CMPE240

2D Graphics Engine Project Requirements

HL

This project counts total 10 points. The soft copy of the report plus the source code exported as a project have to be submitted on line. In this project you will

1. Design and prototype LPC1769 micro-processor system board, and enable a SPI LCD display. Note: you can also use LPC11C24 board.

2. Generate 2D screen saver of rotating squares based on vector graphics formula discussed in the class.

(1) use $P(x,y) = P\_1(x\_1,y\_1) + lamda * (P\_2(x\_2,y\_2) - P\_1(x\_1,y\_1))$ with lamda = 0.8 by default, and lamda = 0.2 when prompted for user selected input;

(2) create two dimensional rotating patterns with data set of "parent" square;

(3) randomized location by using rand() function;

(4) randomized reduction of the parent square;

(5) choose one color for each set of rotation patterns, and rotates at least 10 levles or higher;

(6) continue to display each set of patterns without erasing the patterns.

3. Generate 2D trees with its branches level no less than 10 or higher based on vector graphics formula discussed in the class (5 points)

(1) use $P(x,y) = P\_1(x\_1,y\_1) + lamda * (P\_2(x\_2,y\_2) - P\_1(x\_1,y\_1))$ with lamda = 0.8 by default for tree branch reduction;

(2) create patch of forest by modifying one parent tree;

(3) randomized location of the new trees by using rand() function;

(4) randomized reduction of the parent tree trunks and branches;

(5) randomized angles for the branches;

(6) continue to display trees without erasing till the keyboard input detected.

4. Submit project report together with

(1) Exported project in zip form including source code ready to be compiled and to be executed); the submission is subject to testing and verification. Follow the following naming convention:

FirstName_LastName_Project1_2DGE_CMPE240.zip

(2) 5 seconds video clips.

5. Rubrics for the project

(1) Submit the following material:

(1.1) system block diagrams of the entire system setup including laptop computer;

(1.2) system block diagram of the SPI color LCD interface;

(1.3) Schematics of the LPC1769 interface to LCD color display panel;

(1.4) table(s) of the pin connectivity;

(2) photo(s) of your implemented screen saver I (rotating squares), and screen saver II (trees).

Appendix A. Reference from my lecture notes, see github https://github.com/hualili/CMPE240-Adv-Microprocessors/blob/master/2018F/2022F-101-notes-cmpe240-2022-09-28.pdf

Sept. 20, 22

Interface B
LCD is B
Interface)

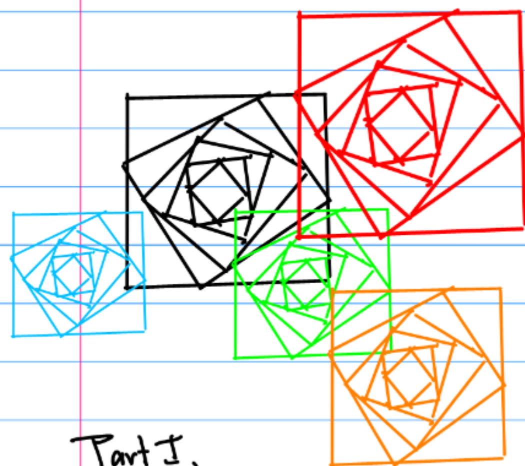

Fig. 1

(Level 10 or higher)

Part I.

LPC
C

Part II. Trees. Optional for Artistic Presentation.

"3+1"

1. M
2. M
3. SC
4. SS

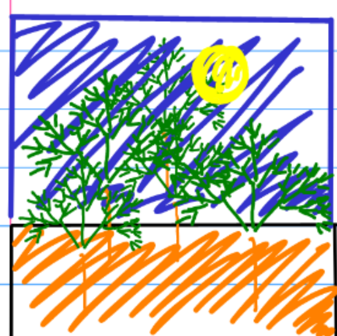

Fig. 2

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