Programming Assignment 2

Submission

Deadline: 23:59:59, Sunday, April 7th , 2019 (KST, +0900)

- Github server clock

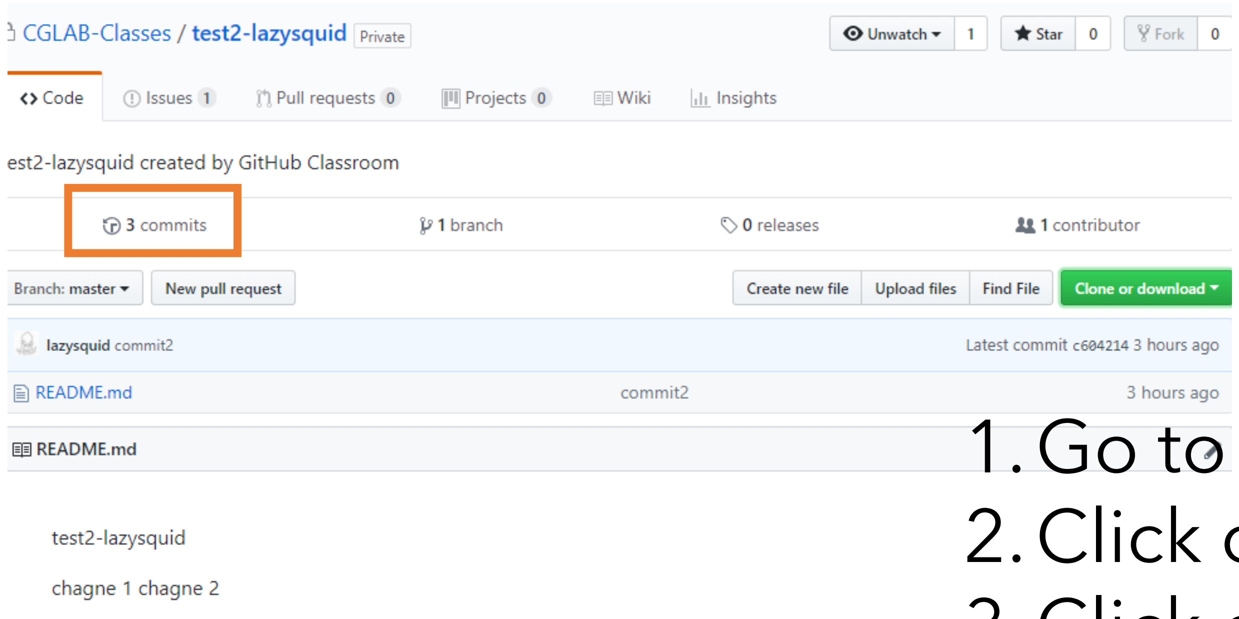
To submit your assignment, you must do two things. **Both of them must be done BEFORE deadline.**

1. You should push your commit to your assignment repo before deadline.
2. You should comment the last commit (before deadline) id (SHA-1 hash) in github issue board. (See next slide)

The last commit BEFORE dead line will be considered as submitted assignment.

- Github server will track this for me.
- Timestamp in your commit (local time) will be igrnoed. (I will use github server timestamp instead)

