

CERTIFICATE

*THIS IS TO CERTIFY THAT MISS.KIRAN BOHRA OF SYBSC.IT DIV-A ROLL NO: 07
AND MR.PRAKASH TRIPATHI OF SYBSC.IT DIV-B ROLL NO: 41 HAS
COMPLETED EMBEDDED SYSTEM PROJECT ON TOPIC: SMART BLIND
STICK. DURING THE ACADEMIC YEAR 2017-18.*

SIGNATURE: _____

SMART BLIND STICK

KIRAN BOHRA (DIV-A, ROLL NO: 07) AND PRAKASH TRIPATHI (DIV-B, ROLL NO: 41)

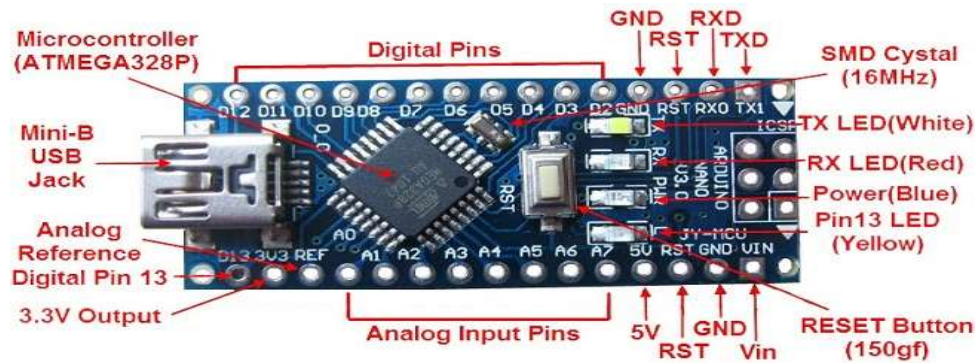
KES SHROFF COLLEGE

DEPARTMENT: BSc.INFORMATION TECHNOLOGY

INTRODUCTION: There are many guidance systems for visually impaired travellers to navigate quickly and safely against obstacles and other hazards faced. Generally, a blind user carries a white cane or a guidance dog as their mobility aid. With the advances of modern technologies, many different types of devices are available to support the mobility of blind. These mobility aids are generally known as Electronic Travel Aids (ETAs). With this information, they need to arrive at their destinations, avoiding unexpected obstacles. The main objective of this project is to develop a simple guidance system for the blind users, using sensors. Using this smart blind stick, a visually impaired person can walk without anyone's help. The smart blind stick automatically detects the obstacle in front of the person and give him a response to the person with a warning sound.

THE PARTS REQUIRED FOR MAKING THIS PROJECT ARE AS FOLLOWS WITH THEIR FUNCTIONS:

- **ARDUINO NANO:** The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328P; offers the same connectivity and specs of the UNO board in a smaller form factor. The Arduino Nano is programmed using the Arduino Software (IDE), an Integrated Development Environment common to all our boards and running both online and offline. The Arduino Nano can be powered via the Mini-B USB connection, 6-20V unregulated external power supply or 5V regulated external power supply. The power source is automatically selected to the highest voltage source. The ATmega168 has 16 KB of flash memory for storing code (of which 2 KB is used for the bootloader); the ATmega328 has 32 KB, (also with 2 KB used for the bootloader). The ATmega168 has 1 KB of SRAM and 512 bytes of EEPROM (which can be read and written with the EEPROM library); the ATmega328 has 2 KB of SRAM and 1 KB of EEPROM. Each of the 14 digital pins on the Nano can be used as an input or output, using pin Mode (), digital Write (), and digital Read () functions. They operate at 5 volts.

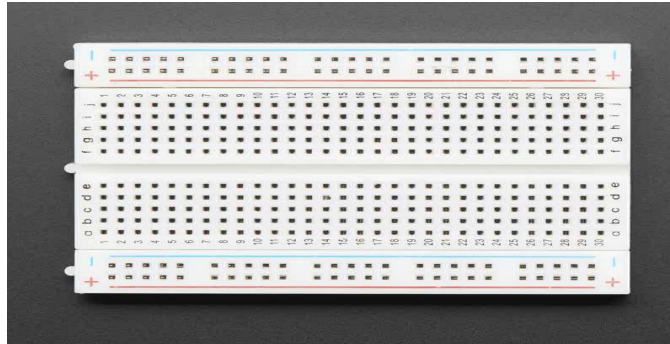


- ULTRASONIC SENSOR (HCSR04):** Ultrasonic Sensor (transducers) is a type of sensor that uses sound waves to detect an object or target. It works on similar principle of radar or sonar which generates high frequency sound waves and evaluates the echo which is received back by the sensor. It emits an ultrasound at 40 000 Hz which travels through the air and if there is an object or obstacle on its path it will bounce back to the module. The HC-SR04 Ultrasonic Module has 4 pins, Ground, VCC, Trig and Echo. The Ground and the VCC pins of the module need to be connected to the Ground and the 5 volts pins on the Arduino Board respectively and the trig and echo pins to any Digital I/O pin on the Arduino Board. In order to generate the ultrasound you need to set the Trig on a High State for 10 μ s. That will send out an 8 cycle sonic burst which will travel at the speed of sound and it will be received in the Echo pin. The Echo pin will output the time in microseconds the sound wave travelled.



