

Assignment 1, Due Fri. 2 October 2009, 9.30am. Worth 33% of CA. Demonstrations of software execution, see below, must be completed by the same Fri. 2 October 2009, 10.30am

Answers should be in your own words. For numerical answers, where appropriate, show your working; a numerical answer written down with no explanation of working is likely to get zero marks.

Late assignments. 10% of marks will be deducted for each day late; assignments seven days late will receive 0%.

Computing Department Rules: 1. Assignments must be neatly typed and printed; 2. A cover sheet and declaration must be included.

Relevant sections of code (with comments as necessary) should be submitted.

1. (a) 50% of marks for demonstration, at which you should be prepared to discuss your program.
Based on Chapter 8 of the notes, rewrite `cubed10.cpp` (available on my public folder) using *display lists*. Create a separate display list for the solid cube and for the wire cube.
[50 + 50 = 100 marks]
- (b) Write a brief explanation of how/why display lists can help to improve performance (frame rates).
[20 marks]

2. (a) 50% of marks for demonstration, at which you should be prepared to discuss your program.
Based on Chapter 8 of the notes, rewrite `cubed10.cpp` (available on my public folder) using *vertex arrays*. Do not use a colour array, simply colour the whole cube blue.
Hints.

```
In init:
static GLint vi[8][3] = {{-1, -1, 1}, // 0
                        {1, -1, 1}, // 1
                        ...
                       };
```

```
glEnableClientState(GL_VERTEX_ARRAY);
glVertexPointer(??, ???, ???, vi);
```

In cube rendering function:

```
GLuint index[24] = {0, 1, 2, 3,
                  4, 7, 6, 5,
                  ...
                 }
```

Demonstrate the use of these (separately):

```
glDrawElements(GL_QUADS, ??, GL_UNSIGNED_INT, index);
```

and

```
glBegin(GL_QUADS);
for (int i = 0; i < ??; ++i){
    glVertex(i);
}
glEnd();
```

When drawing the wireframe, use:

```
glColor3f(1.0, 1.0, 1.0);

int k = 0;
for (int j = 0; j < 6; ++j){
    glBegin(GL_LINE_LOOP);
    for (int i = 0; i < 4; ++i, ++k){
        glVertexElement(index[k]);
    }
    glEnd();
}
```

This is because `GL_LINE_LOOP` is not completely equivalent to `GL_QUADS`.

[80 + 80 = 160 marks]

(b) Write a brief explanation of how/why vertex arrays can help to improve performance (frame rates).

[20 marks]

3. (a) 50% of marks for demonstration, at which you should be prepared to discuss your program.

Based on Chapter 7 of the notes, rewrite `fog.cpp` to use the solid cube from `cubed10.cpp`. Use the same materials and lighting.

[50 + 50 = 100 marks]

1. 100; 2. 160; 3. 100; Total 360.