2D Graphics Engine Lab Requirements

HL

This lab counts total 10 points. Note hard copy of the cover page of the lab report has to be ready for the time to make in class demo, fail to bring the hard copy can result in 2 marks reduction. In addition, the soft copy of the report plus the source code exported as a project have to be submitted on line. This lab as a preliminary step to build vector graphics processing engine in software for LPC1769 ARM processor. In this lab you will

1. Design and prototype LPC1769 micro-processor system board, and enable one SPI LCD display.

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, the submission is subject to testing and verification.

5. Rubrics for lab

(1) Satisfies the requirements stated in 2018S-17-Lab-report-rubrics.txt;

(2) Submit a Lab report to cover the following content:

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

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

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

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

  (2.5) photo(s) of the implementation.

(3) The software requirements of the lab report

  (3.1) software part should cover

    a. Algorithm description;

    b. Flow chart(s);

    c. Pseudo code;

    d. testing and verification section;

    e. source code listing (appendix).

(END)