Commenting Commit ID 1/2



est2-lazysquid created by GitHub Classroom

lazysquid commit2 Latest commit c604214 3 hours ago

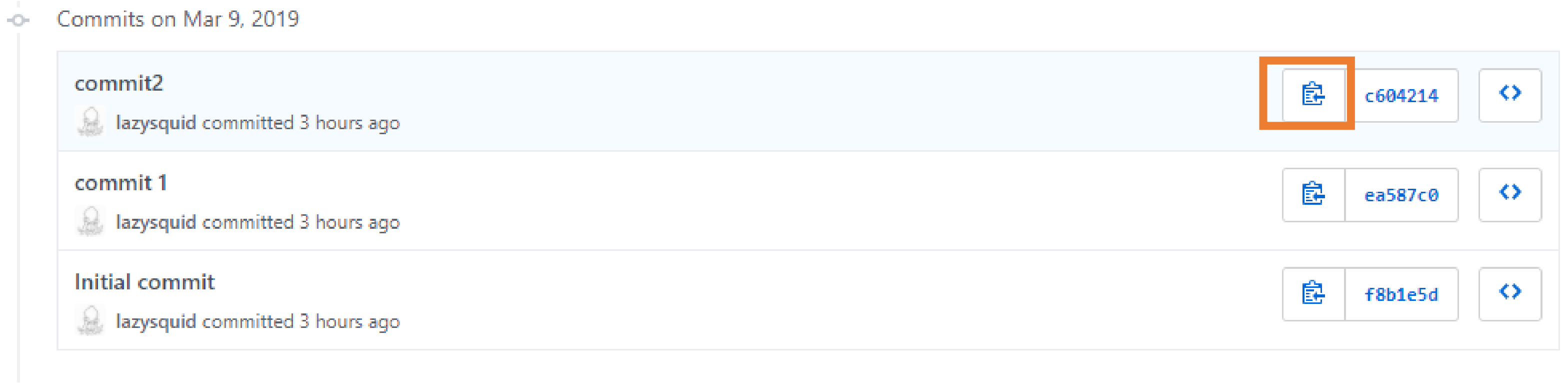
README.md commit2 3 hours ago

README.md

test2-lazysquid

chagne 1 chagne 2

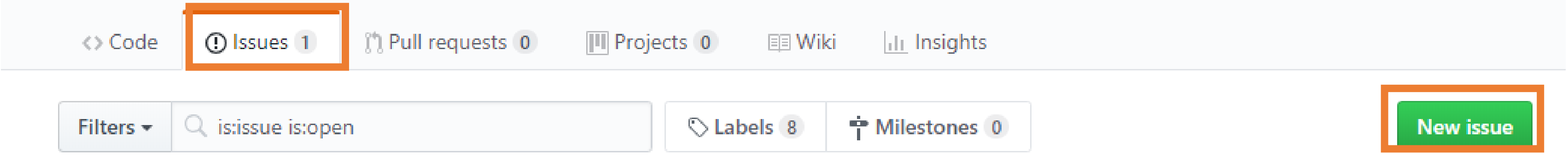
1. Go to your assignment repository
2. Click commits
3. Click copy button of your last commit

