD DISPLAY PCB AND BREADBOARD RESISTOR CRYSTAL 16MHZ CAPACITOR TRANSISTOR CABLES AND CONNECTORS DIODES PUSH BOTTONS

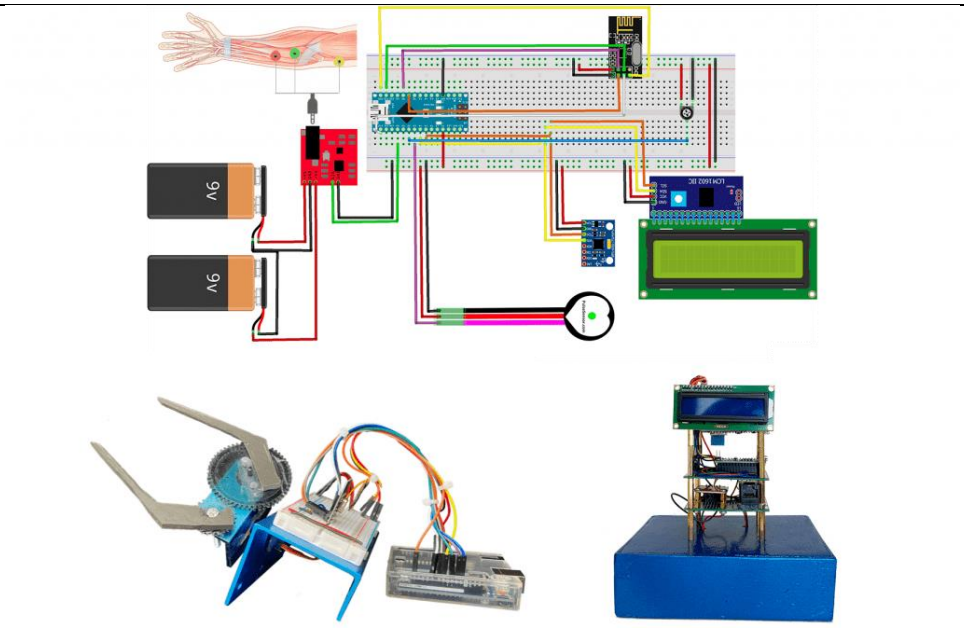
	SWITCH BATTERY IC SOCKETS
SOFTWARE	Arduino IDE
DIAGRAM	
PROCEDURE	1. Take a **pulse sensor** and connect its VCC pin with the 5 volt pin of the Arduino. 2. Join the GND pin of the pulse sensor with the GND pin of the Arduino. 3. Attach the OUT/signal pin of the heart beat sensor to the Analog-0 pin of the Arduino. 4. Now take an LED and connect its positive leg with the digital-3 pin of the Arduino. 5. Join the negative leg of the LED with the GND pin of the Arduino via a 220 ohm resistor. 6. Then Connect the I2C module with the 16×2 LCD module. 7. You can also check the interfacing of the I2C module with Arduino. 8. Join the VCC pin of the I2C module with the 5 volt pin of the Arduino and the GND pin of the Arduino with the GND pin of the I2C module. 9. Connect the SDA and SCK pins of the I2C module with the analog-4 and analog-5 pins of the Arduino as shown in the diagram. 10. Make sure that the connections are correct and tight.
CONCLUSION	A simple project involving Arduino UNO, 16×2 LCD and Heartbeat Sensor Module is designed here which can **calculate the heart rate of a person**. This project can be

	used as an inexpensive alternative to Smart Watches and other expensive Heart Rate Monitors.

