Project Design Phase-4

Date	26 October 2023
Team ID	454
Project Name	4123-Traffic Management
Team Name	Proj_227233_Team_2
Team Members	5

Advance Traffic Management Block Diagram:
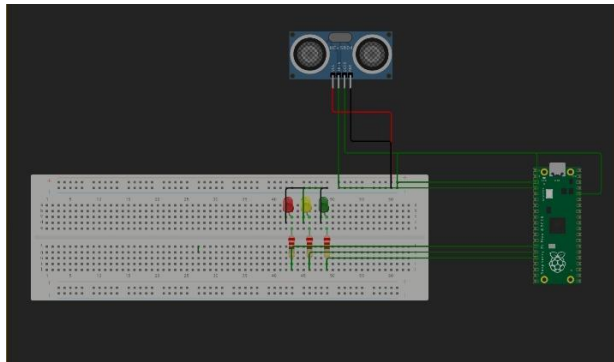
Program code for Traffic Management:

```
import machine
import utime

# GPIO pins for the HC-SR04 sensor
trigger_pin = machine.Pin(2, machine.Pin.OUT)  # Connect to the sensor's trigger pin
echo_pin = machine.Pin(3, machine.Pin.IN)      # Connect to the sensor's echo pin

# Traffic light control pins (simulated)
red_light = machine.Pin(10, machine.Pin.OUT)
yellow_light = machine.Pin(11, machine.Pin.OUT)
green_light = machine.Pin(12, machine.Pin.OUT)

# Function to measure distance using the HC-SR04 sensor
def measure_distance():
    trigger_pin.value(0)
    utime.sleep_us(2)
    trigger_pin.value(1)
    utime.sleep_us(10)
```

```python
    trigger_pin.value(0)

    while echo_pin.value() == 0:
        pulse_start = utime.ticks_us()

    while echo_pin.value() == 1:
        pulse_end = utime.ticks_us()

    pulse_duration = utime.ticks_diff(pulse_end, pulse_start)
    distance = (pulse_duration * 0.0343) / 2  # Speed of sound is approximately 343 meters per
second

    return distance