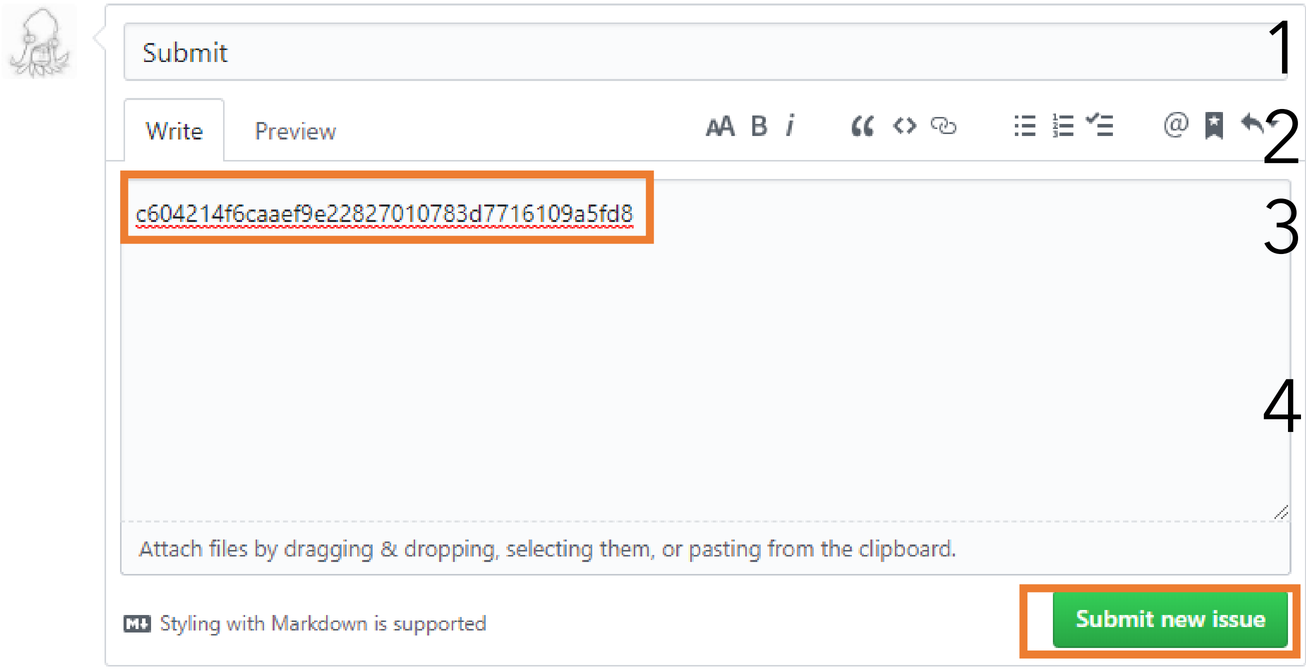


Commits on Mar 9, 2019

commit2 lazysquid committed 3 hours ago	c604214
commit 1 lazysquid committed 3 hours ago	ea587c0
Initial commit lazysquid committed 3 hours ago	f8b1e5d

Commenting Commit ID 2/2




Write
Preview
Attach files by dragging & dropping, selecting them, or pasting from the clipboard.
Styling with Markdown is supported
Submit new issue

Submit

c604214f6caaef9e22827010783d7716109a5fd8

1. Go to issue tab
2. Click “new issue”
3. Paste your lastest commit id (Ctrl-v)
4. Click “submit new isse”

Policy

In the following cases, your grade for this PA will be 0

- Late submission (Late push before deadline or Late last commit id comment on issue board)
- Build/execuition failure
- Making public of your assignment repository
- If you tried to push your commit with force option(Tried to change history of remote server)

Your final grade will be “F”

