Raspberry Pi with Ultrasonic sensor:

Introduction: In this project we are going to measure distance using HC-SR04 ultrasonic sensor.

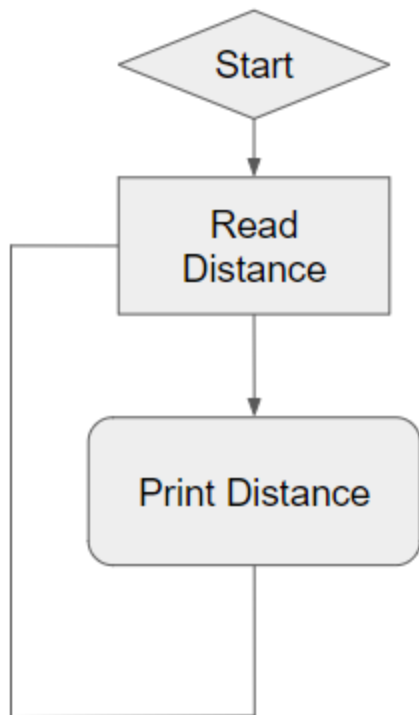**Components:**
Raspberry Pi
HC-SR04 Ultrasonic sensor module
Breadboard
Jumper wires

Application:
Distance meter
Obstacle avoid car
Smart dustbin

Objectives:

Flowchart:

```
            ┌─────────┐
           ╱  Start   ╲
           ╲          ╱
            └─────────┘
                 │
                 ▼
        ┌─────────────────┐
        │      Read       │
        │    Distance     │
        └─────────────────┘
                 │
                 ▼
        ╭─────────────────╮
        │  Print Distance │
        ╰─────────────────╯
                 │
                 └──────────┘
```

Code:
```
import RPi.GPIO as GPIO
import time


GPIO.setmode(GPIO.BOARD)

TRIG = 16
ECHO = 18
i=0

GPIO.setup(TRIG,GPIO.OUT)
GPIO.setup(ECHO,GPIO.IN)

GPIO.output(TRIG, False)
print "Calibrating....."
time.sleep(2)
```

```python
print "Place the object......"


try:
    while True:
        GPIO.output(TRIG, True)
        time.sleep(0.00001)
        GPIO.output(TRIG, False)

        while GPIO.input(ECHO)==0:
            pulse_start = time.time()

        while GPIO.input(ECHO)==1:
            pulse_end = time.time()

        pulse_duration = pulse_end - pulse_start

        distance = pulse_duration * 17150

        distance = round(distance+1.15, 2)

        if distance<=20 and distance>=5:
            print "distance:",distance,"cm"
            i=1

        if distance>20 and i==1:
            print "place the object...."
            i=0
        time.sleep(2)

except KeyboardInterrupt:
    GPIO.cleanup()
```

Hardware connection:
Vcc - 3.3 V
Trig - GPIO16
Echo - GPIO18
GND - GND

Circuit Diagram: