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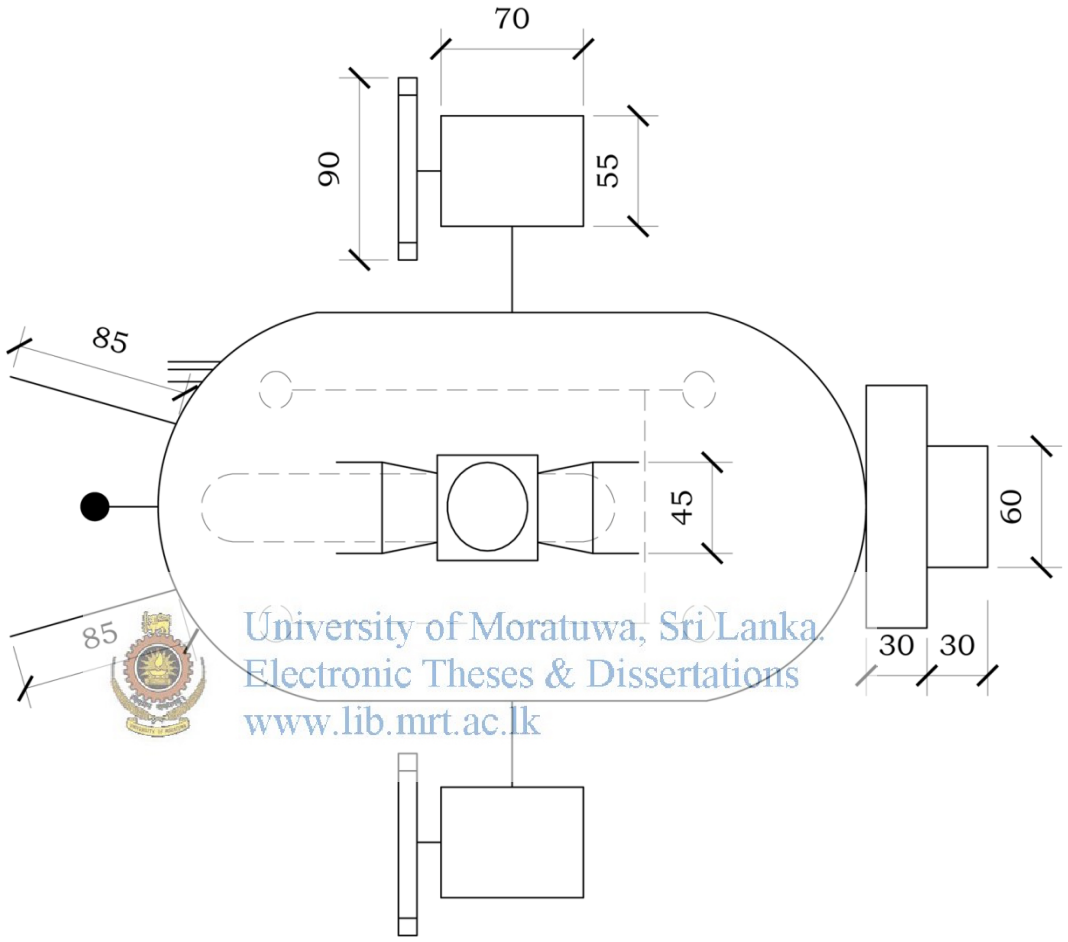
# Top View

