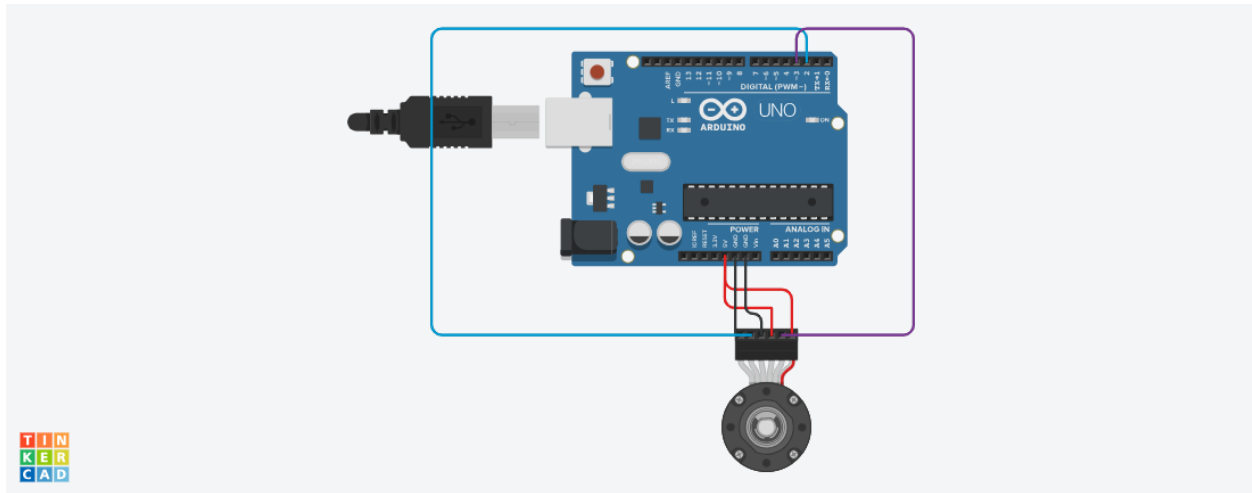


Task 6.2



Arduino Simulation for Wall-E rotary motor

```
//defining channel pins
#define Channel_A 2
#define Channel_B 3
long long counter=0;
void setup()
{
    Serial.begin(9600);
    //defining pins as input
    pinMode(Channel_A, INPUT_PULLUP);
    pinMode(Channel_B, INPUT_PULLUP);
    //calling interrupt to count
    attachInterrupt(digitalPinToInterrupt(Channel_A), ISR_ENCODER_Channel_A, CHANGE);
    attachInterrupt(digitalPinToInterrupt(Channel_B), ISR_ENCODER_Channel_B, CHANGE);
}

void loop()
{
    //Serial.println(counter);
}
//moving clock wise
void ISR_ENCODER_Channel_A(void)
{
    if(digitalRead(Channel_A)!=digitalRead(Channel_B))
        counter++;
}
```

```

else
    counter--;
    //Serial.println("moving clockwise");
}
//moving anti clock wise
void ISR_ENCODER_Channel_B(void)
{
    if(digitalRead(Channel_A)==digitalRead(Channel_B))
        counter++;
    else
        counter--;
    //Serial.println("moving clockwise");
}

```

Wall-E specs

1. 540 pulse per revolution
2. Diameter of wheel = 40 cm = 0.4 m
3. maximum speed = 0.5 m/s = 50 cm per second

How to calculate Cutoff Frequency?

It is well known that $Time = Distance / Speed$

- Distance moved in one revolution: $2 * \pi * r = 2 * \pi * 0.2 = 1.2567m$
- $Time = Distance / maxspeed = 1.2567 / 0.5 = 2.51327s$
- now the revolution takes $2.51327s \rightarrow 0.3978rev/sec$
- number of pulses per second: $540 * 0.3978 = 214.86$ **pulse per sec**
- $fc = 214.86pulse/sec$
- $540 = 2\pi \rightarrow 214.85 = 0.4\pi$
- $fc = 0.4\pi * 2\pi = 2.5rad/s$