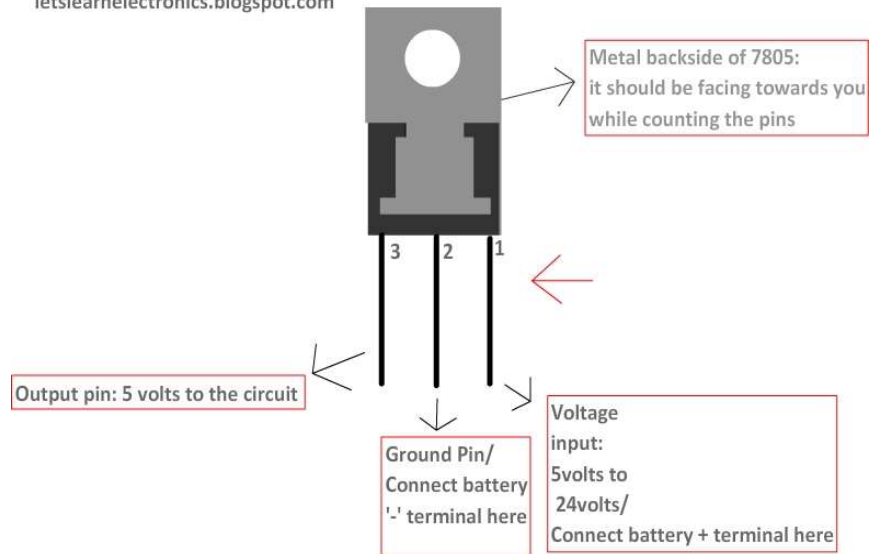
- Vcc-** Connects to 5V of positive voltage for power
- Trig-** A pulse is sent here for the sensor to go into ranging mode for object detection
- Echo-** The echo sends a signal back if an object has been detected or not. If a signal is returned, an object has been detected. If not, no object has been detected.
- GND-** Completes electrical pathway of the power.

- **BREADBOARD:** A breadboard is a solderless device for temporary prototype with electronics and test circuit designs. Most electronic components in electronic circuits can be interconnected by inserting their leads or terminals into the holes and then making connections through wires where appropriate. The breadboard has strips of metal underneath the board and connect the holes on the top of the board. The top and bottom rows of holes are connected horizontally and split in the middle while the remaining holes are connected vertically.



- **7805 IC:** A voltage regulator IC maintains the output voltage at a constant value. 7805 IC, a member of 78xx series of fixed linear voltage regulators used to maintain such fluctuations, is a popular voltage regulator integrated circuit (IC). The xx in 78xx indicates the output voltage it provides. 7805 IC provides +5 volts regulated power supply with provisions to add a heat sink. 7805 IC Rating-Input voltage range 7V-35V, Current rating $I_c = 1A$, Output voltage range $V_{Max}=5.2V$, $V_{Min}=4.8V$

Pin No.	Pin	Function	Description
1	INPUT	Input voltage (7V-35V)	In this pin of the IC positive unregulated voltage is given in regulation.
2	GROUND	Ground (0V)	In this pin where the ground is given. This pin is neutral for equally the input and output.
3	OUTPUT	Regulated output; 5V (4.8V-5.2V)	The output of the regulated 5V volt is taken out at this pin of the IC regulator.

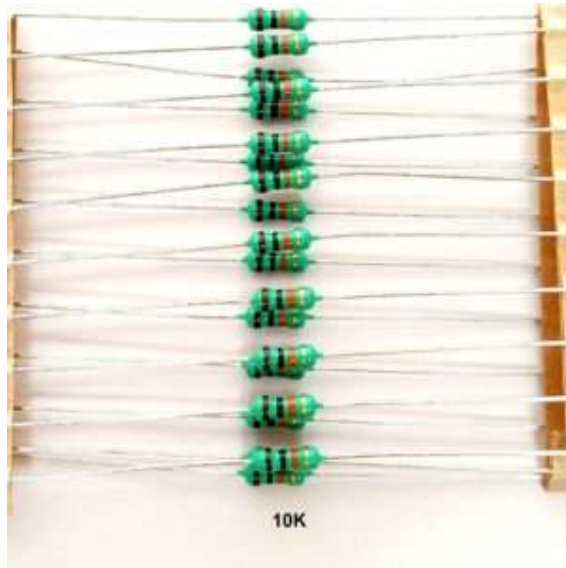


- **BUZZER:** A buzzer is a mechanical, electromechanical, magnetic, electromagnetic, electro-acoustic or piezoelectric audio signalling device. A piezo electric buzzer can be driven by an oscillating electronic circuit or other audio signal source. A click, beep or ring can indicate that a button has been pressed.