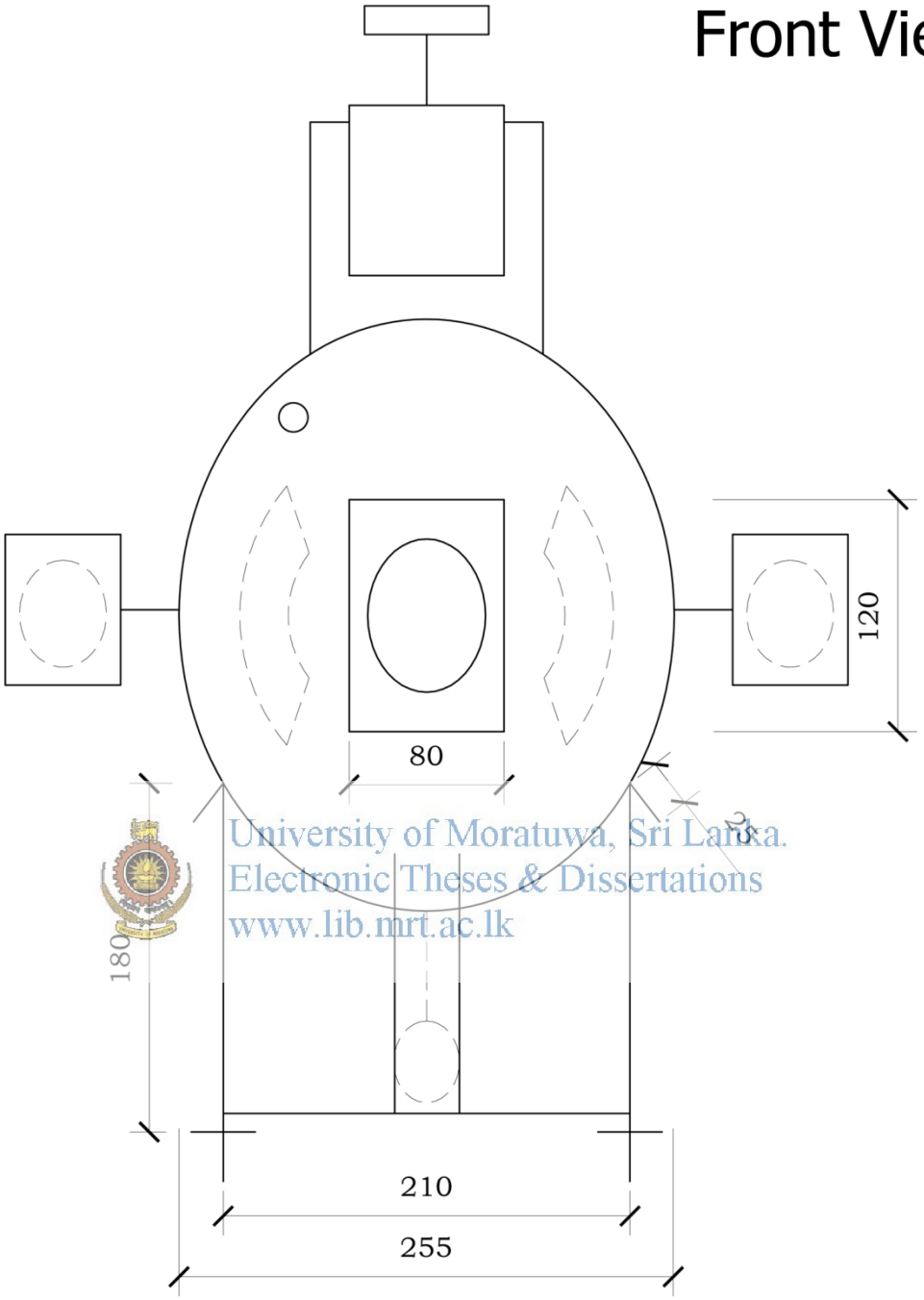





# DRAWING -01

SCALE - 1:10

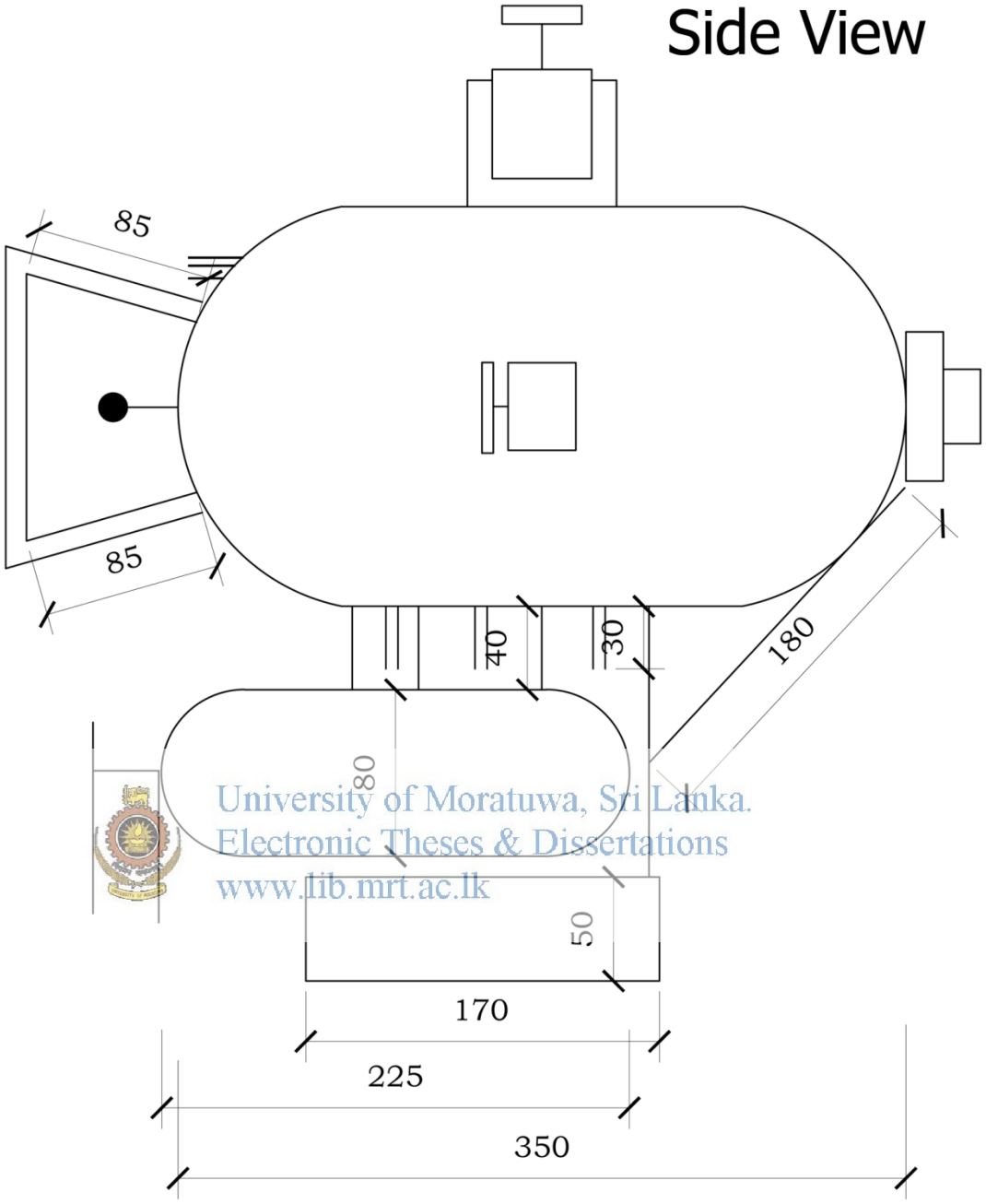
Front View






# DRAWING -02

SCALE - 1:10






# DRAWING -03

SCALE - 1:10

## Mbed Codes used

### 1. Main program

```
#include "mbed.h"
#include "MS5803.h"
#include "string"
#include <stdio.h>

# define DENSITY 1000
# define GRAVITY 9.8

PwmOut pwm_M1_clk(p21);      // clockwise rotation pwm pin for M1
PwmOut pwm_M1_anticlk(p22);  // anti - clockwise rotation pwm pin for M1
PwmOut pwm_M2_clk(p23);     // clockwise rotation pwm pin for M2
PwmOut pwm_M2_anticlk(p24);      // anti-clockwise rotation pwm pin for M2
PwmOut pwm_M3M4_clk(p25);
PwmOut pwm_M3M4_anticlk(p26);
DigitalIn safety_1(p13);
DigitalIn safety_2(p16);
AnalogIn sol(p15);
DigitalOut M3_clk(p5);
DigitalOut M4_clk(p6);
DigitalIn abc1(p7);
DigitalIn abc2(p8);
DigitalOut M3_anticlk(p29);
DigitalOut M4_anticlk(p30);
AnalogIn position1(p17);
AnalogIn position2(p18);
DigitalIn position3(p19);
DigitalIn position4(p20);
DigitalIn auto_pilot(p11);
DigitalOut sol1(p12);
DigitalOut sol2(p13);
DigitalOut sol3(p14);
I2C i2c_gyro(p9, p10);
I2C i2c_pres(p28, p27);

const int addr = 0xD0; //gyro

//customs variables
```

```
int MANUAL_OPS = true; //true means operate manually, false mean auto pilot
float my_pressure=0;
float my_depth=0;
float my_angle=0;
float depth = 0;
int depth_val = 0;
float test1 = 0;
float test2 = 0;

Serial pc(USBTX, USBRX);
MS5803 press_sensor(p28,p27,ms5803_base_addr); // sda, scl, I2C_address 0x76 or
0x77 look at MS5803.h

float read_gyro(void);