PROJECT NO.27

SUBJECT	**Robot hand Arduino and muscle emg sensor[UNIVERSITY AND IIT]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN, HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**Robot hand Arduino and muscle emg sensor [UNIVERSITY AND IIT]**
HARDWARE	• Flex Sensor (5 pcs) • Foam (Like Styrofoam) • Glove • Wires (Jumper) and Breadboard • Battery and Battery Buckle • Rubber Band • Fishline or Wire • Flexible Cardboard or Plastic • Aluminium For Aluminium Tape • Hot Silicone or Solder • Emg sensor • servo x 5 • transistor 7805 • arduino nano

	• 9v battery • muscle emg sensor • 3d printed model
SOFTWARE	Arduino IDE
DIAGRAM	
PROCEDURE	Step 1: Creating the hand • In the finger length, we cut the piece from the Styrofoam. • We divide the piece we cut into 3 parts like finger joints. • We shape the sides of the square parts we cut with the help of sandpaper. • We tie each piece together using rubber. We must leave some space between each piece. • We drill all the pieces longitudinally with the help of a pointed rod. • From these holes we pass the wire to the top of the finger. And let's take the knot to keep the wire stable. • Let's cut a piece of foam as much as hand size.

- Combine all fingers by hand.
- Cut a piece of foam to mount the servo motors.
- Connect all the finger wires to the servo motors.

Step 2: Creating the Glove

- You can use an old glove for this.
- We put the flex sensors we made on the glove fingers.
- We fixed with glue or cable ties.
- Note that you should not stick the sensors completely in the longitudinal direction. Intervals are good for comfortable movement of the sensor.

Step 3: Connection

- The external battery VCC / GND connect to the breadboard.
- The Arduino GND connect to the breadboard's GND input
- The servo connections we use in this project are as follows;

Orange Input - Signal Input

Red Input - Power Input (VCC)

Brown Input - Ground Input(GND)

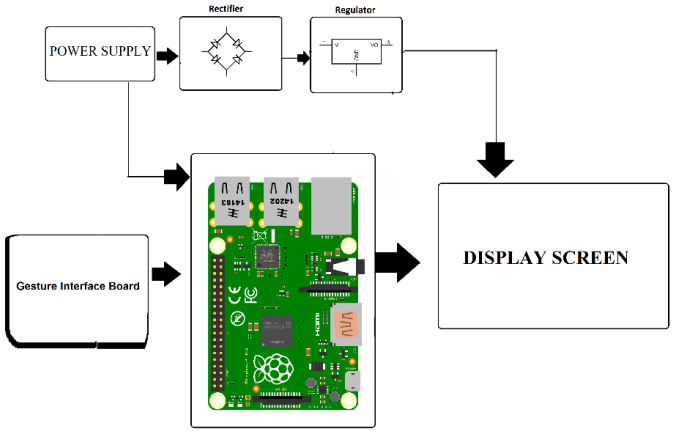
- All servo motors VCC and GND connect to the breadboard's VCC / GND inputs.
- The signal inputs of all servo motors are connect to the Arduino Digital PWM 3-5-6-9-10 respectively.

	• The sensors have two inputs. One is the GND line and the other is the signal (Analog) line. The signal line is connected to the VCC line by dividing with the help of a resistor. Step 6: Code	
CONCLUSION	Robotic arms can be used to **automate the process of placing goods or products onto pallets**. By automating the process, palletizing becomes more accurate, cost-effective, and predictable. The use of robotic arms also frees human workers from performing tasks that present a risk of bodily injury.	
REFERENCE	https://youtu.be/QOyghUxLdqE	

PROJECT NO.28

SUBJECT	**3D Holographic Display with Gesture Controller [UNIVERSITY AND IIT]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN ,HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

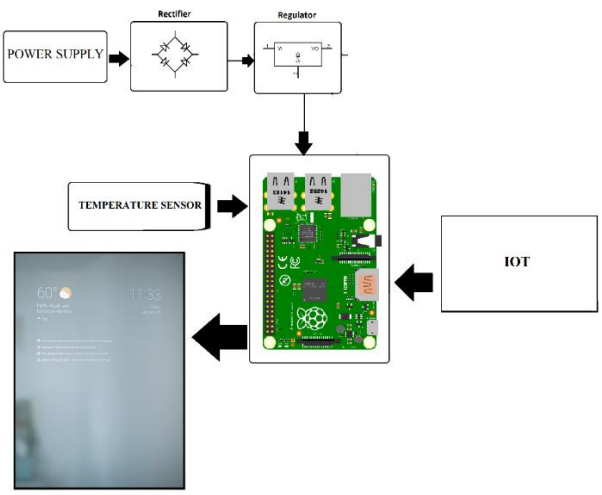
STUDY	***Raspberry Pi is defined as a minicomputer the size of a credit card that is interoperable with any input and output hardware device like a monitor, a television, a mouse, or a keyboard – effectively converting the set-up into a full-fledged PC at a low cost. This article discusses the Raspberry Pi models available today, their key features, and use cases.***
AIM	**3D Holographic Display with Gesture Controller [UNIVERSITY AND IIT]**
HARDWARE	Raspberry pi 3 Gesture interface board 5 inch LCD touch screen display Connectors Raspberry pi Power Adapter 5 inch Outer frame 3d Holographic projection display Boults and Joints Supporting frame
SOFTWARE	Arduino IDE

