Pre-programmed Robots

Pre- programmed robots operate in a controlled environment where they do simple and monotonous tasks. An example of a preprogrammed robot would be a mechanical arm on an automotive assembly line

Humanoid Robots

A humanoid robot is a robot with its body shape built to resemble the human body. The design may be for functional purposes, such as interacting with human tools and environments, for experimental purposes, such as the study of bipedal locomotion.
Some humanoid robots also have heads designed to replicate human facial features such as eyes and mouths.

Autonomous Robots

A humanoid robot is a robot with its body shape built to resemble the human body. The design may be for functional purposes, such as interacting with human tools and environments, for experimental purposes, such as the study of bipedal locomotion.
Some humanoid robots also have heads designed to replicate human facial features such as eyes and mouths.

Teleoperated Robots

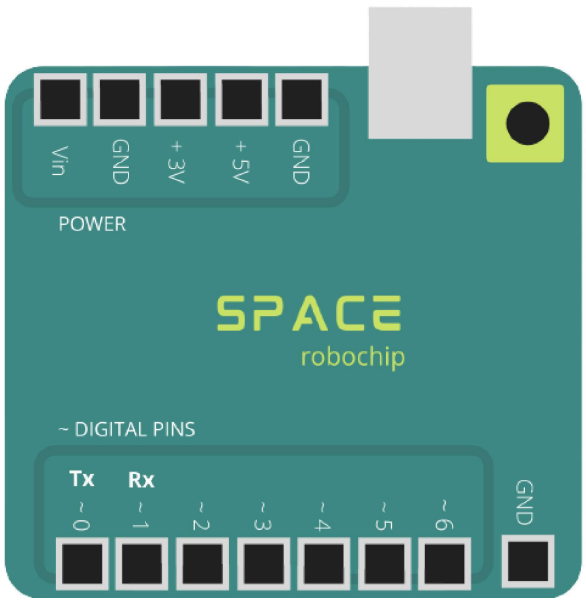
Tele-operated robots are remotely controlled robots. they might have some sort of intelligence , but normally they take their command from a human operator and execute exactly as instructed. Right now, tele-operated robots are mostly used in medical surgeries and military operations.

Augmenting Robots

Augmenting robots generally enhance capabilities that a person has or replace the abilities that a person has lost. The most common example of an augmenting medical device would be a prosthetic limp. or bionic arm

Introduction to Robochip

This is SPACE Robochip. You will be learning to code and build robots virtually using this chip in our internship program.
The Space Robochip is a microcontroller which has 7 digital pins. The Pin 0 is also considered as the transmitter pin (Tx) and Pin 1 is also considered as receiver pin (Rx).

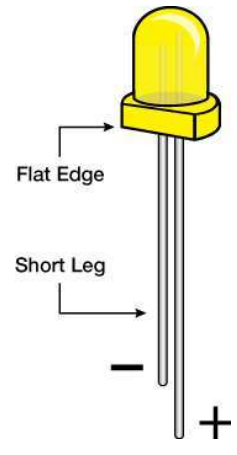


Playing with LED

A light-emitting diode (LED) is a semiconductor device that emits light when an electric current is passed through it.

Positive(+) to Digital Pin 6

Negative(-) to GND



Code – LED Blink

```
void setup() {
pinMode(6, OUTPUT);
}
void loop(){
digitalWrite(6, HIGH);
delay(100);
digitalWrite(6, LOW);
delay(100);
}
```

Ultrasonic Sensor

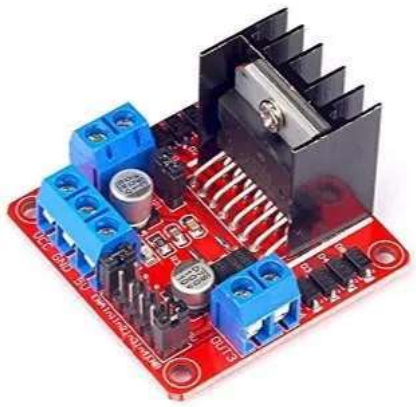
An **ultrasonic sensor** is an electronic device that measures the distance of a target object by emitting **ultrasonic** sound waves.Usually a normal ultrasonic sensor will have 4 pins.
In order to generate the ultrasound we need to set the **Trigger Pin** on a **High** State for **10 microseconds**. That will send out an 8 cycle sonic burst which will travel at the speed sound and it will be received in the Echo Pin. The Echo Pin will **output** the **time** in microseconds the sound wave traveled.