float read_pressure(void);
float read_depth(float pressure);
string find_gyro_sign(float my_gyro);
int main()
{
   pwm_M1_clk.period_us(10);
   pwm_M1_anticlk.period_us(10);
   pwm_M2_clk.period_us(10);
   pwm_M2_anticlk.period_us(10);
   pwm_M3M4_clk.period_us(100);
   pwm_M3M4_anticlk.period_us(100);

   pwm_M1_clk = 0.0;
   pwm_M1_anticlk = 0.0;
   pwm_M2_clk = 0.0;
   pwm_M2_anticlk = 0.0;
   pwm_M3M4_clk = 0.0;
   pwm_M3M4_anticlk = 0.0;



   while (1) {
      //test pressure sensor
      my_pressure = read_pressure();
      //pc.printf("%4.1f \r\n", my_pressure);
      my_depth = read_depth(my_pressure);
      //pc.printf("%4.1f \r\n", my_depth);
```

```
//pc.printf("%4.1f \r\n", my_pressure);
if(auto_pilot == 0) {


   if(position1.read()>0.9) {
      pwm_M1_anticlk= 0.2;


   } else {
      pwm_M1_anticlk= 0.0;

   }

   if(position1.read()==0.0) {
      pwm_M1_clk= 0.2;


   } else {
      pwm_M1_clk= 0.0;

   }

if(position2.read()>0.9) {
   pwm_M2_clk= 0.9;
} else {
   pwm_M2_clk= 0.0;

   }

   if(position2.read()==0.0) {
      pwm_M2_anticlk= 0.9;

   } else {
      pwm_M2_anticlk= 0.0;
   }

   if(abc1==1) {
      // M4  and M3 clk
      pwm_M3M4_clk = 0.9;
      M3_anticlk = 0;
      M4_clk = 1;
```

```
    M4_anticlk = 0;
    M3_clk = 1;

}

if(abc2==1) {
    // M4  and M3 anticlk
    pwm_M3M4_anticlk = 0.9;
    M3_anticlk = 1;
    M4_clk = 0;
    M4_anticlk = 1;
    M3_clk = 0;
}

if(sol.read()==0.0) {
    sol3=0;
} else if (sol.read()>0.9) {
    sol3=1;
}

if(position3==1) {
    // M4 clk and M3 anticlk
