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 [subregulation 5(2) and 5(3)]



CR - 1

Applicant: Perbadanan Harta Intelek M



LY2019000666

04/02/2018

Applicant :

Owner Author Licensee
 Title of work : The source code of Recycle BOT - Learning and Teaching Aid
 (Original language) : for Learning disable Children
 Translation :
 Transliteration :
 Name of the Language : ENGLISH
 (Language that been used in the work)
 If published in a periodical or serial :
 (Literary Work) (Volume / Number) (Issue Date) (On Pages)

Section A : Category of Works

Literary Musical Artistic Film Sound Recording

Date of Fixation / First Published / Erected / Incorporated : / /

Section B : Publication

The Work is : Published Unpublished
 If published : / / / /
 (Year of Compilation) (Date of first publication) (Country)

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Section E : Licensee (Section D must be fill in)

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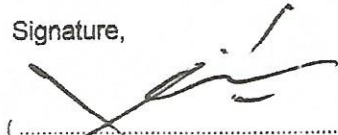
Name : NOREEN IZZA BTE ARSHAD
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State : PERAK Country : MALAYSIA
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Section G : Declaration

I hereby granted my works to be viewed by public for research and educational purpose : Yes No

- Author of the work
- Owner of the copyright in the work
- Licensee of copyright the work (Please provide adequate related document(s))

Signature,



(.....)
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Date (dd/mm/yy) : 4/3/2019

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THE COPYRIGHT ACT 1987
THE COPYRIGHT REGULATIONS 1990

IN THE MATTER OF Section 42 (1) of
the Copyright Act 1987.

STATUTORY DECLARATION

I, **Noreen Izza Arshad (790426145776)** of Universiti Teknologi PETRONAS of Bandar Seri Iskandar, 32610 Tronoh, Perak Darul Ridzuan, Malaysia , a Malaysian citizen of full age do hereby solemnly and sincerely declare as follows:-

1. I am the Lecturer of Computer & Information Sciences Department of Universiti Teknologi PETRONAS of Bandar Seri Iskandar, 32610 Tronoh, Perak Darul Ridzuan, Malaysia (hereinafter referred to as "UTP").
2. The facts deposed to herein are to the best of my knowledge and belief true and are within my personal knowledge and from the records of UTP to which I have access.
3. I am authorized to make this statutory declaration for and on behalf of UTP.

On or about November 2018, (Noreen Izza Arshad (790426145776) and Hazmizan bin Abd Kadir (960925106527) of UTP (hereinafter referred to as "Authors"), have built and developed a Lego Mindstorms EV3 with the assimilation of Arduino Robot and program for developing a robot for kids who were diagnosed with Learning Disabilities to learn about how to Recycle which correlates with Year 4 syllabus of the KBSM learning Modules in Malaysia's school for students with 'special needs'. This built of robot and the program is known as RecycleBOT: Learning and Teaching Aid for Learning Disabled Children about how to Recycle. RecycleBOT is a Lego Mindstorms EV3 Robot that is designed for learning disabled children and teachers who teach learning disabled children. With the aid of the Lego Mindstorms EV3 Robot, learning disabled children can learn the different colors and types of the recycling bin, the types of recyclable materials and how to differentiate the

materials. RecycleBOT is the first robotic Lego invention (Mechanoid robot) that have been built and assembled using the elements of Lego Mindstorms EV3, Arduino UNO Board and its components, and program by using the EV3 programming software alongside the Arduino IDE Software to control the behavior of the robot. RecycleBOT can attract the attention of learning disabled children in learning how to recycle as well as assisting the teacher in teaching. With the fast moving technology of robotics, it is best to give exposure about robotics to them as it is one of the learning tools that has been successfully use among normal kids. The program of RecycleBOT includes information about each color of the recycling bin, types of material to be put in a specific recycling bin, instruction on which bin to put the recyclable materials as well as the correct pronunciation of the types of recycling bin. All of the program were created using EV3 programming software and installed it in the programmable brick (EV3 Brick/Brain) as shown in Figure 1.

