Kingdom of Saudi Arabia
المملكة العربية السعودية
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وزارة التعليم
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جامعة أم القرى
Adham University College
الكلية الجامعية بأضم
Computer Science Department
قسم الحاسب الآلي

CS Department

Computer Graphics Course, 3-6803430

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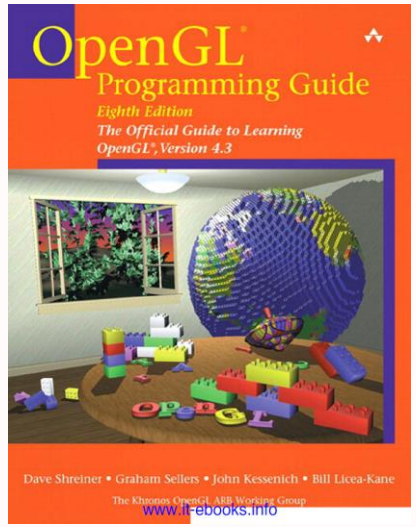
References

- *Lab Lectures, Computer Graphics, Taif University, Faculty Of Computers And Information Technology, TA. Maha Thafar &TA. Haifa Alshehri, TA.Sohair Soliman & L.Shakila Bano.*
- *OpenGL Programming Guide: The Official Guide to Learning OpenGL, Versions 4.3, 8th edition, Dave Shreiner, Graham Sellers, John Kessenich, Bill Licea-Kane & The Khronos OpenGL ARB Working Group, Addison-Wesley.*



Lecture Seven

Translating Objects Programs Using OpenGL

content

1. Modeling Transformations
2. Translate 3D Object Program Using OpenGL

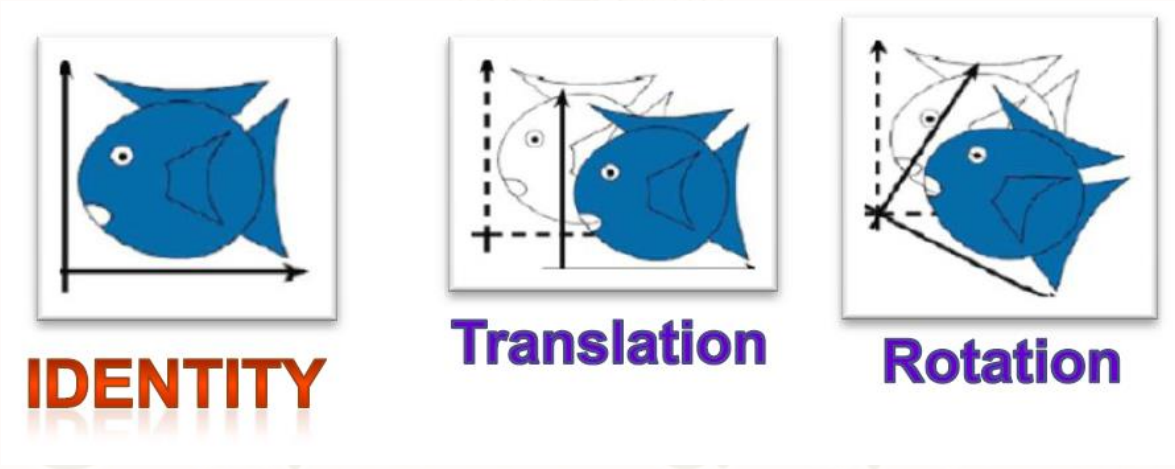
Modeling Transformations

- Before applying modeling or viewing transformations, need to set

  `glMatrixMode(GL_MODELVIEW)`

- Rotation, translation, and scaling are performed by functions that change the values of the modelview matrix.
  - Move object **(Translate).**
  - **Rotate** object around axis.
  - **Scale (**stretch or shrink**).**
  - Mirror object **(Reflection).**