    pwm_M3M4_clk = 0.9;
    pwm_M3M4_anticlk = 0.9;
    M3_anticlk = 1;
    M4_clk = 1;
    M4_anticlk = 0;
    M3_clk = 0;
}


if(position4==1) {
    // M4 clk and M3 anticlk
    pwm_M3M4_clk = 0.9;
    pwm_M3M4_anticlk = 0.9;
    M3_anticlk = 0;
    M4_clk = 0;
    M4_anticlk = 1;
    M3_clk = 1;

}
```

```
            if((abc1== 0)&&(abc2 ==0)&&(position3==0)&&(position4==0)) {
               pwm_M3M4_clk = 0.0;
               pwm_M3M4_anticlk = 0.0;
               M3_anticlk = 0;
               M4_clk = 0;
               M4_anticlk = 0;
               M3_clk = 0;
            }



         } // end if manual
         if(auto_pilot == 1) {

            /*printf ("Enter Depth Value: ");
            scanf ("%d",&depth_val);*/
            pwm_M2_anticlk= 0.9;
            if(my_depth >= 10) {
               pwm_M2_anticlk= 0.0;
               float my_gyro = read_gyro();
               string gyro_sign = find_gyro_sign(my_gyro);
               if(gyro_sign == "plus") {

               }
               if(gyro_sign == "minus") {

               }
               if (gyro_sign == "zero") {

               }
            }
         }// end if auto pilot
      } // end while
   }// end main



   float read_pressure()
   {
      //pressure sensor
```

```
    //wait( 3 );
    //pc.printf("MS5803 demo");
#ifdef debug
#endif
    press_sensor.Barometer_MS5803();
    // pc.printf("%4.1f (mBar)\r\n", press_sensor.MS5803_Pressure());
    //pc.printf("%4.1f (deg C)\r\n", press_sensor.MS5803_Temperature());
    //wait( 1 );
    return press_sensor.MS5803_Pressure();
