**Report—Coding—Task1&2**

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**Arduino libraries:**

A library is a set of code that was previously written, that can be called upon when building our own code. In Arduino, libraries make it easy for us to connect to a sensor, display, module, etc. For example, the built-in LiquidCrystal library makes it easy to talk to character LCD displays.

Libraries are often distributed as a ZIP file or folder. The name of the folder is the name of the library. Inside the folder will be a .cpp file, a .h file and often a keywords.txt file, examples folder, and other files required by the library.

To use a library in out code:

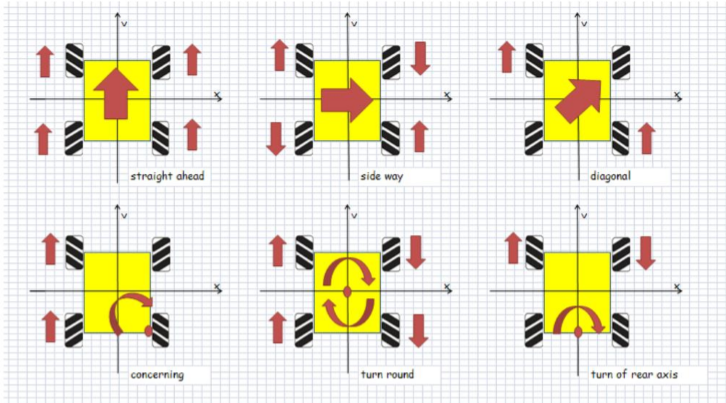
* In the Arduino IDE, navigate to Sketch > Include Library > Add .ZIP Library. At the top of the drop down list, select the option to "Add .ZIP Library''. Return to the Sketch > Include Library menu. menu. We should now see the library at the bottom of the drop-down menu. It is ready to be used in our sketch. The zip file will have been expanded in the libraries folder in our Arduino sketches directory.
* To add a library manually: Extract the ZIP file with all its folder structure in a temporary folder, then select the main folder, that should have the library name. Copy it in the “libraries” folder inside your sketchbook. Start the Arduino Software (IDE), go to Sketch > Include Library. Verify that the library you just added is available in the list.

We can also make our own library in Arduino:

To add our own library, we create a new directory in the libraries directory with the name of our library. The folder should contain a C or C++ file with our code and a header file with our function and variable declarations. It will then appear in the Sketch. Import Library menu in the Arduino IDE.

**Mecanum based four wheel drive:**

Mecanum tyres are basically tyres that have rollers attached to its circumference. These rollers are attached in specific orientation ie 45 deg.. So when the force are applied on them that is at 45 deg, the forces gets resolved and if we drive front tyres forward and rear wheels backwards in a bot having mecanum tyres the vertical components of the forces gets nullified and the bot will move in direction perpendicular to the orientation of bot.



**Header file**

/\*Mecanum4WD- Library for controlling a four

wheel drive with mecanum wheels

\*/

#ifndef Mecanum4WD\_h

#define Mecanum4WD\_h

#include "Arduino.h"

class Mecanum4WD

{

public:

Mecanum4WD(int RF1,int RF2,int pwm1,int LF1,int LF2,int pwm2,int RB1,int RB2,int pwm3,int LB1,int LB2,int pwm4,int time);

void Forward();

void Backward();

void Left();

void Right();

void Stop();

private:

int \_RF1;

int \_RF2;

int \_pwm1;

int \_LF1;

int \_LF2;

int \_pwm2;

int \_RB1;

int \_RB2;

int \_pwm3;

int \_LB1;

int \_LB2;

int \_pwm4;

int \_time;

int \_time1;

};

#endif

**C++ file:**

#include "Arduino.h"

#include "Mecanum4WD.h"

Mecanum4WD::Mecanum4WD(int RF1, int RF2,int pwm1, int LF1,

int LF2, int pwm2, int RB1, int RB2, int pwm3, int LB1,

int LB2,int pwm4, int time)

{

pinMode(RF1,OUTPUT);

pinMode(RF2,OUTPUT);

pinMode(pwm1,OUTPUT);

pinMode(LF1,OUTPUT);

pinMode(LF2,OUTPUT);

pinMode(pwm2,OUTPUT);

pinMode(RB1,OUTPUT);

pinMode(RB2,OUTPUT);

pinMode(pwm3,OUTPUT);

pinMode(LB1,OUTPUT);

pinMode(LB2,OUTPUT);

pinMode(pwm4,OUTPUT);

\_RF1=RF1;

\_RF2=RF2;

\_pwm1=pwm1;

\_LF1=LF1;

\_LF2=LF2;

\_pwm2=pwm2;

\_RB1=RB1;

\_RB2=RB2;

\_pwm3=pwm3;

\_LB1=LB1;

\_LB2=LB2;

\_pwm4=pwm4;

\_time=time;

\_time1=1;

}

void Mecanum4WD::Forward(){

for(int \_time1=\_time/100;\_time1>0;\_time1=\_time1-1){

digitalWrite(\_RF1,HIGH);

digitalWrite(\_RF2,LOW);

analogWrite(\_pwm1,255/\_time1);

digitalWrite(\_LF1,HIGH);

digitalWrite(\_LF2,LOW);

analogWrite(\_pwm2,255/\_time1);

digitalWrite(\_RB1,HIGH);

digitalWrite(\_RB2,LOW);

analogWrite(\_pwm3,255/\_time1);

digitalWrite(\_LB1,HIGH);

digitalWrite(\_LB2,LOW);

analogWrite(\_pwm4,255/\_time1);

delay(100);