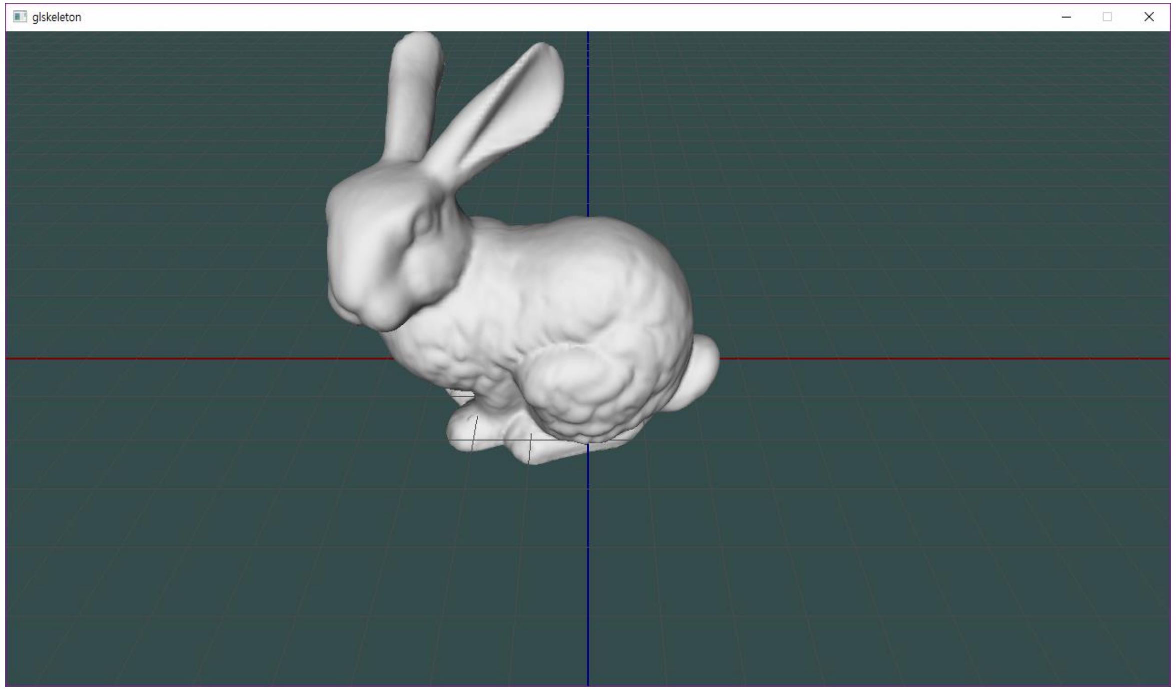
- Copy

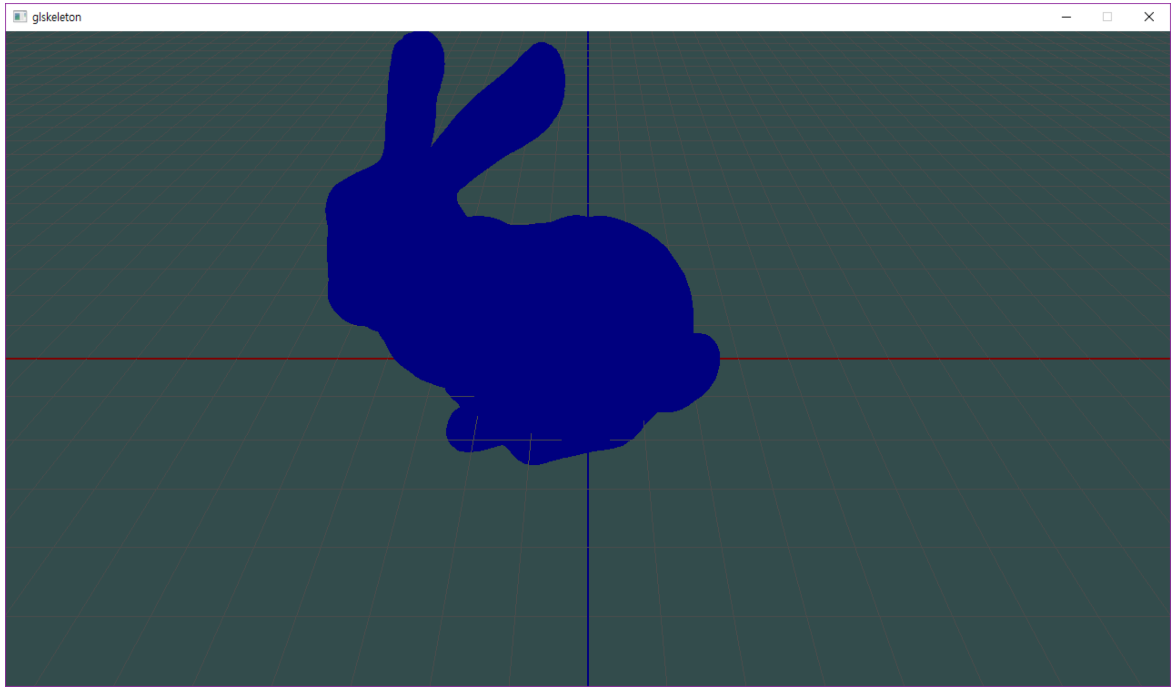
Task Lists

1. Implement object picker [18 Points]
    - Load and draw mesh [9 Points]
        - Do **not** read your mesh with **absolute path**. If you read your mesh with abosulte path, it would not run in my system. (Execution fail, Your score will be 0)
    - Implement picking with front and back buffer method [9 Points]
        - Change color when you only pick the surface of bunny
        - Draw the rendering result in the front buffer
        - Draw the image of object id in the back buffer
        - Read the pixel value of back buffer when you click the image and identify what object is under the cursor.

2. Report [2 Points]
    - Write your name, student id, github id in report.md [1 Points]
    - Attatch at least two result(Picked/Unpicked) images in report.md [1 Points]

Expected Results





Change the color only when you click on the bunny
Currently I applied lighting and disabled it when it is picked. But you don't have to.