Modeling Transformations

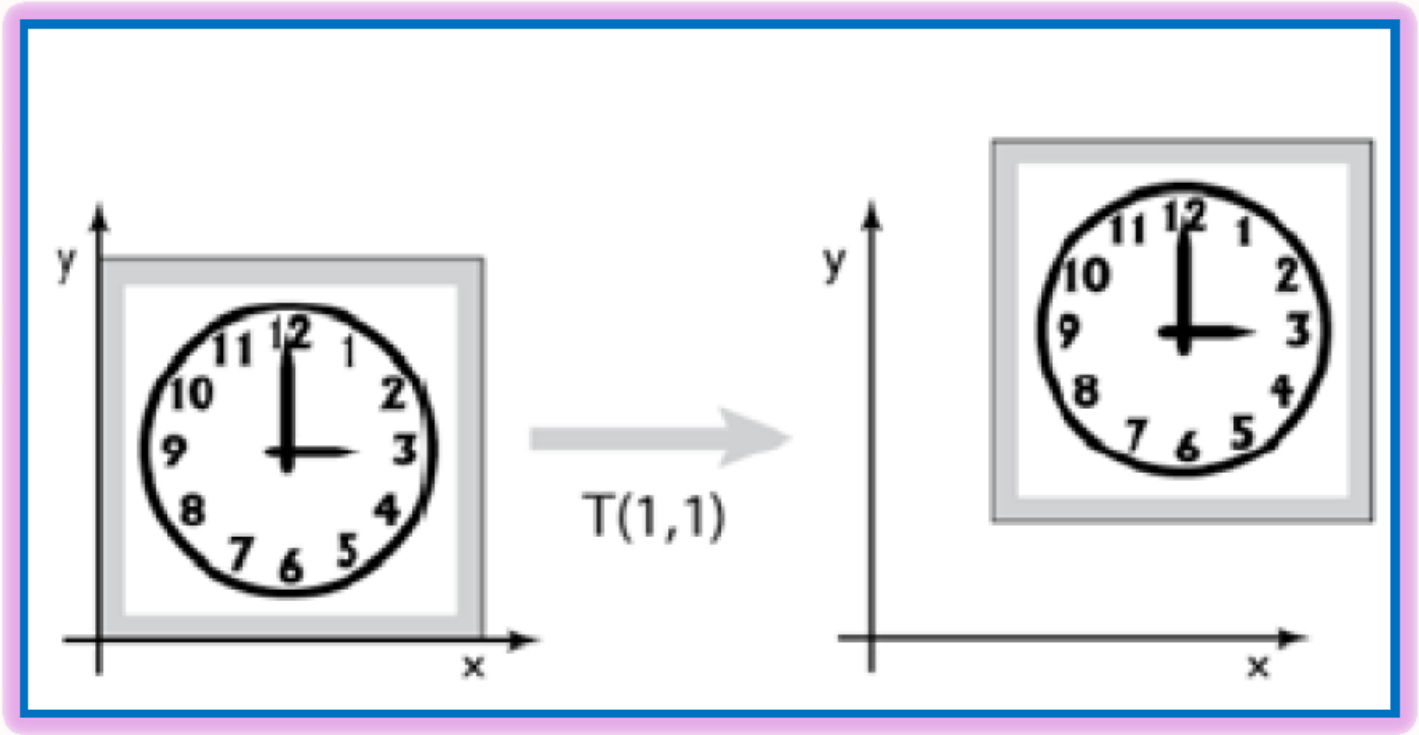


Translate the Objects

- In order to move the object
- You translate the coordinate system.
- And then draw the object in the translated coordinate system
- The function of translate: `void glTranslatef(x , y , z)`
- **Example:** `glTranslatef(5 ,0 ,0);` //move the object 5 units in the x direction.