}

digitalWrite(\_RF1,HIGH);

digitalWrite(\_RF2,LOW);

analogWrite(\_pwm1,(int)255);

digitalWrite(\_LF1,HIGH);

digitalWrite(\_LF2,LOW);

analogWrite(\_pwm2,(int)255);

digitalWrite(\_RB1,HIGH);

digitalWrite(\_RB2,LOW);

analogWrite(\_pwm3,255);

digitalWrite(\_LB1,HIGH);

digitalWrite(\_LB2,LOW);

analogWrite(\_pwm4,(int)255);

}

void Mecanum4WD::Backward(){

for(int \_time1=\_time/100;\_time1>0;\_time1=\_time1-1){

digitalWrite(\_RF1,LOW);

digitalWrite(\_RF2,HIGH);

analogWrite(\_pwm1,(int)255/time1);

digitalWrite(\_LF1,LOW);

digitalWrite(\_LF2,HIGH);

analogWrite(\_pwm2,(int)255/time1);

digitalWrite(\_RB1,LOW);

digitalWrite(\_RB2,HIGH);

analogWrite(\_pwm3,(int)255/time1);

digitalWrite(\_LB1,LOW);

digitalWrite(\_LB2,HIGH);

analogWrite(\_pwm4,(int)255/time1);

delay(100);

}

digitalWrite(\_RF1,LOW);

digitalWrite(\_RF2,HIGH);

analogWrite(\_pwm1,(int)255);

digitalWrite(\_LF1,LOW);

digitalWrite(\_LF2,HIGH);

analogWrite(\_pwm2,(int)255);

digitalWrite(\_RB1,LOW);

digitalWrite(\_RB2,HIGH);

analogWrite(\_pwm3,(int)255);

digitalWrite(\_LB1,LOW);

digitalWrite(\_LB2,HIGH);

analogWrite(\_pwm4,(int)255);

}

void Mecanum4WD::Right(){

for(int \_time1=\_time/100;\_time1>0;\_time1=\_time1-1){

digitalWrite(\_RF1,LOW);

digitalWrite(\_RF2,HIGH);

analogWrite(\_pwm1,(int)255/time1);

digitalWrite(\_LF2,LOW);

analogWrite(\_pwm2,(int)255/time1);

digitalWrite(\_RB1,HIGH);

digitalWrite(\_RB2,LOW);

analogWrite(\_pwm3,(int)255/time1);

digitalWrite(\_LB1,LOW);

digitalWrite(\_LB2,HIGH);

analogWrite(\_pwm4,(int)255/time1);

delay(100);

}

digitalWrite(\_RF1,LOW);

digitalWrite(\_RF2,HIGH);

analogWrite(\_pwm1,HIGH);

digitalWrite(\_LF2,LOW);

analogWrite(\_pwm2,(int)255);

digitalWrite(\_RB1,HIGH);

digitalWrite(\_RB2,LOW);

analogWrite(\_pwm3,(int)255);

digitalWrite(\_LB1,LOW);

digitalWrite(\_LB2,HIGH);

analogWrite(\_pwm4,(int)255);

}

void Mecanum4WD::Left(){

for(int \_time1=\_time/100;\_time1>0;\_time1=\_time1-1){

digitalWrite(\_RF1,HIGH);

digitalWrite(\_RF2,LOW);

analogWrite(\_pwm1,(int)255/time1);

digitalWrite(\_LF2,HIGH);

analogWrite(\_pwm2,(int)255/time1);

digitalWrite(\_RB1,LOW);

digitalWrite(\_RB2,HIGH);

analogWrite(\_pwm3,(int)255/time1);

digitalWrite(\_LB1,HIGH);

digitalWrite(\_LB2,LOW);

analogWrite(\_pwm4,(int)255/time1);

delay(100);

}

digitalWrite(\_RF1,HIGH);

digitalWrite(\_RF2,LOW);

analogWrite(\_pwm1,(int)255);

digitalWrite(\_LF2,HIGH);

analogWrite(\_pwm2,(int)255);

digitalWrite(\_RB1,LOW);

digitalWrite(\_RB2,HIGH);

analogWrite(\_pwm3,(int)255);

digitalWrite(\_LB1,HIGH);

digitalWrite(\_LB2,LOW);

analogWrite(\_pwm4,(int)255);

}

void Mecanum4WD::Stop(){

digitalWrite(\_RF1,LOW);

digitalWrite(\_RF2,LOW);

analogWrite(\_pwm1,0);

digitalWrite(\_LF1,LOW);

digitalWrite(\_LF2,LOW);

analogWrite(\_pwm2,0);

digitalWrite(\_RB1,LOW);

digitalWrite(\_RB2,LOW);

analogWrite(\_pwm3,0);

digitalWrite(\_LB1,LOW);

digitalWrite(\_LB2,LOW);

analogWrite(\_pwm4,0);

}