Homework 3

This is an individual assignment! Any obvious copying of code and/or likeness to other students' work will be penalized with zero points for all affected parties.

Submit all created or modified files – source, libraries, data and outputs printed and stored (all of the above files plus the exe file) on my pen drive in advance. This should be done by the due date.

Then, the assignment must be demoed to me to get the final grade for this homework. This will be done soon after the due date.

You must prepare separate solutions and put in separate folders Problem 1 and Problem 2.

Problem1. :   (Max number of points is 50)

Use the code of robot as shown. It uses only one 3D sphere and transformations. Add not less than 3 more details to the robot. Render the robot in whatever colors you prefer. (You must use not less than three different colors). Choose the material and lighting. When the program runs, it should display the robot with rotating hands and feet. A flat shading model is used by default.

Grading:
For basic drawing defined above - - **max 25 points.**

For creativity You can use the menu options to toggle the shading model (smooth or flat), turn on/off the hands and feet rotation, or turn on/off rotation of the entire robot, add some more details to the robot etc., and more transformations.

- **max 25 points**

Problem 2:   (Max number of points is 50))
Create a scene containing the above robot, its two children and surrounding environment. Utilize the robot from the previous problem. Use appropriate colors/stippling and masks for the robot family and scene. Use appropriate lighting, shading and include some basic transformations.
The above description of problem 2 presents the Basic Version - max 25 points, 5 of which will be for basic movement.

Creativity:
For robot creativity you may include additional robot elements, colors etc. to make it more atractive. (defined as elements of it being rendered efficiently, good/appropriate use of colors, stippling, masks), **5 points max**.
For additional scene elements added to the robot family from the previous problem – **max 5 points**

For creativity in the "animation" as robot dance, robot play etc. – **max 15 points**

Given code

```
void drawSphere()
{
   glutSolidSphere(.1, 16, 16);
}

// Draws right arm, hand, leg, and foot
//
void drawRightSideAppendages()
{
        glPushMatrix();                 // right arm
        glTranslatef(0.40f, 0.7f, 0.0f);
        glRotatef(35,0,0,1);
        glScalef(0.5f, 4.0f, 0.5f);
        drawSphere();
        glPopMatrix();

        glPushMatrix();                 // right hand
        glTranslatef(0.69f, 0.28f, 0.0f);
        glRotatef(feetAndHandsRotation[Z], 0, 0, 1);
        drawSphere();
        glPopMatrix();

        glPushMatrix();                 // right thigh
        glTranslatef(0.2f, -0.4f, 0.0f);
        glRotatef(15,0,0,1);
        glScalef(0.5f, 3.0f, 0.5f);
        drawSphere();
        glPopMatrix();

        glPushMatrix();                 // right shin
        glTranslatef(0.3f, -0.985f, 0.0f);
        glRotatef(6,0,0,1);
        glScalef(0.5f, 3.0f, 0.5f);
        drawSphere();
        glPopMatrix();

        glPushMatrix();                 // right foot
        glTranslatef(0.33f, -1.40f, 0.0f);
```

```
        glRotatef(feetAndHandsRotation[Z], 0, 0, 1);
        drawSphere();
        glPopMatrix();
}   // drawRightSideAppendages


// draws the desired robot object
//
void drawRobot()
{
        glPushMatrix();                      // head
        glTranslatef(0.0f, 1.5f, 0.0f);
        glScalef(3.0f, 3.0f, 3.0f);
        drawSphere();
        glPopMatrix();


        glPushMatrix();                      // body
        glTranslatef(0.0f, 0.5f, 0.0f);
        glScalef(2.5f, 7.0f, 2.5f);
        drawSphere();
        glPopMatrix();


        drawRightSideAppendages();


        // use reflection to draw the left side appendages
        //
        glPushMatrix();
        glScalef(-1.0, 1.0, 1.0);
        drawRightSideAppendages();
        glPopMatrix();
```