DIAGRAM	
PROCEDURE	STEP1- 3D multi-dimensional images enable users to interact with content from a 360-degree viewing point. STEP 2- The system produces holographic projections created from picture by refraction through the interference design, without losing any light, working with more productivity. STEP3- In this paper, we have proposed the working of 3D Holographic Display with gesture using Raspberry pi. STEP4- A holoprojector uses the various optic principles to project giant scale, high resolution photos onto varied viewing sur-faces(or simply suspended in air), at completely different focal lengths, from comparatively small projection devices. STEP 5. Considering the most recent movies being viewed in 3D, focus lies on 3D holographic projections. STEP6. The viewing of 3D movies may be possible without the need of 3D glasses.
CONCLUSION	Hence we learned how to create a 3d holographic display gesture controller using raspberry pi
REFERRENCE	https://youtu.be/MHBusDLxsQg

PROJECT NO.29

SUBJECT	**IOT Smart Mirror [UNIVERSITY AND IIT]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN, HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	Arduino = Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board. ***Raspberry Pi =*** ***Raspberry Pi is defined as a minicomputer the size of a credit card that is interoperable with any input and output hardware device like a monitor, a television, a mouse, or a keyboard – effectively converting the set-up into a full-fledged PC at a low cost. This article discusses the Raspberry Pi models available today, their key features, and use cases.***
AIM	**IOT Smart Mirror [UNIVERSITY AND IIT]**
HARDWARE	2Way Mirror Arduino board uno raspberry pi 3 temperature sensor humidity sensor light sensor dell monitor power supply
SOFTWARE	ARDUINO UNO/ RASPBERRY PI 3

DIAGRAM	
PROCEDURE	FOLLOWING ARE THE STEPS:- 1.Gather materials: You will need a mirror, a display (such as a monitor or tablet), a frame to hold the mirror and display, and any other materials you want to use to decorate the mirror (such as paint or trim). You will also need a microcontroller, such as an Arduino or Raspberry Pi, to control the display and any additional sensors or devices you want to add to the mirror. 2.Prepare the mirror: Clean the mirror and remove any backing or protective covering. If you are using a regular mirror, you can add a two-way mirror film to the surface to make it transparent when the display is turned on. 3.Assemble the frame: If you're using a pre-made frame, skip this step. If you're making a frame from scratch, you'll need to cut and assemble the pieces to create a frame that will hold both the mirror and the display. It can be made of wood, acrylic or other materials. Make sure the frame is tight and flush so the display will sit against it firmly. 4.Install the display: Place the display behind the mirror in the frame and secure it in place. If the display is a monitor or tablet, you will need to connect it to a power source and your microcontroller. 5.Add sensors and other devices: If you want to add features such as a motion sensor, temperature sensor, or camera to your smart mirror, you will need to connect them to the microcontroller and write code to control them. 6.Install the software: Install a software package such as Magic Mirror or Smart Mirror on your microcontroller. This will provide the interface that runs on the mirror, displaying things like the time, weather, news, and other information. 7.Customize the interface: Once the software is installed, you can customize the interface to display the information and features that you want. This can include adding custom modules to show things like your calendar or social media updates. 8.Power on: After all the step done, you're ready to power on your smart mirror and test it out!