Referring to the RecycleBOT: Learning and Teaching Aid for Learning Disabled Children on how to Recycle, the items that we would like to protect are:

1. The source code of RecycleBOT: Learning and Teaching Aid for Learning disabled Children (as attached in Appendix 1).

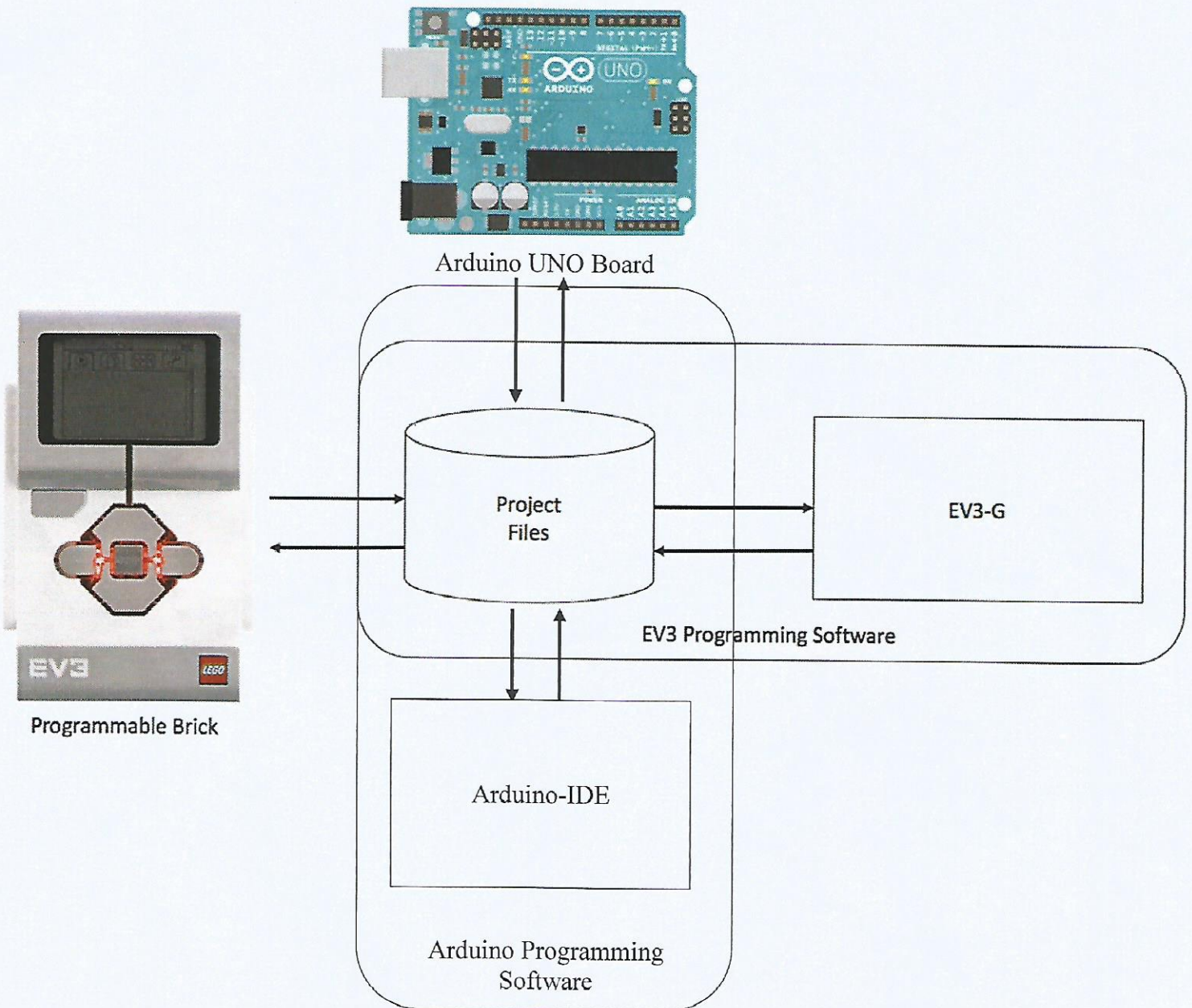


Figure 1: Bird Eye View of System Architecture

4. On November 2018, the development of the EV3 Robot and source codes were completed.

Now produced and marked as Exhibit, RecycleBOT are the source codes and screen shots from RecycleBOT project files are shown in Figure 2 and Thread 1.