}

float read_depth(float pressure)
{

    pressure = pressure/100;
    depth = pressure/(DENSITY*GRAVITY);
    //pc.printf("%f (depth m)\r\n", depth);
    //depth = depth *1000000;
    pc.printf("%d (depth m)\r\n", depth);
    //depth = depth + 1;
    return depth;
}

float read_gyro()
{
    char cmd[2];
    cmd[0] = 0x8c;

    cmd[1] = 0x00;
    i2c_gyro.write(addr, cmd, 2);
    wait(0.5);
    cmd[0] = 0x8c;

    i2c_gyro.write(addr, cmd, 1);
    i2c_gyro.read(addr, cmd, 2);

    float gyro_value = (float((cmd[0]<<8)|cmd[1]) / 256.0);
    //printf("tilt = %.2f\n", gyro_value);
    return gyro_value;
}
```

```
string find_gyro_sign(float my_gyro)
{
   string gyro_sign;
   int  integral, binaryInt = 0, i = 1;
   float  binaryFract = 0, k =0.1f, fractional, temp1, binaryTtotal;

   //Separating the integral value from the floating point variable
   integral = (int)my_gyro;

   //Separating the fractional value from the variable
   fractional = my_gyro - (int)my_gyro;

   while(integral>0) {
      binaryInt = binaryInt + integral % 2 * i;
      i = i * 10;
      integral = integral / 2;
   }
//Loop for converting Fractional value to binary
   while(k>0.00000001) {
      temp1 = fractional *2;
      binaryFract = binaryFract+((int)temp1)*k;
      fractional = temp1 - (int)temp1;
      k = k / 10;
   }

   //Combining both the integral and fractional binary value.
   binaryTotal = binaryInt +binaryFract;
   printf(" \nbinary equivalent = %f\n\n\n\n\n", binaryTotal);
   gyro_sign = "plus";
   return gyro_sign;
}
```



