Lab Taks-6

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20-44213-3

Question-1
Design a car that will have rotating wheels.

Graph Plot (Picture)-

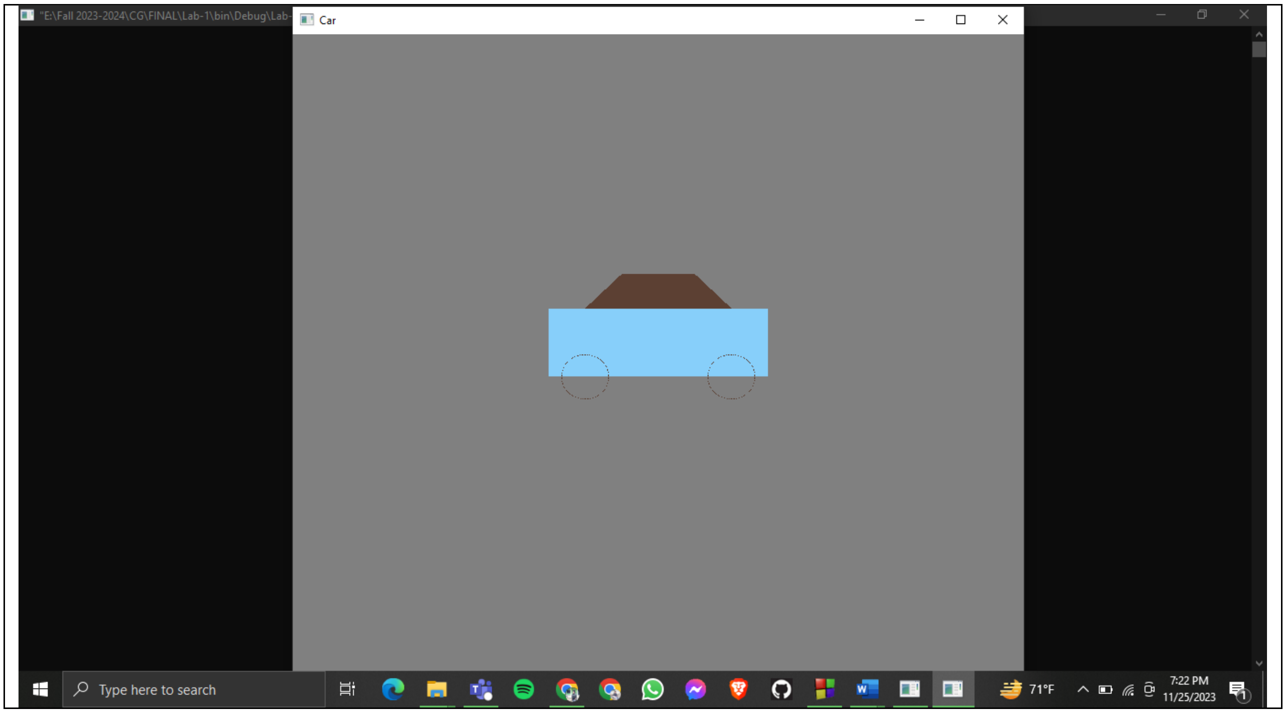
[Not needed]