CONCLUSION	Smart mirrors have great potential to enhance user experience of accessing and interacting with information. Not only do they allow users to see relevant information effortlessly, they can also be integrated as a thief detection system. Our smart mirror saves time and makes it easier to access information. In todays society security is of crucial importance. By keeping this in mind we have integrated a thief detection system into our smart mirror .In future this project can be improved by adding interactive touch screen

PROJECT NO.30

SUBJECT	**SMART GLOVE FOR SIGN LANGUAGE TRANSLATION USING ARDUINO [UNIVERSITY AND IIT]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN, HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

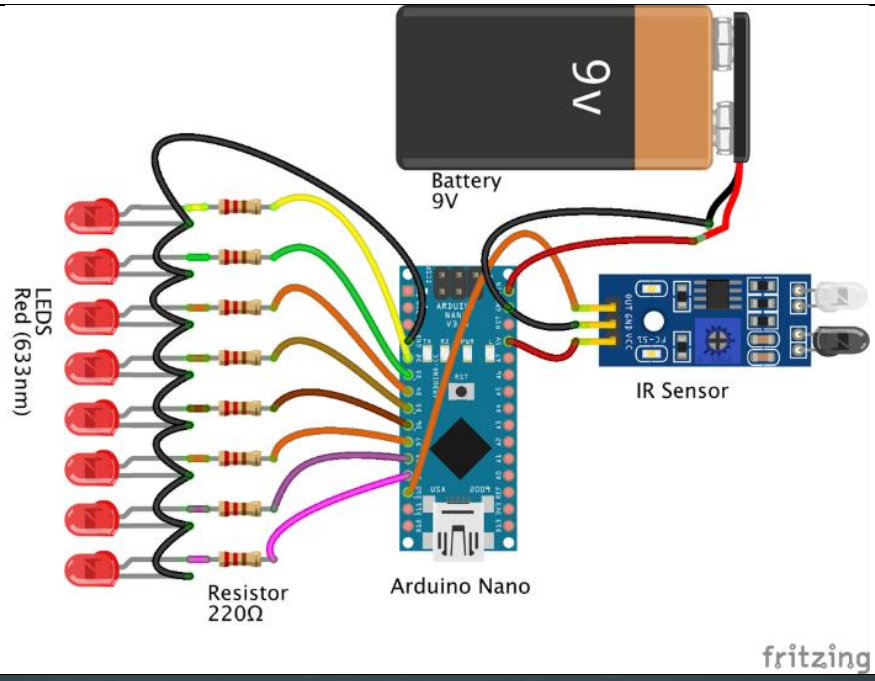
STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**SMART GLOVE FOR SIGN LANGUAGE TRANSLATION USING ARDUINO [UNIVERSITY AND IIT]**
HARDWARE	ARDUINO UNO R3 WITH CABLE MPU6050 ACCELEROMETER HC05 BLUETOOTH MODULE FLEX SENSOR *6 JUMPER WIRES FULL SET AND CONNECTING WIRES RESISTOR BOX GLOVES *2
SOFTWARE	ARDUINO UNO

DIAGRAM	
PROCEDURE	The easiest way for communication in the world is speech. Whereas it becomes difficult for speech impaired and hearing impaired people to communicate as they use sign language for the communication. It becomes difficult for normal people to understand. Smart Glove for Sign Language Translation is a work that aims to present an easy way of communication for speech impaired and hearing impaired people. This work consists of a glove equipped with sensors which senses different sign language gesture, these senses data are fed to arduino and transfer data to android phone via Bluetooth module, a common android phone is used in this work for sign to voice translation and voice to sign language translation. In real life, the sign language users mostly use both hands. Thus, this is a prototype work presenting an ease in communication for the speech impaired and hearing impaired people.
CONCLUSION	Smart Glove for Sign Language Translation is a work that aims to **present an easy way of communication for speech impaired and hearing impaired people**.
REFERENCE	https://youtu.be/60ch5FFG5nI