## 2. Header program

```
/*
```

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```
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   THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR
   IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY,
   FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE
   AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER
   LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM,
   OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN
   THE SOFTWARE.

 * Barometer Sensor (Altimeter) MS5803-01BA of MEAS Switzerland (www.meas-spec.com).
 * The driver uses I2C mode (sensor PS pin low).
 * Other types of MEAS are compatible but not tested.
 * Written by Raig Kaufer distribute freely!
 */
#include "mbed.h"


#ifndef MS5803_H
#define MS5803_H

#define MS5803_RX_DEPTH 3
#define MS5803_TX_DEPTH 2


#define ms5803_addrCL 0x77 //0b1110111  CSB Pin is low
#define ms5803_addrCH 0x76 //0b1110110  CSB Pin is high

#define ms5803_base_addr ms5803_addrCH // choose your connection here

#define ms5803_reset       0x1E // Sensor Reset
```
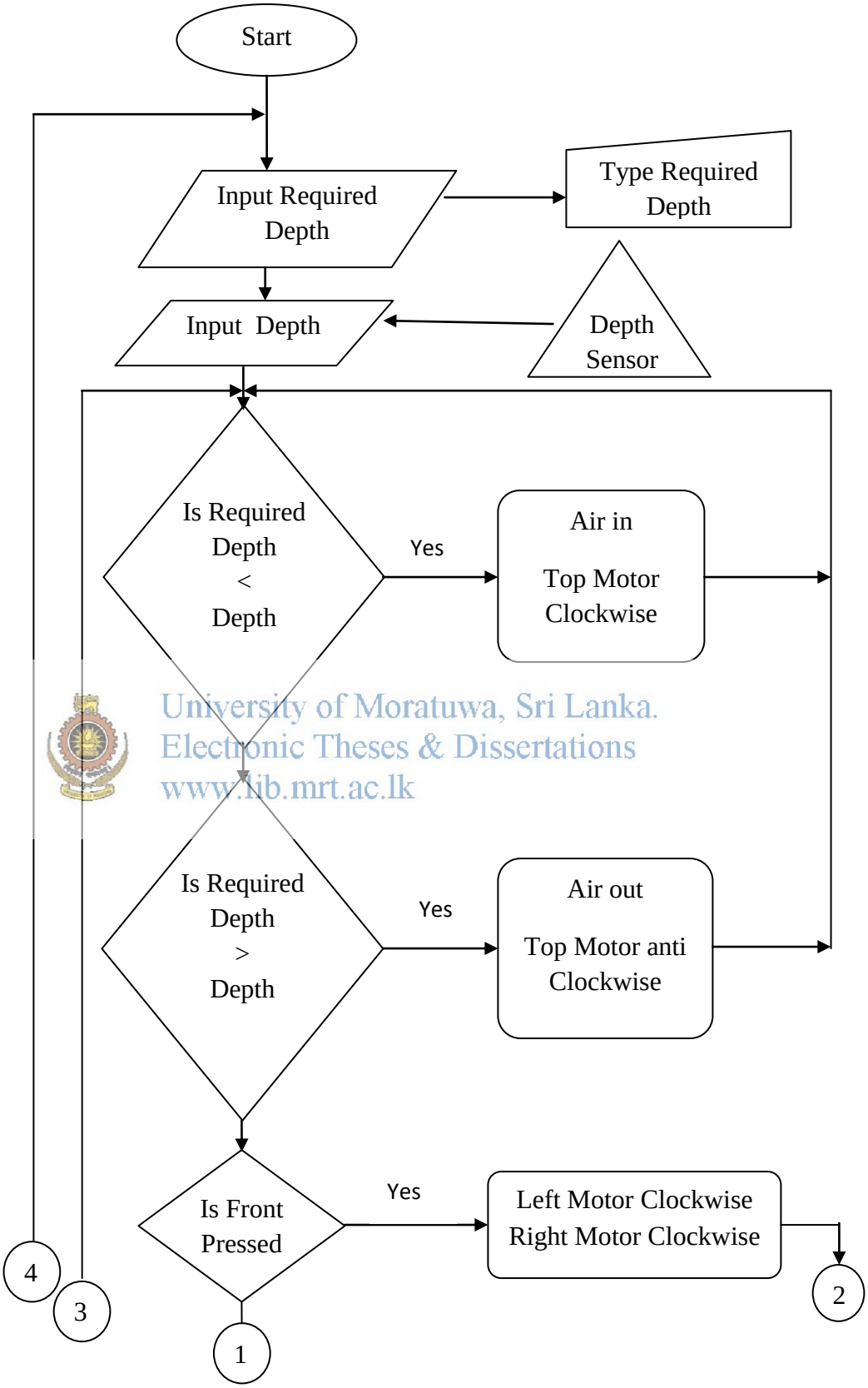

```
#define ms5803_convD1_256  0x40 // Convert D1 OSR 256
#define ms5803_convD1_512  0x42 // Convert D1 OSR  512
#define ms5803_convD1_1024 0x44 // Convert D1 OSR 1024
#define ms5803_convD1_2048 0x46 // Convert D1 OSR 2048
#define ms5803_convD1_4096 0x48 // Convert D1 OSR 2048

#define ms5803_convD1 ms5803_convD1_4096 // choose your sampling rate
here

#define ms5803_convD2_256  0x50 // Convert D2 OSR  256
#define ms5803_convD2_512  0x52 // Convert D2 OSR  512
#define ms5803_convD2_1024 0x54 // Convert D2 OSR 1024
#define ms5803_convD2_2048 0x56 // Convert D2 OSR 2048
#define ms5803_convD2_4096 0x58 // Convert D2 OSR 2048

