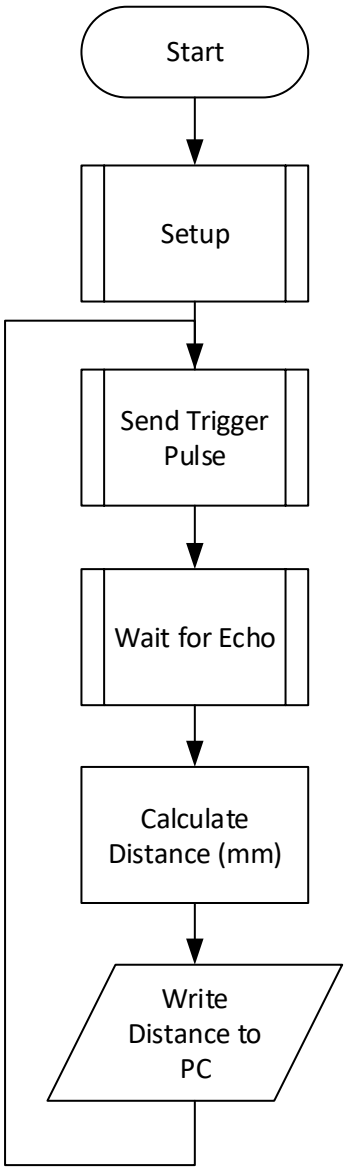
Stage 1: Ultrasonic Sensor



Aim of Stage 1:

To read back distance data from the Ultrasonic sensor and display it on the PC.

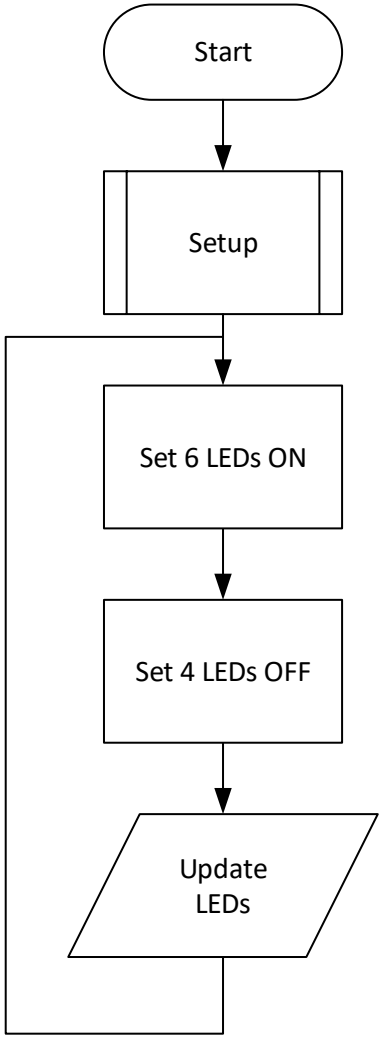
Key Tasks:

- Complete Setup Program.
- Complete Ultrasonic Sub-programs.
- Find a formula to calculate the distance.

See these Provided Documents:

- HC-SR04 Data Sheet
- Ultrasonic Sub-program Flowcharts
- 'Ultrasonic.ino' example arduino code
- Arduino Programming Notes

Stage 2: RGB LEDs



Aim of Stage 2:

To turn ON and OFF RGB LEDs on the strip and set their colour.

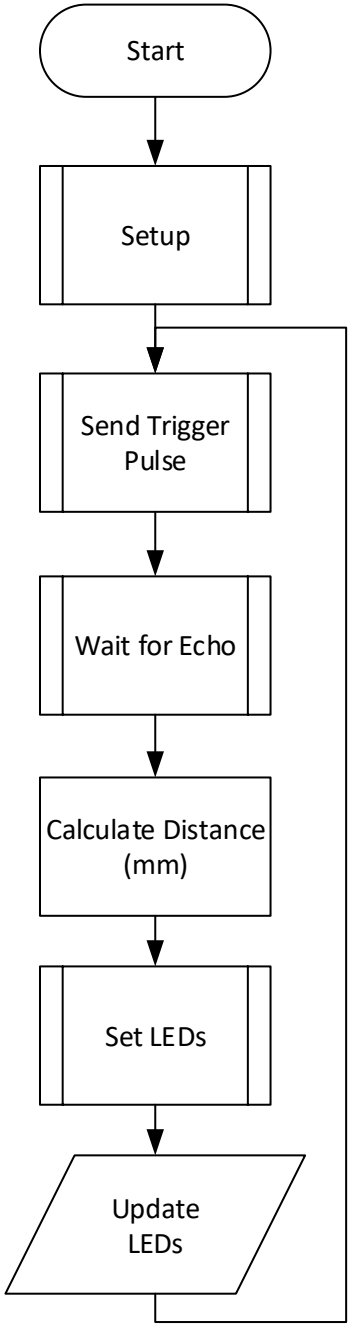
Key Tasks:

- Complete Setup Program.
- Set 6 LEDs ON and 4 LEDs OFF
- Set 3 LEDs to a different colour.

See these Provided Documents:

- Neopixel RGB LED Data Sheet
- 'Neopixel.ino' example arduino code
- Arduino Programming Notes

Stage 3: All together



Aim of Stage 3:

To combine the previous two stages and make the LEDs light up as an object approaches.

Key Tasks:

- Complete Setup Program.
- Complete Set LEDs program using the switch method

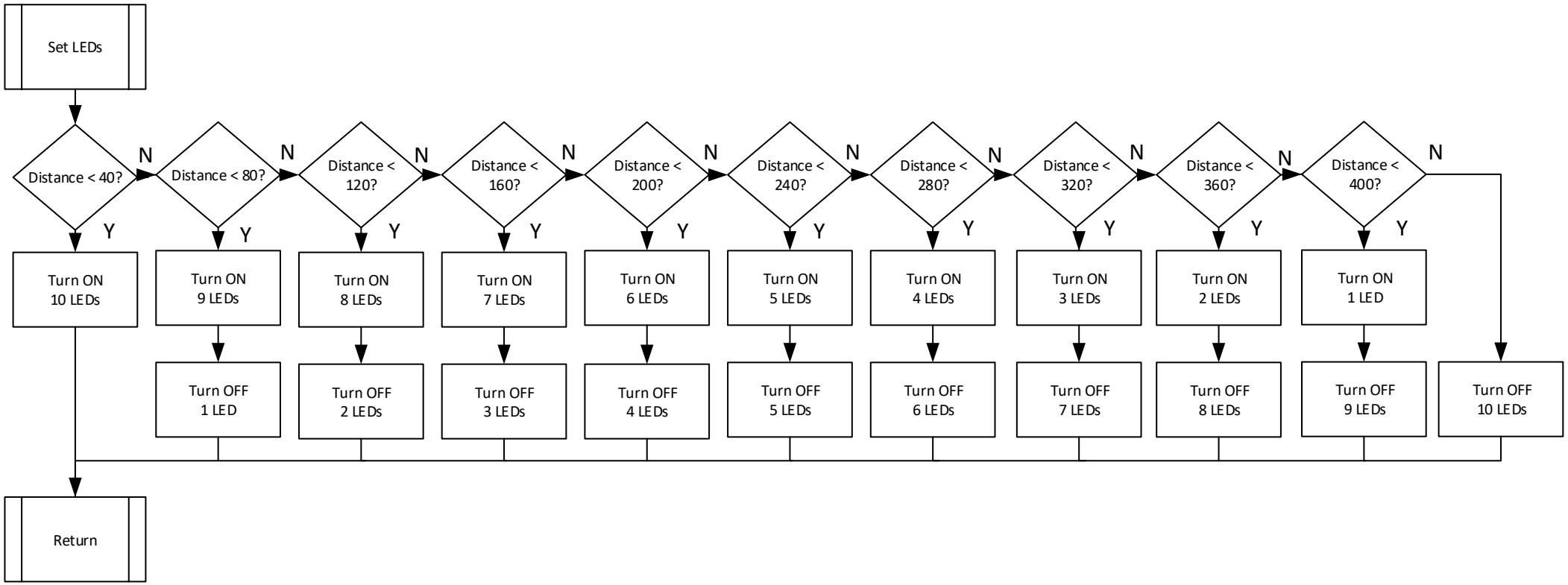
See these Provided Documents:

- 'CombinedSwitch.ino' example arduino code
- Arduino Programming Notes
- 'Set LEDs with Switch()' Flowchart