PA2 Link

1. Login to github
2. Go to following link https://classroom.github.com/a/dhFgKIoI
3. Accept the assignment

Use `glm::*` instead of `GLU*`

- OpenGL 3.0 specification has deprecated some features that have been removed from OpenGL 3.2 core profile specfication. GLM provides some advantageous replacement functions.
  - Simply you cannot use GLU functions in your assignment

- `glm::` library provide replacement functions for deprecated `glu*` functions. (Examples)
  - gluPerspective(float fovy, float aspect, float zNear, float zFar)
    glm::perspective(float fovy, float aspect, float zNear, float zFar)

  - gluLookAt(GLdouble eyeX, GLdouble eyeY, GLdouble eyeZ, GLdouble centerX, GLdouble centerY, GLdouble centerZ, GLdouble upX, GLdouble upY, GLdouble upZ)
    glm::lookAt(glm::vec3 eye, glm::vec3 center, glm::vec3 up);

- Take a look section 5 to see full deprecated function replacements list.
  - https://github.com/g-truc/glm/blob/master/doc/manual.pdf

Rendering Loop Example

```
 glm::mat4 matModel1 = ...
 glm::mat4 matModel2 = ...

 glm::mat4 matView = ...
 glm::mat4 matProj = ...

 // Render loop
 while (!glfwWindowShouldClose(window))
 {
    glfwWaitEvents();
    ...

    // set projection matrix for this frame
    glMatrixMode(GL_PROJECTION); // set projection
matrix
    // use either of following lines to set the value
of projection matrix
    glLoadMatrixf(glm::value_ptr(matProj)); // you
should include glm/gtc/type_ptr.hpp for glm::value_ptr
    glLoadMatrixf(&matProj[0][0]); // you can use this
also.

    // set modelview matrix for the model1
    glm::mat4 modelView1 = matView * matModel1;
    glMatrixMode(GL_MODELVIEW);
    glLoadMatrixf(glm::value_ptr(modelView1));
    // draw your model 1
    for(some-condition) glVertex3f(...);

    // set modelview matrix for the model2
    glm::mat4 modelView2 = matView * matModel2;
    glMatrixMode(GL_MODELVIEW);
    glLoadMatrixf(glm::value_ptr(modelView1));
    // draw your model 2
    for(some-condition) glVertex3f(...);

    ...

    glFinish(); // Do not swap buffer.
 }
```

Hints

1. Init values of model, view, projection matrix that is used in pa2-ref-demo

```
glm::mat4 matModel = glm::identity<glm::mat4>(); //4x4 indentity matrix
glm::mat4 matView = glm::lookAt(glm::vec3(0, 4, 4),
                                glm::vec3(0, 0, 0),
                                glm::vec3(0, 1, 0));
glm::mat4 matProj = glm::perspective(glm::radians(60.0f), (float)WIDTH/HIEGHT, 0.1f, 100.0f);
```

2. Set projection and model view matrix

```
    // set projection matrix for this frame
    glMatrixMode(GL_PROJECTION); // set projection matrix
    glLoadMatrixf(glm::value_ptr(matProj)); // you should include glm/gtc/type_ptr.hpp for
glm::value_ptr
    // set modelview matrix for this frame
    glm::mat4 modelView = matView * matModel
    glMatrixMode(GL_MODELVIEW);
    glLoadMatrixf(glm::value_ptr(modelView));
```

Hints

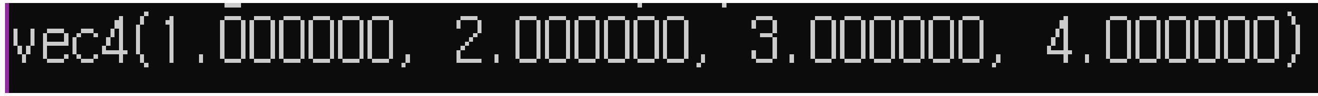
3. Use following functions to set up your object id

- Use `glColor3ub` if you use unsigned integer.
- Use `glColor3b` if you use signed integer.

4. Use string cast to debug your matrix/vector

- include `<glm/gtx/string_cast.hpp>`
- Then you can do this (left the code, right is the consol output)

```
glm::vec4 test{1,2,3,4};
std::cout<<glm::to_string(test)<<std::endl;
```



```
vec4(1.000000, 2.000000, 3.000000, 4.000000)
```

5. Include #include <tinyobjloader/tiny_obj_loader.h> to use tinyobjloader

Manual Helpers

- https://github.com/g-truc/glm/blob/master/manual.md
- https://github.com/syoyo/tinyobjloader#usage
- http://www.opengl-tutorial.org/