#define ms5803_convD2 ms5803_convD2_4096 // choose your sampling rate
here

#define ms5803_ADCread     0x00 // read ADC command
#define ms5803_PROMread    0xA0 // read PROM command base address
```



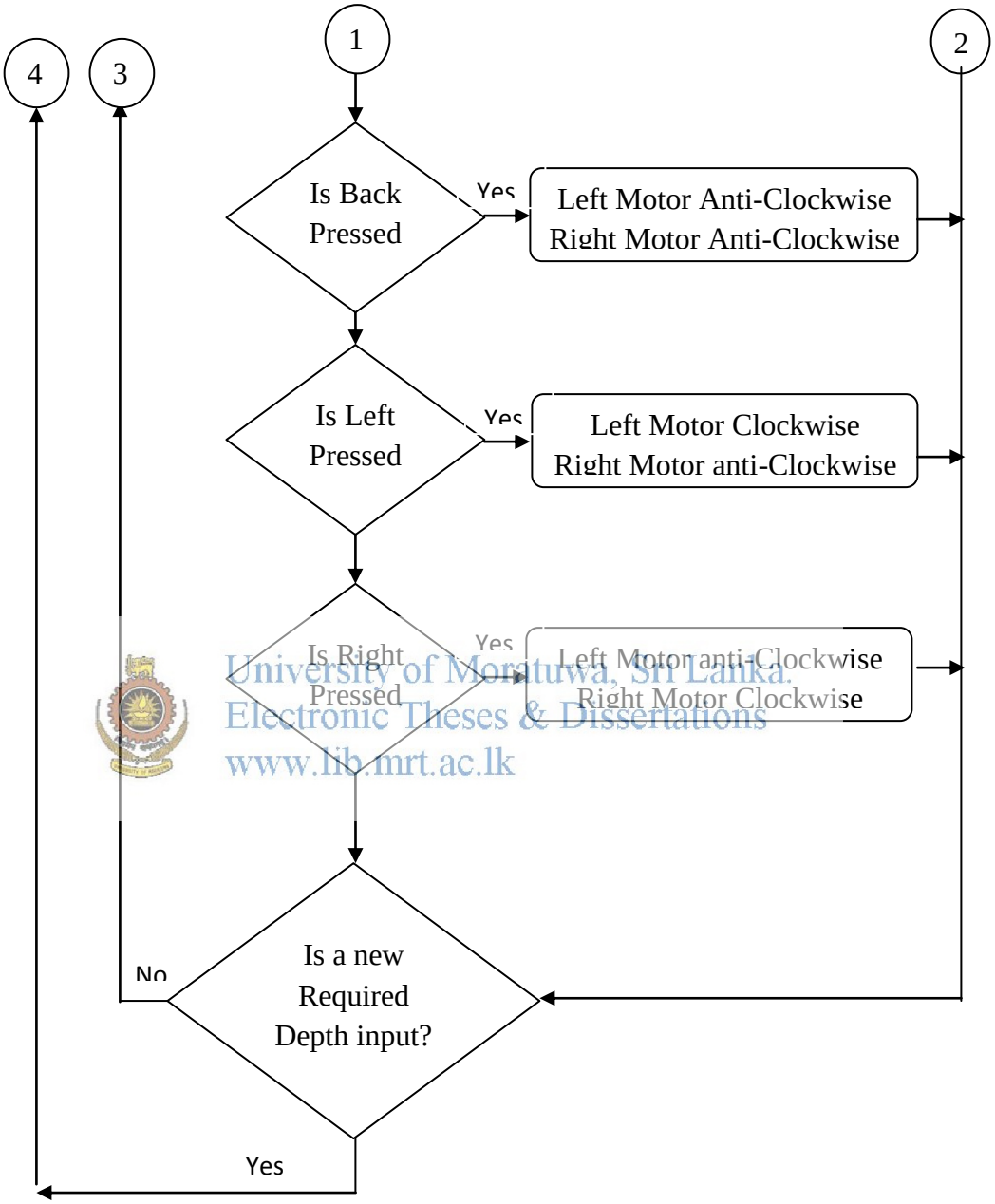
```
class MS5803 {
private:
   int D1, D2, Temp, C[8];
   float T_MS5803, P_MS5803;
   /* Data buffers */
   char ms5803_rx_data[MS5803_RX_DEPTH];
   char ms5803_tx_data[MS5803_TX_DEPTH];

public:
   MS5803 (PinName sda, PinName scl,
         char ms5803_addr = ms5803_base_addr  )
         : i2c( sda, scl ), device_address( ms5803_addr << 1 ) {
   }
   void MS5803Reset(void);
```

```
    void MS5803ReadProm(void);
    void MS5803ConvertD1(void);
    void MS5803ConvertD2(void);
    int32_t MS5803ReadADC(void);
    float MS5803_Pressure (void);
    float MS5803_Temperature (void);
    void Barometer_MS5803(void);


private:
    I2C     i2c;
    char    device_address;

};
#endif
```

# FLOW CHART



# FLOW CHART



# FLOW CHART