Code-

```
#include <iostream>
#include <GL/gl.h>
#include <GL/glut.h>
#include <math.h>

float _move = 0.0f;
float _angle1 = 0.0f;

void wheel() {
   glLoadIdentity();
   glMatrixMode(GL_MODELVIEW);
   glPushMatrix();
   glTranslatef(-0.2, 0, 0);
   glRotatef(_angle1, 0.0f, 0.0f, 1.0f);
   glBegin(GL_LINES);
   for (int i = 0; i < 200; i++) {
      glColor3f(0.36, 0.25, 0.20);
      float pi = 3.1416;
      float A = (i * 2 * pi) / 200;
      float r = 0.065;
      float x = r * cos(A);
      float y = r * sin(A);
      glVertex2f(x, y);
   }
   glEnd();
   glPopMatrix();

   glLoadIdentity();
   glMatrixMode(GL_MODELVIEW);
```

```
    glPushMatrix();
    glTranslatef(0.2, 0, 0);
    glRotatef(_angle1, 0.0f, 0.0f, 1.0f);
    glBegin(GL_LINES);
    for (int i = 0; i < 200; i++) {
        glColor3f(0.36, 0.25, 0.20);
        float pi = 3.1416;
        float A = (i * 2 * pi) / 200;
        float r = 0.065;
        float x = r * cos(A);
        float y = r * sin(A);
        glVertex2f(x, y);
    }
    glEnd();
    glPopMatrix();
}

void drawScene() {
    glClearColor(0.5, 0.5, 0.5, 1.0);
    glClear(GL_COLOR_BUFFER_BIT);
    glColor3d(0.53, 0.81, 0.98);

    glBegin(GL_QUADS);
    glVertex2f(-0.3f, 0.0f);
    glVertex2f(0.3f, 0.0f);
    glVertex2f(0.3f, 0.2f);
    glVertex2f(-0.3f, 0.2);
    glEnd();

    glColor3d(0.36, 0.25, 0.20);

    glBegin(GL_QUADS);
    glVertex2f(-0.2f, 0.2f);
    glVertex2f(0.2f, 0.2f);
    glVertex2f(0.1f, 0.3f);
    glVertex2f(-0.1f, 0.3);
    glEnd();

    wheel();
    glutSwapBuffers();
}

void update(int value) {
    _move += 0.02;
    if (_move > 1.3) {
        _move = -1.0;
    }
    glutPostRedisplay();
    glutTimerFunc(20, update, 0);
}

void update1(int value) {
    _angle1 += 2.0f;
    if (_angle1 > 360.0) {
        _angle1 -= 360;
    }
    glutPostRedisplay();
    glutTimerFunc(20, update1, 0);
}

int main(int argc, char** argv) {
    glutInit(&argc, argv);
    glutInitDisplayMode(GLUT_DOUBLE | GLUT_RGB);
    glutInitWindowSize(800, 800);
    glutCreateWindow("Car");
    glutDisplayFunc(drawScene);
    gluOrtho2D(-2, 2, -2, 2);
    glutTimerFunc(20, update, 0);
    glutTimerFunc(20, update1, 0);
    glutMainLoop();
    return 0;
}
```

Output Screenshot (Full Screen)-



Question-4
Design a windmill with rotating blades.

Graph Plot (Picture)-

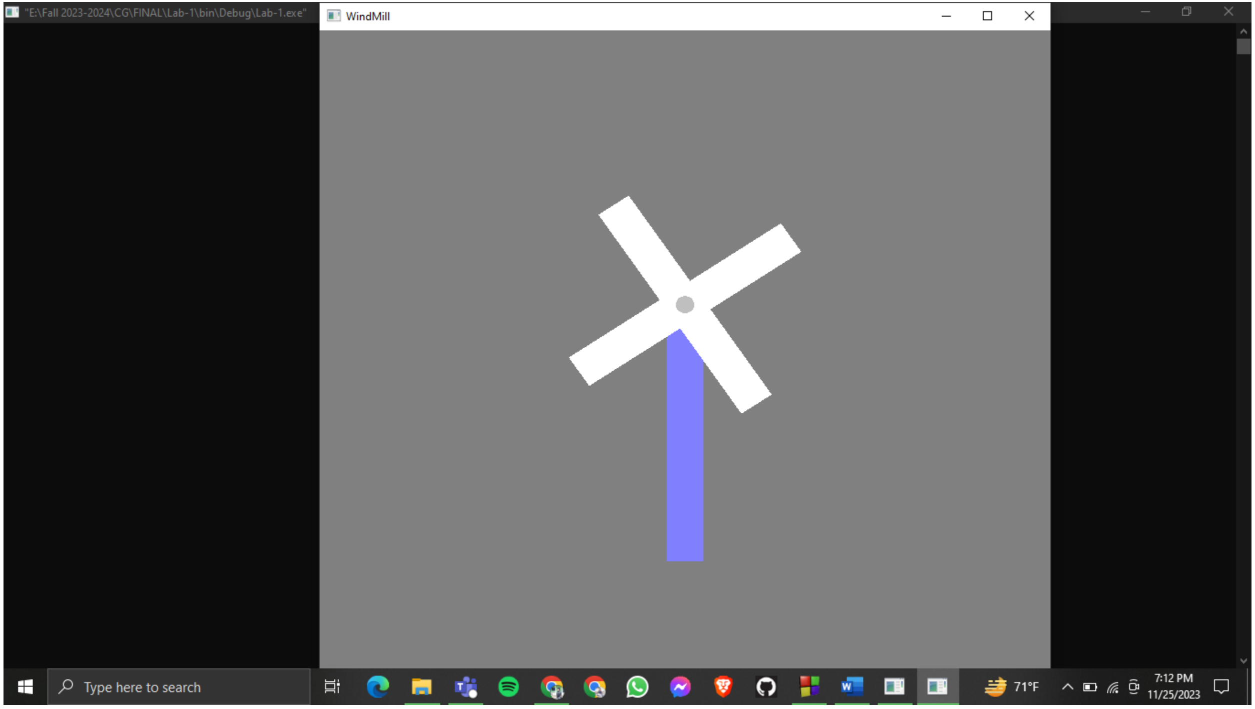
[Not needed]