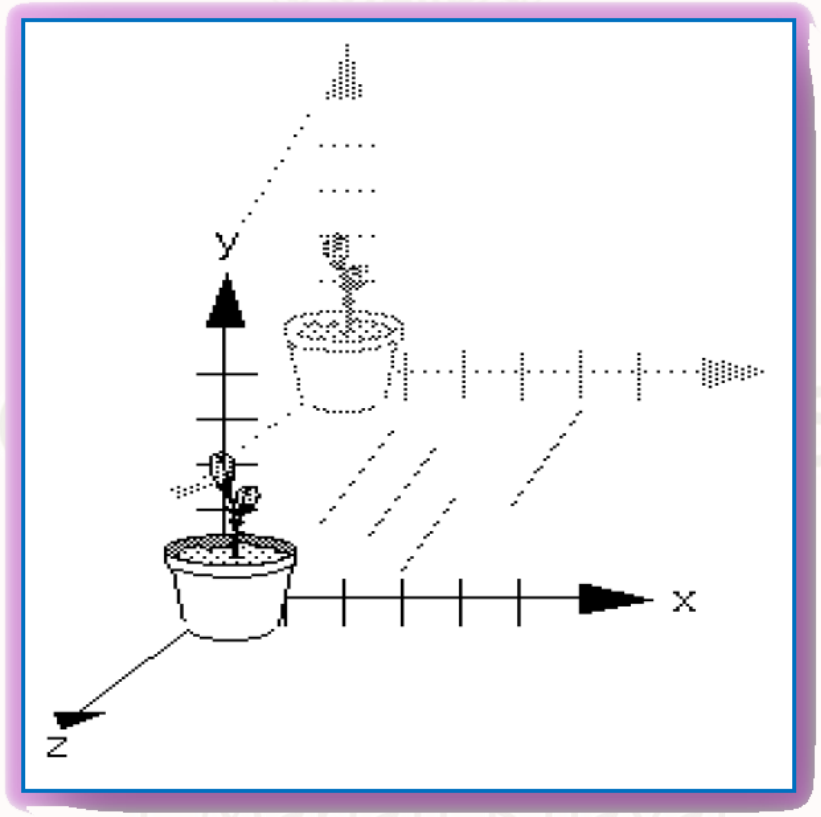
Translate the Objects

2D



Translate the Objects

3D



Translate 3D Object Program Using OpenGL

```
#include<windows.h>
#include<GL/glut.h>
void Draw() {
    glClear(GL_COLOR_BUFFER_BIT);
    glTranslatef(0.0, 0.0, -100.0);
    glColor3ub(255, 178, 178);  //Pink Color
    //void glutSolidSphere (GLdouble radius, GLint slices, GLint stacks);
    glutSolidSphere(10.0, 30, 40); //Draw a big sphere
    glTranslatef(20.0, 0.0, 0.0); //Second Translate
    glColor3ub(250, 136, 136);
    glutWireSphere(3.0, 30, 40);
    glTranslatef(0.0, -20.0, 0.0);
    glColor3ub(253, 1, 1); //Red Color
    glutWireSphere(3.0, 30, 40);
    glutSwapBuffers(); //Swap Buffers (Double Buffering)
}

void init() {
glClearColor(1.0,0.8,0.8, 0);
glMatrixMode(GL_PROJECTION);
glLoadIdentity();
gluPerspective(45, 1.0, 10.0, 200.0);
glMatrixMode(GL_MODELVIEW); //Select the Modelview Matrix
}

int main() {
    glutInitDisplayMode(GLUT_RGB | GLUT_DOUBLE);
    glutInitWindowSize(500, 500);
    glutInitWindowPosition(0,0);
    glutCreateWindow("Draw Some Spheres");
    init();
    glutDisplayFunc(Draw);
    glutMainLoop();
    return 0;
}
```

Translate 3D Object Program Using OpenGL

Translate3DObject] - Code::Blocks 17.12

Build Debug Fortran wxSmith Tools Tools+ Plugins DoxyBlocks Settings Help

Translate3DObject.cpp

```
#include<GL/glut.h>
void Draw() {
    glClear(GL_COLOR_BUFFER_BIT);
    glTranslatef(0.0, 0.0, -100.0);
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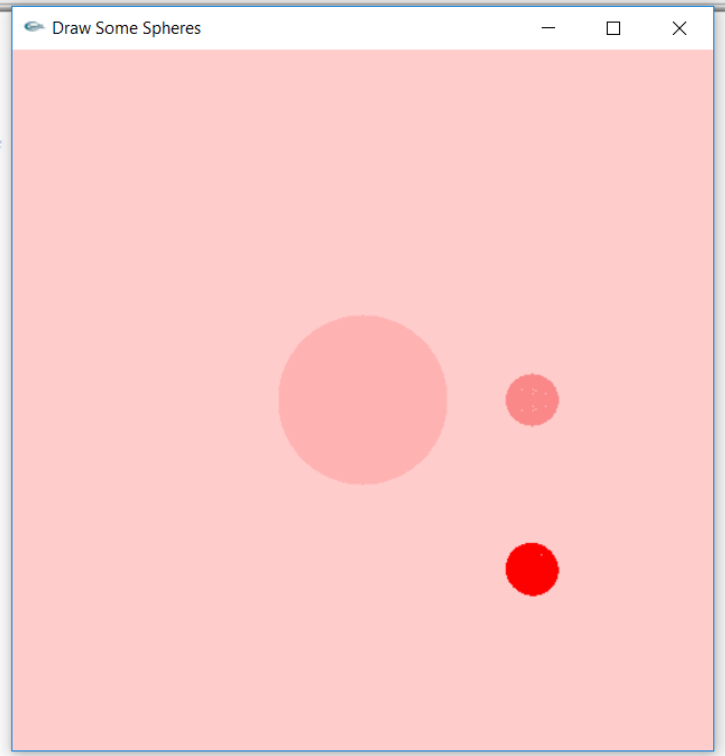

Exercise

- **Draw a Cube using the built in functions then change the object's place by translating it in into other place.**

وصلى الله وبارك على نبينا محمد

The End Summary of Lecture Seven

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