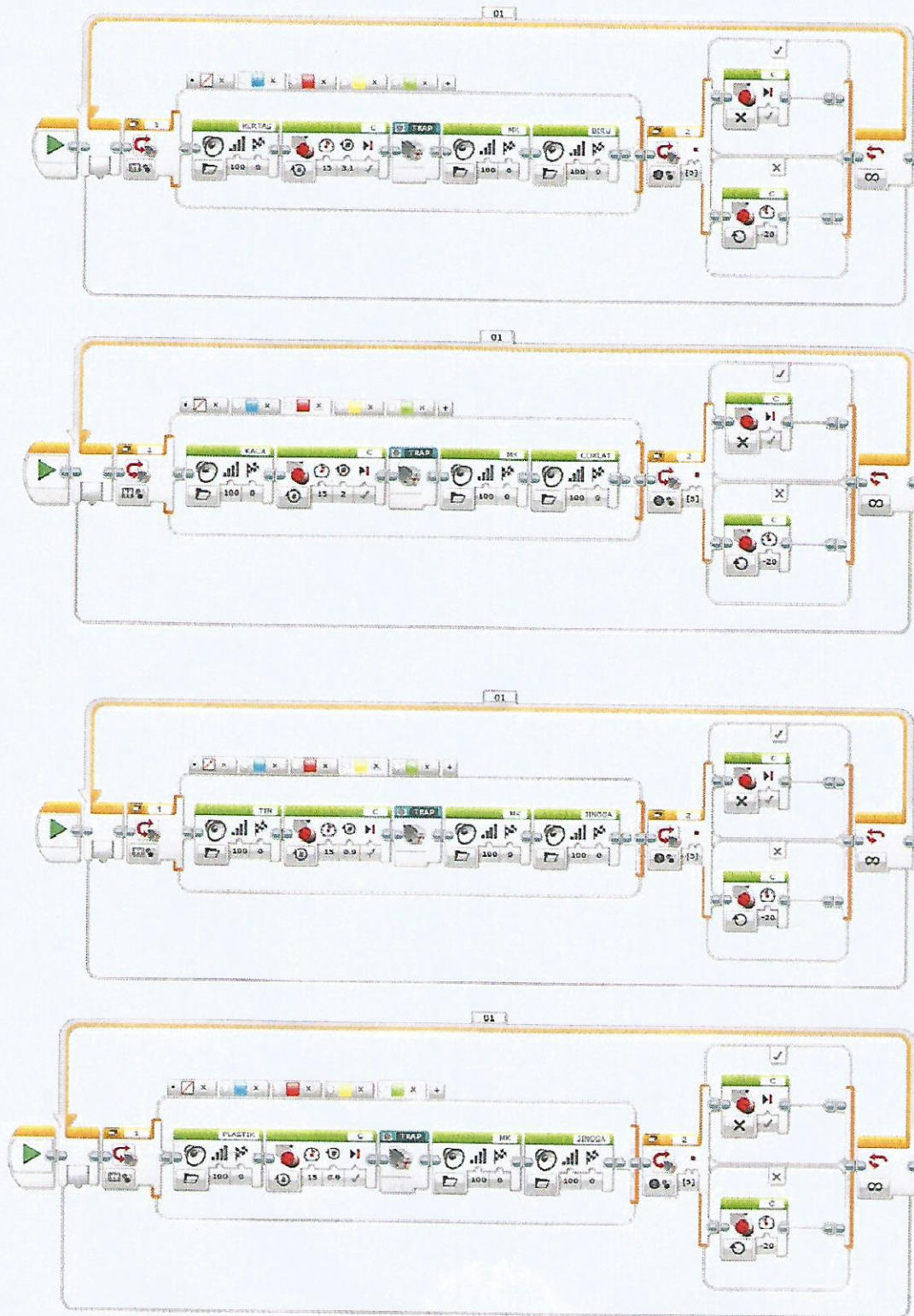


Figure 2: Snapshots of Colour Detect Project File

```

* www.learningbuz.com */
/Impport following Libraries/
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
//I2C pins declaration
LiquidCrystal_I2C lcd(0x27, 2, 1, 0, 4, 5, 6, 7, 3, POSITIVE);

// defines pins numbers
const int trigPin1 = 5;
const int echoPin1 = 6;
const int trigPin2 = 7;
const int echoPin2 = 8;
const int trigPin3 = 9;
const int echoPin3 = 10;
const int yellowPin = 2;
const int bluePin = 3;
const int redPin = 4;

long dur1;
long dur2;
long dur3;
int dist1;
int dist2;
int dist3;

void setup()
{

lcd.begin(16,2);//Defining 16 columns and 2 rows of lcd display
lcd.backlight();//To Power ON the back light
//lcd.backlight();// To Power OFF the back light

pinMode(yellowPin, OUTPUT); // sets the digital pin as output
pinMode(bluePin, OUTPUT); // sets the digital pin as output
pinMode(redPin, OUTPUT);

pinMode(trigPin1, OUTPUT); // Sets the trigPin as an Output
pinMode(trigPin2, OUTPUT); // Sets the trigPin as an Output
pinMode(trigPin3, OUTPUT); // Sets the trigPin as an Output

pinMode(echoPin1, INPUT); // Sets the echoPin as an Input
pinMode(echoPin2, INPUT); // Sets the echoPin as an Input
pinMode(echoPin3, INPUT); // Sets the echoPin as an Input

Serial.begin(9600); // Starts the serial communication

}

void loop()
{

```



```

// Setup Screen
lcd.clear();
lcd.setCursor(0,0); //Defining position to write from first row,first column .
lcd.print(" RECYCLE BOT :3"); //You can write 16 Characters per line .

// Clears the trigPin
digitalWrite(trigPin1, LOW);
digitalWrite(trigPin2, LOW);
digitalWrite(trigPin3, LOW);
delayMicroseconds(2);

// Sets the trigPin on HIGH state for 10 micro seconds
digitalWrite(trigPin1, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin1, LOW);
dur1 = pulseIn(echoPin1, HIGH);

digitalWrite(trigPin2, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin2, LOW);
dur2 = pulseIn(echoPin2, HIGH);

digitalWrite(trigPin3, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin3, LOW);
dur3 = pulseIn(echoPin3, HIGH);

// Calculating the distance
dist1= dur1*0.034/2;
dist2= dur2*0.034/2;
dist3= dur3*0.034/2;