Code-

```
#include <iostream>
#include <GL/gl.h>
#include <GL/glut.h>
#include <math.h>

using namespace std;

float _move = 0.0f;
float _angle1 = 0.0f;
float _angle2 = 0.0f;

void wheel() {
   glLoadIdentity();
   glMatrixMode(GL_MODELVIEW);
   glPushMatrix();
   glTranslatef(0.0, 0.2, 0);
   glRotatef(_angle1, 0.0f, 0.0f, 1.0f);
   glBegin(GL_POLYGON);
   for (int i = 0; i < 200; i++) {
      glColor3f(0.75, 0.75, 0.75);
      float pi = 3.1416;
      float A = (i * 2 * pi) / 200;
      float r = 0.025;
      float x = r * cos(A);
      float y = r * sin(A);
      glVertex2f(x, y);
   }
   glEnd();
   glPopMatrix();
}

void drawScene() {
   glClearColor(0.5, 0.5, 0.5, 1.0);
   glClear(GL_COLOR_BUFFER_BIT);
   glColor3d(0.5, 0.5, 1.0);

   glBegin(GL_POLYGON);
   glVertex2f(0.05f, 0.1f);
   glVertex2f(0.05f, -0.55f);
   glVertex2f(-0.05f, -0.55f);
   glVertex2f(-0.05f, 0.1f);
   glEnd();

   glBegin(GL_POLYGON);
   glVertex2f(-0.05f, 0.1f);
   glVertex2f(0.05f, 0.1f);
   glVertex2f(0.0f, 0.2f);
   glEnd();

   glColor3d(1, 1, 1);

   glLoadIdentity();
   glMatrixMode(GL_MODELVIEW);
   glPushMatrix();
   glTranslatef(_move, 0.0f, 0.0f);
   glTranslatef(0.0, 0.2, 0);
   glRotatef(_angle2, 0.0f, 0.0f, 1.0f);
   glBegin(GL_POLYGON);
```

```
    glVertex2f(0.0f, 0.05f);
    glVertex2f(0.35f, 0.05f);
    glVertex2f(0.35f, -0.05f);
    glVertex2f(0.0f, -0.05f);
    glEnd();

    glBegin(GL_POLYGON);
    glVertex2f(0.0f, 0.05f);
    glVertex2f(-0.35f, 0.05f);
    glVertex2f(-0.35f, -0.05f);
    glVertex2f(0.0f, -0.05f);
    glEnd();

    glBegin(GL_POLYGON);
    glVertex2f(0.05f, 0.0f);
    glVertex2f(0.05f, 0.35f);
    glVertex2f(-0.05f, 0.35f);
    glVertex2f(-0.05f, 0.0f);
    glEnd();

    glBegin(GL_POLYGON);
    glVertex2f(0.05f, 0.0f);
    glVertex2f(0.05f, -0.35f);
    glVertex2f(-0.05f, -0.35f);
    glVertex2f(-0.05f, 0.0f);
    glEnd();

    wheel();
    glPopMatrix();
    glutSwapBuffers();
}

void update1(int value) {
    _angle1 -= 2.0f;
    if (_angle1 > -360.0) {
        _angle1 += -360;
    }
    glutPostRedisplay();

    glutTimerFunc(20, update1, 0);
}

void update2(int value) {
    _angle2 -= 2.0f;
    if (_angle2 > -360.0) {
        _angle2 += -360;
    }
    glutPostRedisplay();

    glutTimerFunc(20, update2, 0);
}

int main(int argc, char** argv) {
    glutInit(&argc, argv);
    glutInitDisplayMode(GLUT_DOUBLE | GLUT_RGB);
    glutInitWindowSize(800, 800);
    glutCreateWindow("WindMill");
    glutDisplayFunc(drawScene);
    glutTimerFunc(20, update1, 0);
    glutTimerFunc(20, update2, 0);
    glutMainLoop();
    return 0;
}
```

Output Screenshot (Full Screen)-


"E:\Fall 2023-2024\CG\FINAL\Lab-1\bin\Debug\Lab-1.exe"
WindMill
Type here to search
71°F
7:12 PM
11/25/2023