PROJECT NO.31

SUBJECT	**PERSISTENCE OF VISION [UNIVERSITY AND IIT]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN, HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.
AIM	**PERSISTENCE OF VISION [UNIVERSITY AND IIT]**
HARDWARE	● Arduino Nano ● IR Sensor ● General Purpose Board ● LEDs ● Resistors ● DC Motor ● Battery ● Wires ● Soldering Iron ● Some 3D Printed Parts
SOFTWARE	Arduino IDE

DIAGRAM	
	
PROCEDURE	Step 1: List of Components Needed Step 2: Printing the 3D Printed Part The Holder consists of two parts. 1. The Rotating Part 2. The Stable Part Step 3 Assembling the LEDs Once you have the 3D Printed parts with you, its time to start the making. Take the General Purpose Board and cut it in the size that fits the Rotating part. Once done, its time to add the LEDs.

In this project, I have used 8 red LEDs, you can use as many and of any color you want.

Once done, short (common) the cathode terminal of all the LEDs by soldering them on the GPB.

Add resistors to protect the LEDs from blowing up due to high voltage supply (5V). I have used the 220ohm resistors. Solder one end of each resistor to the anode terminal or positive leg of each LED.

Solder jumper cables to the second leg of each resistor.

Step 4: Connection With Arduino Nano

Connect all the LEDs to Arduino Nano as given below:

- LED0: D2 of nano
- LED1: D3 of nano
- LED2: D4 of nano
- LED3: D5 of nano
- LED4: D6 of nano
- LED5: D7 of nano
- LED6: D8 of nano
- LED7: D9 of nano
- Common cathode: Ground of nano

Step 5: Attaching the DC Motor

Attach the DC Motor to the given space in the holder.

Power the DC Motor using evive.

Step 6: Adding IR Sensor

It's time to add the IR Sensor.

As we need to indicate the beginning from where the text should be written. Attach a small piece of white paper to the steady assembly, which will be detected by the IR Sensor.

	Varying the place of the paper leads to a change in the position of the text displayed. Connect it to Nano: • GND: GND of nano • Vin: 5v of nano • Out: D10 of nano Step7 : Completing the Assembly. We need to power up the Nano. For that, connect the battery to it. Once done, fix the Nano into the Rotating Part. Fasten the Rotating Part to the holder. Step 8: Working When the IR sensor detects the white paper, the LEDs start glowing and create the illusion that something is displayed by the LED. This is due to the persistence of vision, where the LEDs turn on and off in such a way that the different images overlap each other forming letters.
CONCLUSION	With this, your very own LED POV Display is all set to display the message of your choice!
REFERENCE	https://youtu.be/FoLSfqmOiYo https://www.instructables.com/Persistence-of-Vision-PoV-Display-Using-Arduino/

PROJECT NO.32

SUBJECT	**AI assistant using raspberry PI [UNIVERSITY AND IIT]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN, HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	***Raspberry Pi is defined as a minicomputer the size of a credit card that is interoperable with any input and output hardware device like a monitor, a television, a mouse, or a keyboard – effectively converting the set-up into a full-fledged PC at a low cost. This article discusses the Raspberry Pi models available today, their key features, and use cases.***
AIM	**AI assistant using raspberry PI [UNIVERSITY AND IIT]**
HARDWARE	**Raspberry Pi** **Micro SD card** **Usb Microphone** **Speakers**
SOFTWARE	**Raspberry PI**
DIAGRAM	
PROCEDURE	**Step 1 :** **Setting Up Raspberry Pi OS** **The first step is installing an Operating System. I recommend Raspberry Pi OS, which is what we are using for this tutorial.** **If you are new to installing an Operating system on a Raspberry Pi, follow these steps:** **Go to www.raspberrypi.com/software/**