- **9-VOLT BATTERY:** It is a common size of battery that was introduced for the early [transistor radios](#). It has a rectangular prism shape with rounded edges and a polarized snap connector at the top. This type is commonly used in [walkie-talkies](#), [clocks](#) and [smoke detectors](#). The battery has both [terminals](#) in a snap connector on one end. The smaller circular (male) terminal is positive, and the larger hexagonal or octagonal (female) terminal is the negative contact.
- **RESISTOR:** A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors

are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses. High-power resistors that can dissipate many watts of electrical power as heat may be used as part of motor controls, in power distribution systems, or as test loads for generators. Fixed resistors have resistances that only change slightly with temperature, time or operating voltage. Variable resistors can be used to adjust circuit elements (such as a volume control or a lamp dimmer), or as sensing devices for heat, light, humidity, force, or chemical activity. Here we use 10k value resistor.



- **Other components are:** Jumper wires, LED, Push button.

CONNECTIONS:

Ultrasonic VCC to Arduino 5v.

Ultrasonic GND to Arduino GND.

Ultrasonic TRIG to Arduino D12.

Ultrasonic ECHO to Arduino D11.

Buzzer RED to Arduino D8.

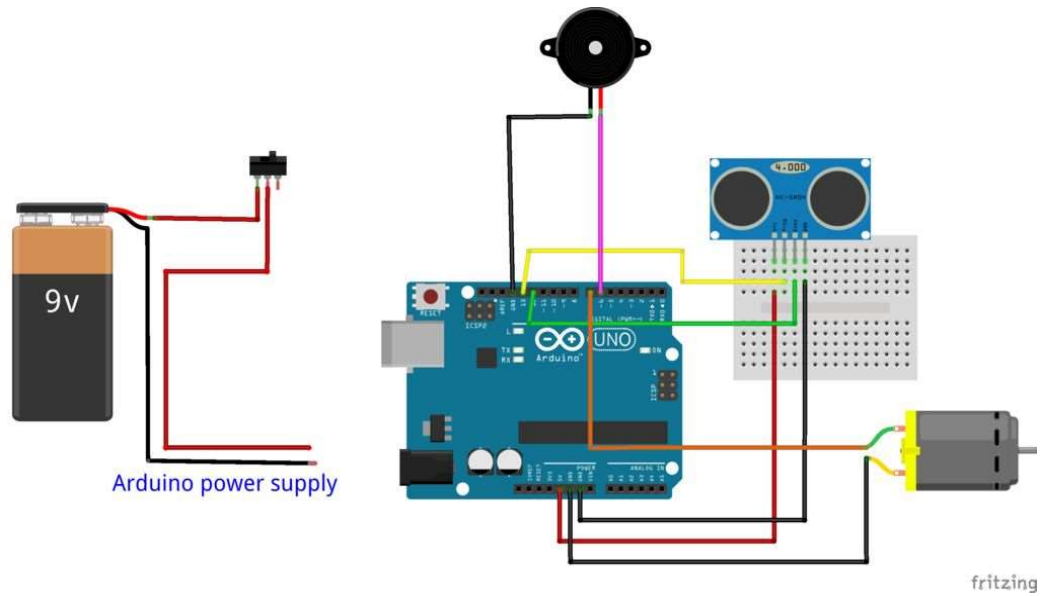
Buzzer BLACK to Arduino GND.

9-volt battery RED to Push button pin 1.

9-volt battery BLACK to DC male power jack(-).

Push button pin 2 to DC male power jack (+).

CIRCUIT DIAGRAM:



PROGRAM:

```
#define trigPin 12

#define echoPin 12

#define buzzer 6

void setup()
{
  pinMode(trigPin, OUTPUT);

  pinMode(echoPin, INPUT);

  pinMode(buzzer,OUTPUT);
}

void loop()
{
  long duration, distance;
```

```

digitalWrite(trigPin, LOW);

delayMicroseconds(2);

digitalWrite(trigPin, HIGH);

delayMicroseconds(10);

digitalWrite(trigPin, LOW);

duration = pulseIn(echoPin, HIGH);

distance = (duration/2) / 29.1;

if (distance < 70)// This is where checking the distanceyou can change the value

{

// When the the distance below 100cm

digitalWrite(buzzer,HIGH);

} else

{

// when greater than 100cm

digitalWrite(buzzer,LOW);

} delay(500);

}

```

WORKING:

Finally, it is time to test our project. We should make sure the connections are done as per the circuit diagram and the program is successfully uploaded. Now, power the circuit using a 9V battery and you should start to see results. Move the Ultra Sonic sensor closer to object and you will notice the Buzzer beeping. If everything is normal, the buzzer will not beep. Here we have taken the distance of 70cm. It is a very simple project but of great use.