

## **Computer Graphics Project #2, a moving robot**

1. Design a robot 機器人 comprising with the following parts: (at least)
  - a 、 A head, a torso, 2 arms (+ forearms), 2 legs (+ knees). These parts are connected by joints (關節)
2. The scene (場景) contains the robot, a big floor, and other objects standing on the floor: (40%)
  - a 、 Initially, the robot stands on the big floor (ZX 平面上 , at least 50x50, [0,0,0]-[50,0,50])
  - b 、 The obstacles may be rocks, buildings, trees, other robots, etc.
3. Allow the robot to perform some motions by rotating its joints and moving its body. (20%)
  - a 、 Generating gestures (產生走路姿態)
  - b 、 Walking
  - c 、 Making turns
4. Add more advanced motions (20%)
  - a 、 Jump and kneel down
  - b 、 Avoid obstacles. (collision detection and reaction generation)
5. Add complex motions (20%)
  - a 、 Running or flipping
  - b 、 Grasp things 抓東西
  - c 、 Add constraints to the motions (for example, max speed, rotational angles of fist, wrist, waist, ...)
6. Other fancy ideas are welcome. (20%)
7. Please hand-in your documents when demonstrating your programs. Your documents should contain the following information:
  - a 、 The scene graph (body parts + joints) of your robot,
  - b 、 The degree of freedoms of the joints
  - c 、 The manual for controlling the motions
  - d 、 Description of your ideas and algorithms for creating the motions.
8. You have 3 weeks to finish this project. Don't copy others' work. Your robot should definitely not resemble others'.
9. The display and reshape callback functions::

```
/*----Define the current eye position and the eye-coordinate system---*/  
glMatrixMode(GL_MODELVIEW);  
glLoadIdentity();  
gluLookAt(45.0, 70.0, 55.0, 25.0, 0.0, 0.0, 0.0, 1.0, 0.0);
```

```
void my_reshape(int w, int h)  
{ glViewport(0, 0, w, h);  
  glMatrixMode(GL_PROJECTION);  
  glLoadIdentity();  
  glOrtho(-40.0, 40.0, -40, 40, 0.0, 120.0);
```