	Download the imager by clicking the download button when you scroll down **Open the App, click "Operating System," click Raspberry Pi OS (Other)** **Scroll down and click Raspberry Pi OS Lite (32-bit or legacy)** **Insert SD Card** **Click Storage and click on your Micro SD card.** **Click Write** **Insert SD card to the Raspberry Pi** **Connect a good power supply to the Raspberry Pi.** **Step 2:** **Registering for the Google API** **Before we get started with setting up the Google Assistant code on the Raspberry Pi itself, we must first register and set up a project on the Google Actions Console.** **With your Google account ready to go to the Google Console Actions dashboard** **Once you have logged into your account, you will be greeted with the following screen. On here you will want to click the "Add/Import project" button as shown in our screenshot above.** **On this next screen, you will be asked to enter a Project Name In addition to a project name you need to set both your country and your language.** **Once you have set the Project Name and chosen your language and country, click the "Create Project" button.** **In a new tab, go to the Google developers console and enable the Google Embedded Assistant API.** **Now before you go ahead and click the "Enable" button make sure that you have your project selected.** **Once you are sure you have your current project selected, click the "Enable" button.** **Now back in the other tab where you created the project, scroll down to the bottom of the screen.** **You should see some text saying, "Are you looking for device registration? Click here".** **All you need to do to proceed is to click the "click here" text.** **You will now be taken to the following screen, click the "Register Model" button to continue.**

	Step 3: **Register the Model** **On this screen, you need to set a "Product Name", "Manufacturer name", and set a "Device Type"** **Below you can see the data that we entered into it, it doesn't hugely matter what you set here, but all three boxes do need to be set for you to be able to register your model.** **For the "Product Name" we just set this as a simple descriptor of what we are using this for, which in the case of this tutorial is just simply "Ras-pi Google Assistant".** **"Manufacturer name" doesn't hugely matter as we have no intention of this being a widely used device, so we just set this to our website's name "Pi My Life Up".** **Lastly, we set the "Device Type" as "Speaker" as we felt it matched best what we intend on using the Google Assistant API for on our Raspberry Pi.Make sure you write down the "Device Model ID" as you will need this later in the tutorial. Finally, once everything is set, and you have written down the "Device Model ID" click the "Register Model" (3.) button to continue.** **Step 4:** **Download Credentials** **Now that you have registered the model you will now be taken to the "Download credentials" screen.** **This screen is crucial as the provided credentials file is what we need for our Raspberry Pi-based Google Assistant to talk with the server.** **To get this credentials file click the "Download OAuth 2.0 credentials" button as shown on the screenshot below.** **Keep this somewhere safe, as we will the text inside the file to the Raspberry Pi. (Of course, unless you downloaded it directly to your Pi)** **Once you have the credentials safely stored on your computer or Raspberry Pi, you need to click the "Next" button.** **Finally, you can specify any traits that you might need.** **In our case, we don't need any of these so we just clicked the "Save Traits" button as shown below.** **Once everything is done, you should be shown on the screen above.** **We now only have one last thing we need to do before we can set up the Google Assistant on the Raspberry Pi itself.**

	Step 5: **Configure the OAuth Consent Screen** **We also need to configure the OAuth consent screen. Without this, Google won't let us authorize our Raspberry Pi Google Assistant device later in this tutorial.** **To do this, you will need to go to the API Credentials OAuth consent screen settings page.** **On this first page, make sure that your project is selected in the top dropdown box.** **Secondly, you will need to select "External" as the user type. This option will allow anyone with a Google account to utilize the Google Assistant software that we are setting up.** **Once all configured, click the "CREATE" button to continue on to setting up the authorization screen.** **Step 6:** **The Details** **This page will allow you to set up the details of the auth screen. As we don't intend this to be publicly accessible there is only one option we are required to set.** **Click the email dropdown to select your account's email address, selecting this will allow us to continue with the guide.** **Once everything required has been set, click the "Save" button at the bottom of the page.** **Finally, we need to go to the Google My Account activity controls. On here you will need to activate the following activity controls to ensure that the Google Assistant API works correctly.** **Web & App Activity** **Location History** **Device Information** **Voice & Audio Activity** **Step 7:** **Setting Up Your Audio for Google Assistant** **1. Now that we have set up an account on the Google Actions Console we must configure the audio for it.** **The Google Assistant SDK that we will be using has some strict requirements for it to work correctly.**