Extra Tasks:

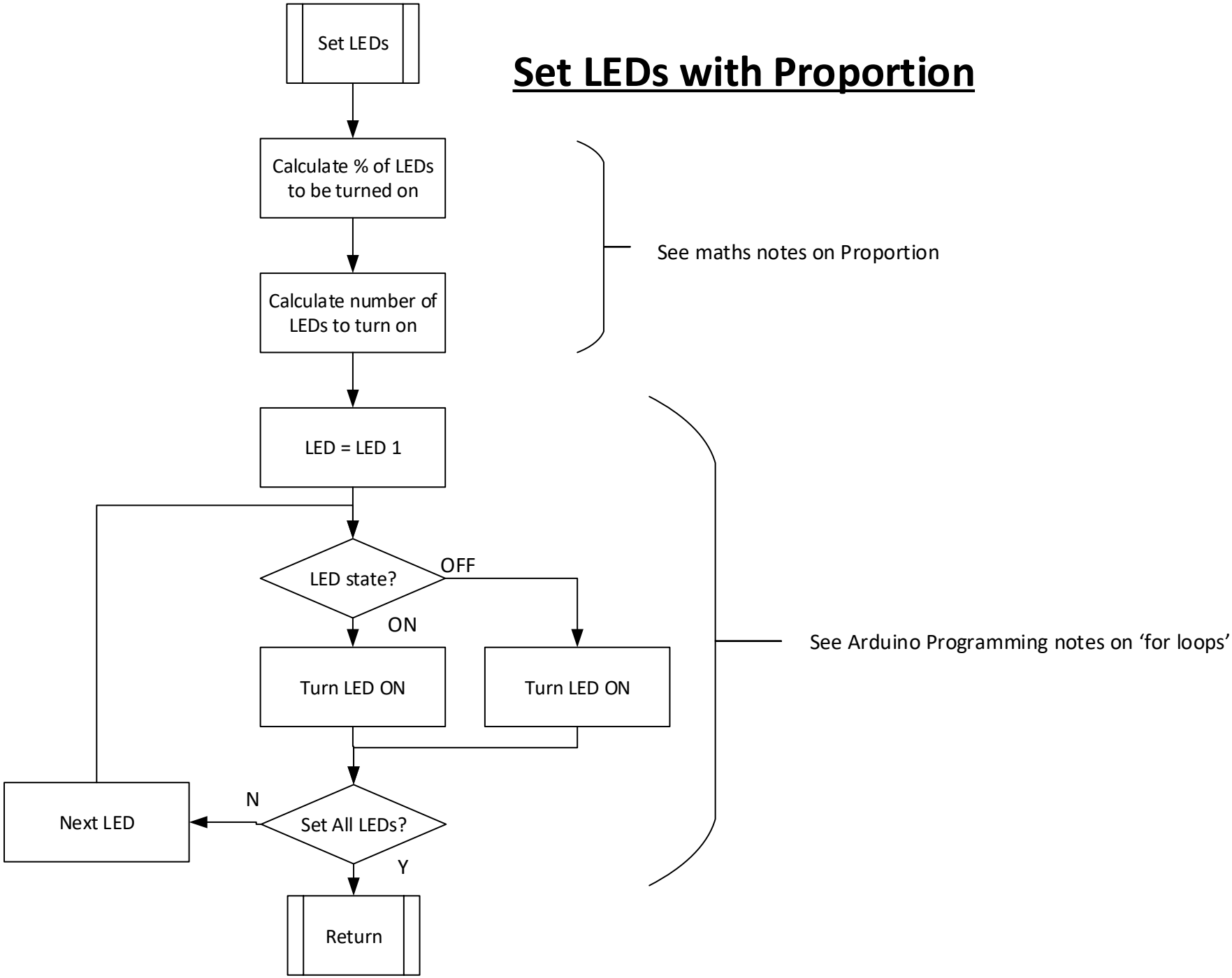
- Implement an Averaging algorithm (see 'averaging' in maths notes)
- Complete alternative Set LEDs sub program (see 'Set LEDs with proportion' flow chart) for unlimited LEDs
- Progressively change the colours of the LEDs as the illuminate
- Use your imagination!

