2nd Year's Eirbot Display for the Robotics French Cup

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Chapter 1

File Index

1.1 File List

Here is a list of all documented files with brief descriptions:

Chapter 2

File Documentation

2.1 caracters.cpp File Reference

```
#include <MD_MAX72xx.h>
#include <SPI.h>
#include "functions.hpp"
#include "caracters.hpp"
#include <string.h>
```

Include dependency graph for caracters.cpp:

2.2 functions.cpp File Reference

```
#include "functions.hpp"
#include "caracters.hpp"
#include "pixel_arts.hpp"
#include <MD_MAX72xx.h>
#include <SPI.h>
```

Include dependency graph for functions.cpp:

Macros

- #define BASE_DELAY 70

  Define the base delay used when scrolling is applied on the display.
- #define FLICKER_DELAY 50

  Define the delay used when flicker is applied on the display.
- #define INVERSION_DELAY 500

  Define the dalay used when pixel inversion is applied on the display.

Functions

- void test_all_points (MD_MAX72XX ∗M)

  This fonction tests all dots of the displat starting from line 0 and column 0.
- void scrolling (MD_MAX72XX ∗M, int c_min, int c_max)

  Function that applies one in which one iteration of right to left scrolling on an MD_MAX72XX display.
- void scrolling_reverse (MD_MAX72XX ∗M, int c_min, int c_max)

  Function that applies one in which one iteration of right to left scrolling on a MD_MAX72XX display.
- int **test_column** (MD_MAX72XX ∗M, int c)
- void inversion (MD_MAX72XX ∗M, int l_min, int l_max, int c_min, int c_max)

  Function that does one iteration of inversion of pixels on a MD_MAX72XX display.
- void flicker (MD_MAX72XX ∗M, int c_min, int c_max)

  Function that makes the display flicker one time.
- void print_with_scroll (MD_MAX72XX ∗M, int ∗buf, int way, int c_min, int c_max)

  Function that prints a buffer on a display in scrooling mod.
- void print_on_column (MD_MAX72XX ∗M, int ∗buf, int c)

  Function that prints a buffer on a display in fixed mod.
- void clear_matrix (MD_MAX72XX ∗M, int c_min, int c_max)

  Function that clears the display.
- int ∗ buf_alloc (int width)

  Function that allocates dynamically a buffer of size 8∗width∗sizeof(int) + 1, this correspond to the datas of a drawing of a size of width column and his size.
- void buf_realloc (int ∗buffer, int width)

  Function that changes the size of the dynamically allocated buffer to 8∗width∗sizeof(int) + 1.
- void buf_init (int ∗buf, int width)

  Function that entirely sets a buffer to 0.
- void buf_free (int ∗buf)

  Function that frees the memory associated with the buffer.
- void random_stuffs (MD_MAX72XX ∗M)

  Function that displays random stuffs on the display based on functions implemented in caracters.cpp and pixel_arts.cpp.

2.2.1 Detailed Description

File in which there are functions for general manipulation for a MD_MAX72XX display

2.2.2 Function Documentation

2.2.2.1 buf_alloc()

```
int* buf_alloc (
            int width )
```

Function that allocates dynamically a buffer of size 8∗width∗sizeof(int) + 1, this correspond to the datas of a drawing of a size of width column and his size.

Parameters

width	the maximun width that can be use to draw (typically the number of column of the drawing)

Returns

int∗ the buffer

2.2.2.2 buf_free()

```
void buf_free (
            int * buf )
```

Function that frees the memory associated with the buffer.

Parameters

buf	the buffer that will be freed

2.2.2.3 buf_init()

```
void buf_init (
            int * buf,
            int width )
```

Function that entirely sets a buffer to 0.

Parameters

buf	the buffer that will be set to 0
width	the size of the buffer that will be stores in buf[0]

2.2.2.4 buf_realloc()

```
void buf_realloc (
            int * buffer,
            int width )
```

Function that changes the size of the dynamically allocated buffer to 8∗width∗sizeof(int) + 1.

Parameters

buffer	the buffer which will be reallocated
width	the maximun width that can be use to draw (typically the number of column of the drawing)

2.2.2.5 clear_matrix()

```
void clear_matrix (
            MD_MAX72XX * M,
            int c_min,
            int c_max )
```

Function that clears the display.

Parameters

M	a MD_MAX72XX* that referes to the MD_MAX72XX display that will be cleared
c_min	the minimum column from which the erasure will begin
c_max	the maximum column from which the erasure will end

2.2.2.6 flicker()

```
void flicker (
            MD_MAX72XX * M,
            int c_min,
            int c_max )
```

Function that makes the display flicker one time.

Parameters

M	a MD_MAX72XX* that referes to the MD_MAX72XX display that will flicker
c_min	the minimun column in which the flicker will occur
c_max	the maximun column in which the flicker will occur

2.2.2.7 inversion()

```
void inversion (
            MD_MAX72XX * M,
            int l_min,
            int l_max,
```

```
            int c_min,
            int c_max )
```

Function that does one iteration of inversion of pixels on a MD_MAX72XX display.

Parameters

M	a MD_MAX72XX* that referes to the MD_MAX72XX display in which the inversion is applied
l_min	the minimun line in which the inversion will be applied
l_max	the maximun line in which the inversion will be applied
c_min	the minimun column in which the inversion will be applied
c_max	the maximun column in which the inversion will be applied

2.2.2.8 print_on_column()

```
void print_on_column (
            MD_MAX72XX * M,
            int * buf,
            int c )
```

Function that prints a buffer on a display in fixed mod.

