**Introduction to Programming D (2022.01-02)**

**About this class**

Lecturer: KAMEDA Yoshinari

Classroom: 3L504 (Computer Room)

Period: Autumn C (Jan - Feb 2022)

Time slot: Thursday 1 2 (subject to change)

Credit : 1 credit

**The schedule**

01 Sec.1-4 Review of C programming

02 Sec.5 Eclipse and basic skills of compile and link

03 Sec.6 OpenGL programming

04 Sec.7-8 GLUT / Multiple source files

05 Sec.9-11 CG / Integration

**Lecture materials**

CG programming by C Language using OpenGL

1. Review of basic programming --- "Hello ESYS" again --

1.1. Poor Hello ESYS

1.2. Elegant Hello ESYS

1.3. Very polite Hello ESYS

1.4. It is useful to know Macro

2. How to open a file

2.1.How to open a file carelessly

2.2.How to open a file elegantly

2.3. Cooperation with bash

3. Structure the program by using functions

3.1. Design a simple calculator program

3.2. Trial run of fgets()

3.3. Trial run of sscanf ()

3.4. Simple calculator

4. Programming with divided files

4.1. C language program source file division

4.2. Simple calculator / split compilation version

4.3. Simple calculator / homemade library production and use

5 .Introduction to Eclipse

5.1. Workspace Concepts

5.1.1. Two types of perspectives and two types of executable files

5.1.2. Project

5.1.3. Workspace

5.2. Folder and file placement

5.2.1. Workspace

5.2.2. Project

5.2.3. Source file

5.2.4. Execution file and current directory at runtime

5.2.5. Others

5.3. First time eclipse

5.3.1. Starting eclipse and setting workspace

5.3.2. Initial setting of eclipse

5.4. First time Project --Hello Eclipse--

5.4.1. Determining the project outline

5.4.2. Registering a new project

5.4.3. Creating a new source file

5.4.4. Coding and Creating an executable file for debugging

5.4.5. Run-time debugging Configuration

5.4.6. Run-time debugging

5.4.7. Step-in (step-in, step-over)

5.4.8. Debug re-execution

5.4.9. Run/Resume (Run, break point)

5.4.10. C/C++ perspective before returning -- End of debugging --

5.4.11. Checking the operation of the execution file for debugging

5.4.12. Switching the perspective

5.4.13. Generating the execution file for releasing

5.5. Bringing the external source file to the project -- Hello ESYS again --

5.5.1. Project Overview

5.5. 2. Registration of new project

5.5.3. Importing source files from outside / debugging / executing

5.6. Bringing external source files into the project -- Divided source files of simple calculator --

5.6.1. Project overview

5.6.2. Registration of new project

5.6.3. Importing source files from outside / debugging / executing

5.7. Bringing external source files into the project -- A program to open files

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5.7.1. Project overview

5.7.2. Registering a new project

5.7.3. Importing source files from outside

5.7.4. Configuring run-time debugging with startup arguments (optional)

5.7.5. Eclipse: How to read a structure including array variables and characters in the debug perspective

5.8. Supplementary material

6. Introduction to OpenGL programming

6.1. First OpenGL -- Only the frame of the program --

6.2. First OpenGL -- Let's switch the buffer --

6.3. First OpenGL -- Confirmation of buffer switching --

6.4 . First OpenGL -- Switch buffer by time --

6.5. First OpenGL -- Orthogonal projection camera --

6.6. First OpenGL -- Draw line drawing object --

6.7. First OpenGLoperation -- Periodic actions --

6.8. First OpenGL -- Microseconds Order measurement --

6.9. First OpenGL -- Code cleaning --

7. Structure the program using GLUT

7.1. Structural design of the program

7.2. File division

7.3. Modifications associated with file division

7.4. Addition of events (keyboard)

7.5. Addition of event (enlarge / reduce logo)

8. Move and rotate CG using GLUT

8.1. Matrix used by OpenGL library

8.2. First move

8.3. Actual matrix operation in OpenGL

8.4. Multi-step matrix operation

9. Perspective projection

9.1. Introduction of perspective projection (provisional)

9.2. Introduction of perspective projection (formal)

9.3. Rotation and movement under perspective projection

10. 3DCG model reading from a file

10.1. Opening / closing a file

10.2. Reading model data from a file

11. Display of 3DCG model

11.1. Co-location of program

11.2. Program integration

11.3. Complete program integration

11.4. Polygon display

11.5. Polygon display with Depth-attached

**Precautions regarding assignments**

* Check manaba.

**The content of the assignment**

The assignments will be posted before (and in some cases after) the lecture each week.

**Grades**

Submit all the required assignments from Task 1 to Task 5 and obtain a total of 60 points or more.