Experiment Connections:

- Vcc to 5V of Space Robochip
- Trig to Digital Pin 5 of Space Robochip
- Echo to Digital Pin 6 of Space Robochip
- GND to GND of Space Robochip

Code - Ultrasonic Sensor

```
const int trigPin = 5;
const int echoPin = 6;
float duration, distance;
void setup() {
pinMode(trigPin, OUTPUT);
pinMode(echoPin, INPUT);
Serial.begin(9600);
}
void loop() {
digitalWrite(trigPin, LOW);
delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);
duration = pulseIn(echoPin, HIGH);
distance = (duration*.0343)/2;
Serial.print(“Distance: “);
Serial.println(distance);
delay(100);
}
```



Motor Driver

As the name suggest a motor driver IC or module is used to drive the motors of a robot. We are using it as a kind of protection from high voltages which would damage our microcontroller board which in this case is our Space Robochip.
Its because our microcontroller board only require maximum of 5v to run but for motors we need more voltage for its proper working. So we use this driver as a link to carry out both the jobs together, which is the proper working of microcontroller board as well as the motors

Obstacle Avoidance Robot

Code – Obstacle Avoidance Robot

```
#define echo 5
#define trig 6
#define led 13
void setup()
{
pinMode(trig, OUTPUT);
pinMode(echo,INPUT);
pinMode(1,OUTPUT);
pinMode(2,OUTPUT);
pinMode(3,OUTPUT);
pinMode(4,OUTPUT);
Serial.begin(9600);
}
void loop()
{
long time,dist;
digitalWrite(trig,LOW);
delayMicroseconds(2);
digitalWrite(trig,HIGH);
delayMicroseconds(10);
digitalWrite(trig,LOW);
time = pulseIn(echo,HIGH);
dist = time/2/29.1;
Serial.println(dist);
delay(1000);
if (dist<100)
{
digitalWrite(1,LOW);
digitalWrite(2,LOW);
digitalWrite(3,LOW);
digitalWrite(4,LOW);
}
else
{
digitalWrite(1,HIGH);
digitalWrite(2,LOW);
digitalWrite(3,LOW);
digitalWrite(4,HIGH);
}
}
```

Line Following Robot

Code – Line Following Robot

```
const int r1=1, r2=2, l1=3, l2=4;
const int LS = 6;
const int RS = 5;
int L,R;
void setup()
{
```

```
pinMode(l1, OUTPUT);
pinMode(l2, OUTPUT);
digitalWrite(r2,LOW);
digitalWrite(l2,LOW);
}
void loop()
{
L = digitalRead(LS);
R = digitalRead(RS);
digitalWrite(r1, !R);
digitalWrite(l1, !L);
}
```

Joystick Controlled Robot

In this experiment we will be building a line follower robot
A proximity sensor is a sensor able to detect the presence of nearby objects without any physical contact. A proximity sensor often emits an electromagnetic field or a beam of electromagnetic radiation (infrared, for instance), and looks for changes in the field or return signal.

Code – Joystick Controlled Robot

```
char t;
const int r1=2,r2=3,l1=4,l2=5;

void setup() {
Serial.begin(9600);
pinMode(r1,OUTPUT);
pinMode(r2,OUTPUT);
pinMode(l1,OUTPUT);
pinMode(l2,OUTPUT);
}

void loop() {
if(Serial.available()){
t = Serial.read();
}

if(t == 'F'){
digitalWrite(r1,HIGH);
digitalWrite(r2,LOW);
digitalWrite(l1,HIGH);
digitalWrite(l2,LOW);
}

else if(t == 'B'){
digitalWrite(r1,LOW);
digitalWrite(r2,HIGH);
digitalWrite(l1,LOW);
digitalWrite(l2,HIGH);
}

else if(t == 'L'){
digitalWrite(r1,HIGH);
digitalWrite(r2,LOW);
digitalWrite(l1,LOW);
digitalWrite(l2,HIGH);
delay(100);
t = 'S';
}

else if(t == 'R'){
digitalWrite(r1,LOW);
digitalWrite(r2,HIGH);
digitalWrite(l1,HIGH);
digitalWrite(l2,LOW);
delay(100);
t = 'S';


ι
```