// Prints the distance on the Serial Monitor
Serial.print("Sensor 1: ");
Serial.println(dist1);
Serial.print("Sensor 2: ");
Serial.println(dist2);
Serial.print("Sensor 3: ");
Serial.println(dist3);

if (dist1 < 10){
  lcd.setCursor(0,1);
  lcd.print("Tin and Plastic");
  digitalWrite(yellowPin, HIGH);
  delay(5000);
  digitalWrite(yellowPin, LOW);
}
else if (dist2 < 10){
  lcd.setCursor(0,1);
  lcd.print(" Glass");
  digitalWrite(redPin, HIGH);
  delay(5000);
}

```

```
digitalWrite(redPin, LOW);
}
else if (dist3 < 10){
  lcd.setCursor(0,1);
  lcd.print("  Paper");
  digitalWrite(bluePin, HIGH);
  delay(5000);
  digitalWrite(bluePin, LOW);
}
}
```

Thread 1: Arduino Code of Ultrasound and LCD Detection

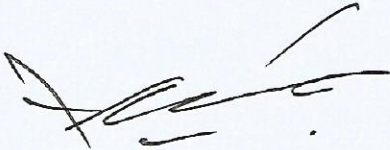
5. I am advised and verily believe that computer programs or compilations of computer programs including source codes are Literary Work within the meaning of the Copyright Act 1987 and by virtue of that, the copyright subsists in the Literary Work on the date of creation.

4. I verily believe that since sufficient skill and effort has been expended in the creation of the Literary Work by the Authors to make the Literary Work original in character and that the Literary Work have been reduced into material form, the copyright in the Literary Work subsists from the date it was made or created as stated herein.

5. I further assert that by virtue of the facts deposed to hereinbefore, the UTP is the owner of the copyright in the computer program which includes the source codes and all materials arising therefrom.

AND I make this solemn declaration conscientiously believing the same to be true and by virtue of the provisions of the Statutory Declarations Act 1960.

Subscribed and solemnly)
declared by the abovenamed)
Emelia Akashah Patah Akhir)
at **SERI ISKANDAR**)
PERAK)
on 16th day November, 2018)



Before me,

✓ 
Commissioner for Oaths



THE COPYRIGHT ACT 1987
THE COPYRIGHT REGULATIONS 1990

IN THE MATTER OF Section 42 (1)
of the Copyright Act 1987.

This is the document marked "DRA-1"
Referred to in the Statutory Declaration dated
This 16th day November, 2018.

Before me,



No. 17, Medan Selera MDPT,
Seri Iskandar,
32610 Seri Iskandar, Perak.