# Traffic light control function
def control_traffic_lights(distance):
    if distance < 20:  # If a vehicle is very close
        red_light.value(0)
        yellow_light.value(1)
        green_light.value(0)
    elif 30 <= distance < 40:  # If a vehicle is moderately close
        red_light.value(1)
        yellow_light.value(0)
        green_light.value(0)
    else:  # If no vehicle is detected
        red_light.value(0)
        yellow_light.value(0)
        green_light.value(1)

while True:
    distance = measure_distance()

    # Control traffic lights based on the distance measurements
    control_traffic_lights(distance)

    # For simulation purposes, print the distance and the traffic light state
    print("Distance: {:.2f} cm".format(distance))
    utime.sleep(2)  # Wait for a few seconds before taking the next measurement
```
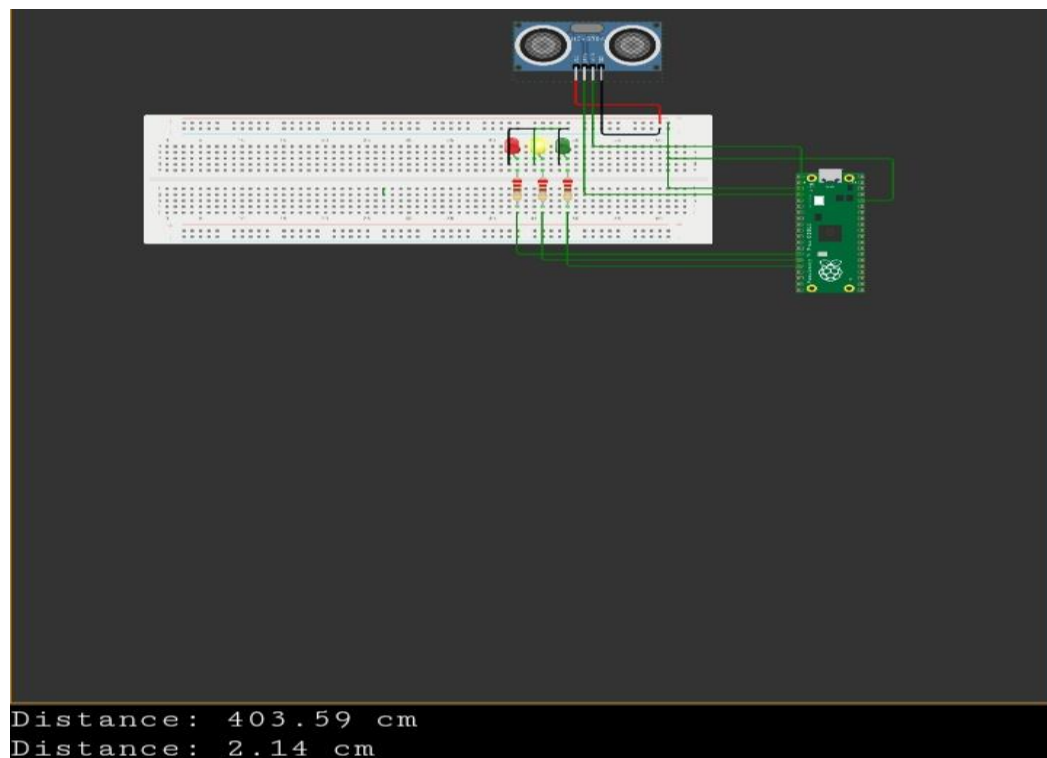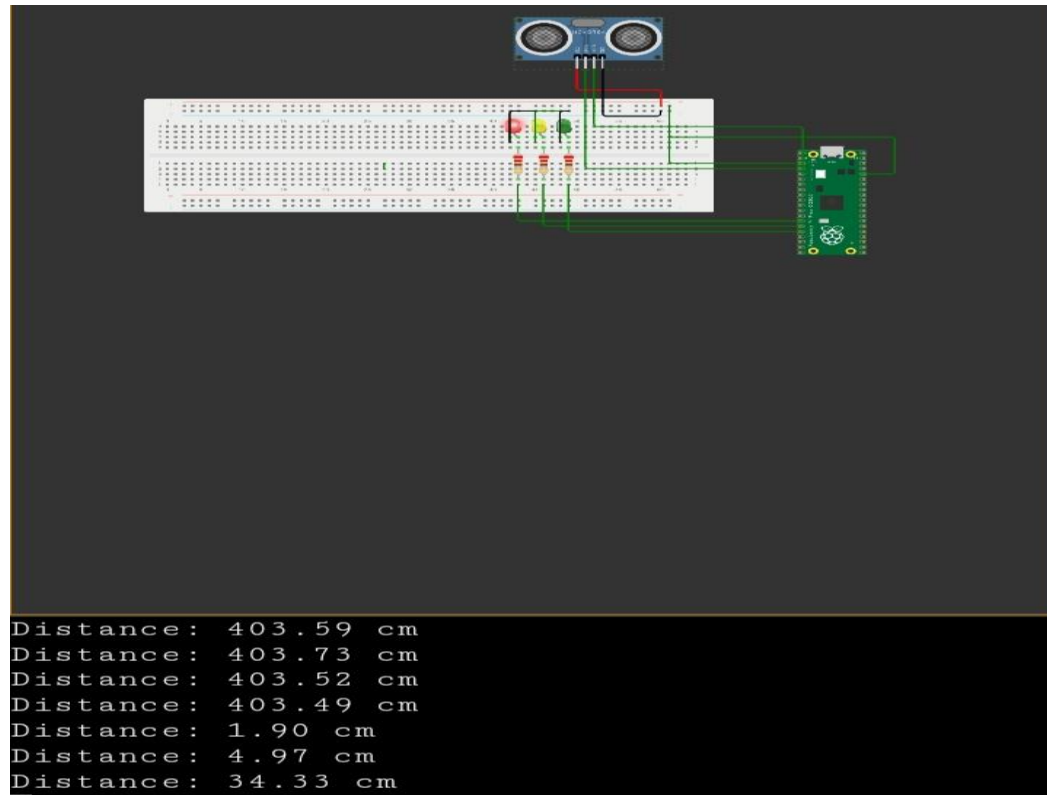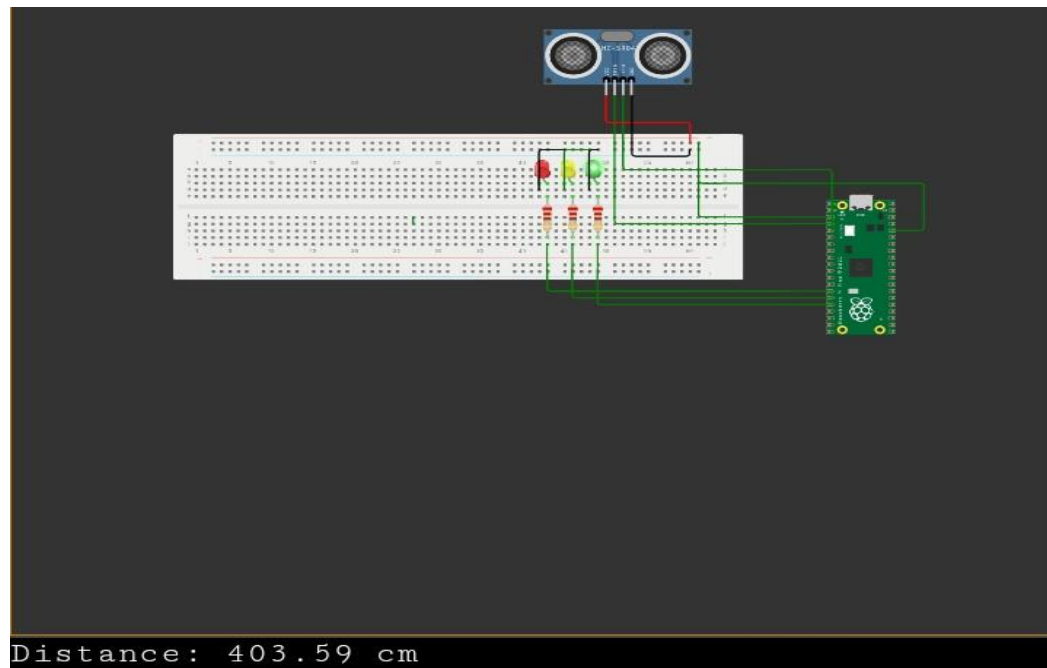
OUTPUT:

```
Distance:   403.59  cm
Distance:   403.73  cm
Distance:   403.52  cm
Distance:   403.49  cm
Distance:   1.90  cm
Distance:   4.97  cm
Distance:   34.33  cm
```



```
Distance:   403.59  cm
Distance:   2.14  cm
```

Distance: 403.59 cm

Reference: http:wokwi.com/projects/379623461907998721