Parameters

M	a MD_MAX72XX* that referes to the MD_MAX72XX display in which the buffer will be print out
buf	a buffer that stores the datas that will be print out
c	the column from which the display of datas will begin

2.2.2.9 print_with_scroll()

```
void print_with_scroll (
            MD_MAX72XX * M,
            int * buf,
            int way,
            int c_min,
            int c_max )
```

Function that prints a buffer on a display in scrooling mod.

Parameters

M	a MD_MAX72XX* that referes to the MD_MAX72XX display in which the buffer will be print out
buf	a buffer that stores the datas that will be print out
way	the way a the scroll
c_min	the minimum column of the scroll
c_max	the maximum column of the scroll

2.2.2.10 random_stuffs()

```
void random_stuffs (
            MD_MAX72XX * M )
```

Function that displays random stuffs on the display based on functions implemented in caracters.cpp and pixel_arts.cpp.

Parameters

M	a MD_MAX72XX* that referes to the MD_MAX72XX display in which this will be displayed

2.2.2.11 scrolling()

```
void scrolling (
            MD_MAX72XX * M,
            int c_min,
            int c_max )
```

Function that applies one in which one iteration of right to left scrolling on an MD_MAX72XX display.

Parameters

M	a MD_MAX72XX* that referes to the MD_MAX72XX display in which the scrooling is applied on
c_max	

2.2.2.12 scrolling_reverse()

```
void scrolling_reverse (
            MD_MAX72XX * M,
            int c_min,
            int c_max )
```

Function that applies one in which one iteration of right to left scrolling on a MD_MAX72XX display.

Parameters

M	a MD_MAX72XX* that referes to the MD_MAX72XX display in which the reverse scrooling is applied
c_min	
c_max	

2.2.2.13 test_all_points()

```
void test_all_points (
            MD_MAX72XX * M )
```

This fonction tests all dots of the displat starting from line 0 and column 0.

Parameters

M	a MD_MAX72XX* that referes to the MD_MAX72XX display in which the dots will be print out

2.3 main.cpp File Reference

```
#include <Arduino.h>
#include "caracters.hpp"
#include "functions.hpp"
#include "pixel_arts.hpp"
#include <MD_MAX72xx.h>
#include <SPI.h>
```

Include dependency graph for main.cpp:

Macros

- #define **Max7219_pinCLK** 2
- #define **Max7219_pinCS** 3
- #define **Max7219_pinDIN** 4

Functions

- void **setup** ()
- void **loop** ()

Variables

- MD_MAX72XX * **M** = new MD_MAX72XX(M->FC16_HW, 4, 2, 3, 4)

2.3.1 Detailed Description

Main file that stores the main program that will be executed the the arduino

2.4 pixel_arts.cpp File Reference

```
#include <MD_MAX72xx.h>
#include <SPI.h>
#include <stdlib.h>
#include "pixel_arts.hpp"
#include "functions.hpp"
#include "caracters.hpp"
```

Include dependency graph for pixel_arts.cpp:

Functions

- int * pokeball ()

  Function that returns the draw of a pokeball.
- int * laser (int length)

  Function that returns the drawing of a laser.
- int * aliens (int type)

  Function that returns the drawing of an alien.
- void battle_aliens (MD_MAX72XX *M)

  Function that generates a battle between alien 1 and 2, they will shoot 5x3 laser alternatively until a winner is randomly chosen.
- int * amogus ()

  Function that returns the drawing of a crew member of a famous game.
- void sus (MD_MAX72XX *M)

  Function that draws a famous crew with his iconic line.
- int * noot ()

  function that returns the drawing of a famous penguin
- void noot_noot (MD_MAX72XX *M)

  Function that draws a famous penguin and his line.

2.4.1 Detailed Description

File in which there are functions that generates and draws some pixel-arts for/on a MD_MAX72XX display

2.4.2 Function Documentation

2.4.2.1 aliens()

```
int* aliens (
            int type )
```

Function that returns the drawing of an alien.

Parameters

type	the type of the alien, 1 or 2

Returns

int* the buffer that stores the datas of the alien drawing

2.4.2.2 amogus()

```
int* amogus ( )
```

Function that returns the drawing of a crew member of a famous game.

Returns

int* the buffer that stores the datas of the crew member

2.4.2.3 battle_aliens()

```
void battle_aliens (
            MD_MAX72XX * M )
```

Function that generates a battle between alien 1 and 2, they will shoot 5x3 laser alternatively until a winner is randomly chosen.

Parameters

M	a MD_MAX72XX* that referes to the MD_MAX72XX display in which the battle will be displayed

2.4.2.4 laser()

```
int* laser (
            int length )
```

Function that returns the drawing of a laser.

Parameters

length	the lenght of the 3xlenght laser

Returns

int* the buffer that stores the datas of the laser drawing

2.4.2.5 noot()

```
int* noot ( )
```

function that returns the drawing of a famous penguin

Returns

int* the buffer that stores the datas of the crew penguin

2.4.2.6 noot_noot()

```
void noot_noot (
            MD_MAX72XX * M )
```

Function that draws a famous penguin and his line.

Parameters

M	a MD_MAX72XX* that referes to the MD_MAX72XX display in which this will be displayed

2.4.2.7 pokeball()

```
int* pokeball ( )
```

Function that returns the draw of a pokeball.

Returns

int* the buffer that stores the datas of the drawing

2.4.2.8 sus()

```
void sus (
            MD_MAX72XX * M )
```

Function that draws a famous crew with his iconic line.

Parameters

M	a MD_MAX72XX* that referes to the MD_MAX72XX display in which this will be displayed

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