	To get started with setting up the audio on the Raspberry Pi we must first obtain the card and device numbers for our various inputs and outputs. **Our steps below will show you have to get the correct numbers for these devices.** **1a. Locate your USB microphone by utilizing the following command.** **1b. Now to locate your speaker, we will be utilizing the following command.** **Again write down the card number and device number. Note that the Raspberry Pi's 3.5mm-jack is typically labelled as Analog or bcm2835 ALSA, with the HDMI output being identified as bcm2835 IEC958/HDMI.**
CONCLUSION	The objective of AI virtual assistants for 2021 is to replace secretaries and personal assistants. Those who perform tasks such as reading text and dictation, finding phone numbers and making calls, emailing schedules and meeting reminders, etc.

PROJECT NO.33

SUBJECT	**Advance POV [UNIVERSITY AND IIT]**
FACULTY IN-CHARGE	S.R.KASTURE
FACULTY IN-CHARGE	DEEPAK GUPTA, SAVIO MACWAN, HARSH SURI , HARSH PANDEY, ADITYA PATIL, SOHAM TALELE

STUDY	***Raspberry Pi is defined as a minicomputer the size of a credit card that is interoperable with any input and output hardware device like a monitor, a television, a mouse, or a keyboard – effectively converting the set-up into a full-fledged PC at a low cost. This article discusses the Raspberry Pi models available today, their key features, and use cases.***
AIM	**Advance POV [UNIVERSITY AND IIT]**
HARDWARE	**raspberry pi 3b+** **raspberry Pico** **3d filament** **power supply 24v (50-60)w** **dc motor 1200 rpm (20fps)** **led strip APA102/SK9822 CHIP** **8neodym magnets (10x2)** **LM2596 dc-dc 24v to 5v convertor for led strip** **Carbon Brush Motor Carbon 5 x 8 x 12 mm Compatible with Bosch EHS 6-115 0601375069, EHS 6-115 06013750V6, GBM 13-2 Power Tool** ALLUMINUM ROD
SOFTWARE	On Linux (Raspberry Pi)

DIAGRAM	
PROCEDURE	Step 1: List of Components Needed Step 2: Printing the 3D Printed Part The Holder consists of two parts. 3. The Rotating Part 4. The Stable Part Step 3 Assembling the LEDs Once you have the 3D Printed parts with you, its time to start the making. Take the General Purpose Board and cut it in the size that fits the Rotating part. Once done, its time to add the LEDs. In this project, I have used 8 red LEDs, you can use as many and of any color you want. Once done, short (common) the cathode terminal of all the LEDs by soldering them on the GPB. Add resistors to protect the LEDs from blowing up due to high voltage supply (5V). I have used the 220ohm resistors. Solder one end of each resistor to the anode terminal or positive leg of each LED. Solder jumper cables to the second leg of each resistor. Step 4: Connection With Arduino Nano Connect all the LEDs to Arduino Nano as given below:

- LED0: D2 of nano
- LED1: D3 of nano
- LED2: D4 of nano
- LED3: D5 of nano
- LED4: D6 of nano
- LED5: D7 of nano
- LED6: D8 of nano
- LED7: D9 of nano
- Common cathode: Ground of nano

Step 5: Attaching the DC Motor

Attach the DC Motor to the given space in the holder.

Power the DC Motor using evive.

Step 6: Adding IR Sensor

It's time to add the IR Sensor.

As we need to indicate the beginning from where the text should be written. Attach a small piece of white paper to the steady assembly, which will be detected by the IR Sensor.

Varying the place of the paper leads to a change in the position of the text displayed.

Connect it to Nano:

- GND: GND of nano
- Vin: 5v of nano
- Out: D10 of nano

Step7 : Completing the Assembly.

We need to power up the Nano. For that, connect the battery to it.

Once done, fix the Nano into the Rotating Part.

	Fasten the Rotating Part to the holder. Step 8: Working When the IR sensor detects the white paper, the LEDs start glowing and create the illusion that something is displayed by the LED. This is due to the persistence of vision, where the LEDs turn on and off in such a way that the different images overlap each other forming letters.
CONCLUSION	With this, your very own LED POV Display is all set to display the message of your choice!