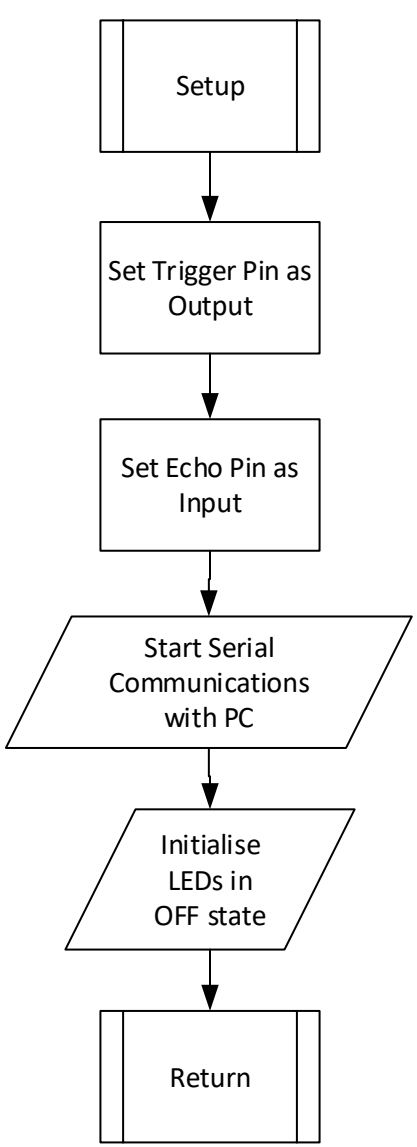
Set LEDs with ‘Switch()’ Statement

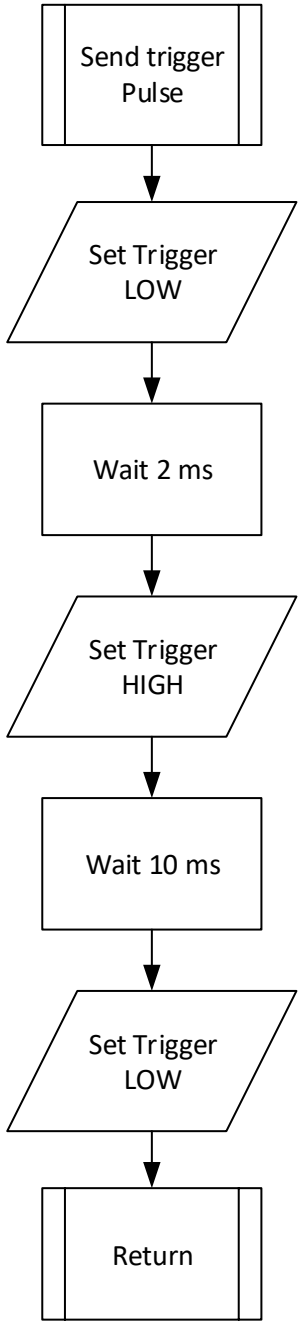


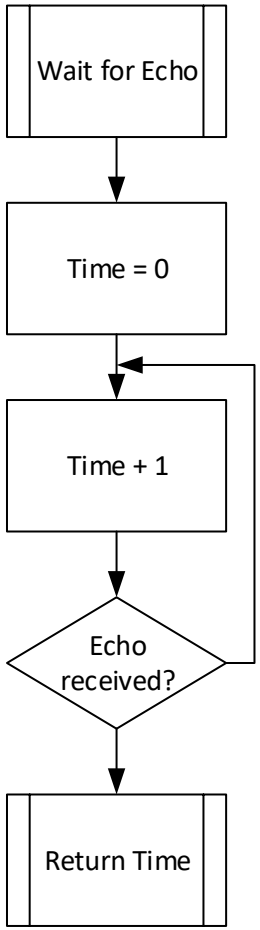
See arduino programming notes on ‘Switch statements’

Set LEDs with Proportion




Setup
Set Trigger Pin as Output
Set Echo Pin as Input
Start Serial Communications with PC
Initialise LEDs in OFF state
Return


Send trigger Pulse
Set Trigger LOW
Wait 2 ms
Set Trigger HIGH
Wait 10 ms
Set Trigger LOW
Return


Wait for Echo
Time = 0
Time + 1
Echo received?
Return Time