



Group Project Report

Computer Graphics
CS360

-Group 19-

Students Names:

ID:

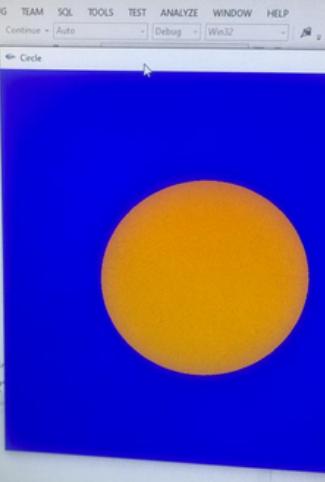
E-MAIL:

Section:

Instructor Name:

WORK PROGRESS STEP BY STEP:

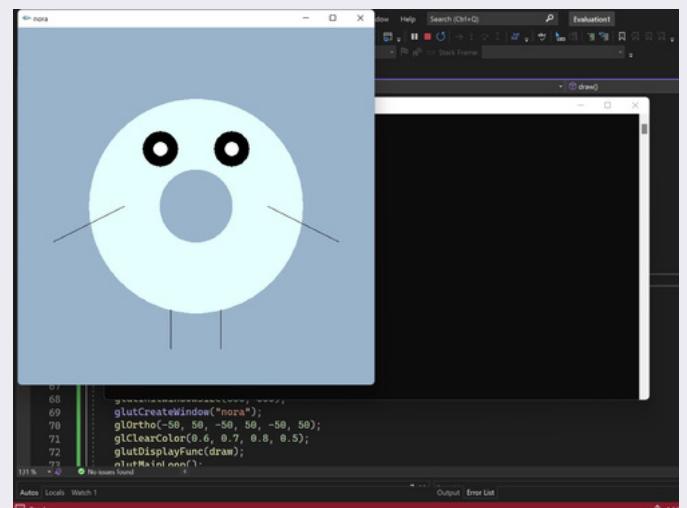
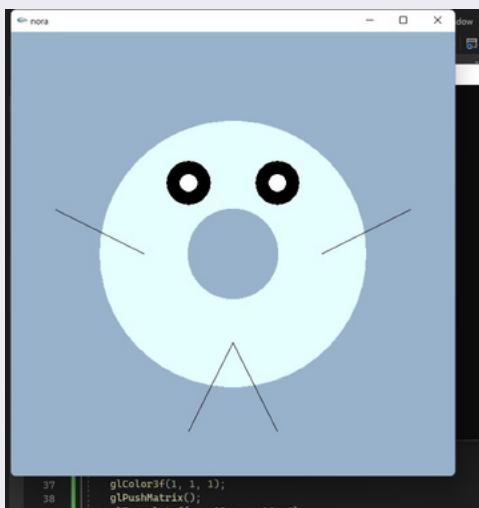
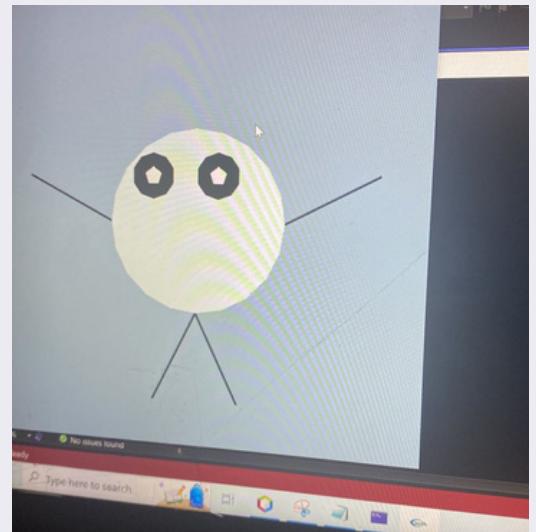
Work Progress:



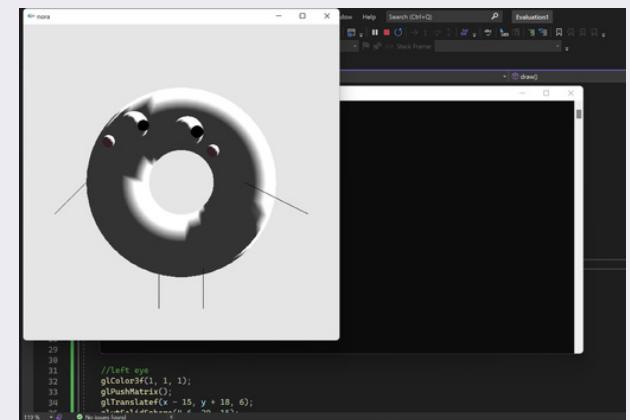
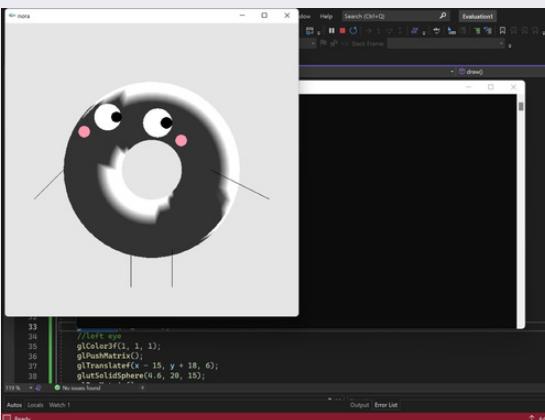
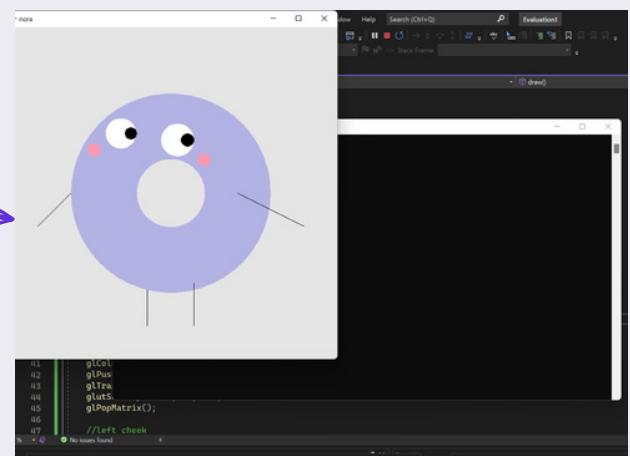
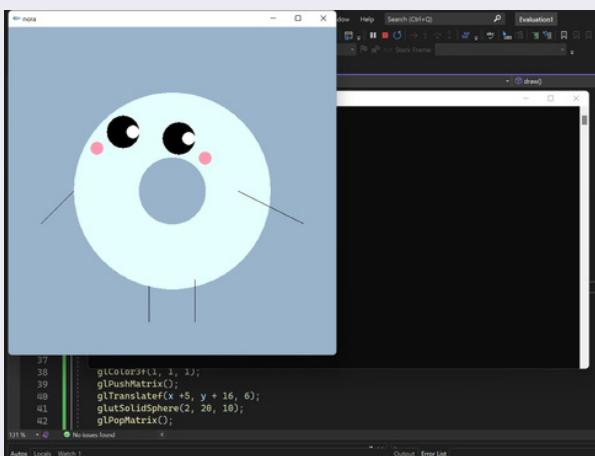
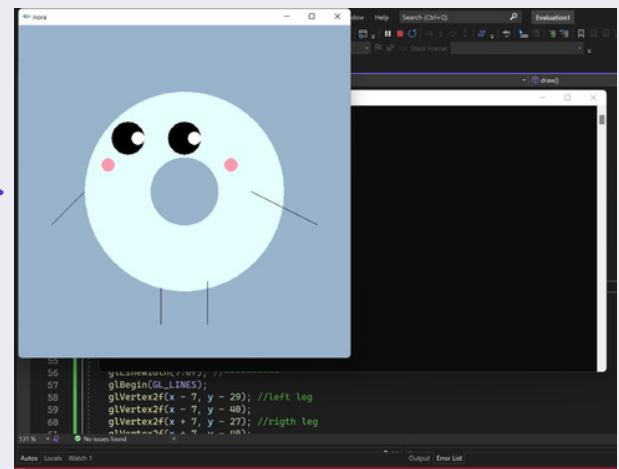
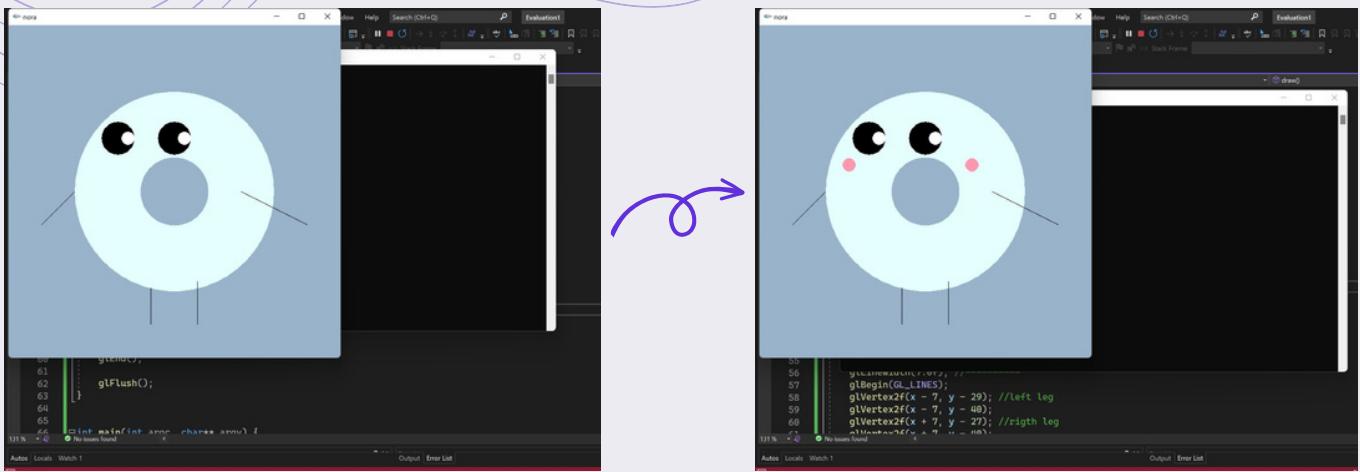
```
Project1 (Running) - Microsoft Visual Studio
FILE EDIT VIEW PROJECT BUILD DEBUG TEAM SQL TOOLS TEST ANALYZE WINDOW HELP
Process: [0x9520] Project1.exe
Scenes.cpp < X
[Global Scope]
C:\Users\user\Documents\#define PI 3.14159265
int numPoints = 500;
float Radius = 0.5;

void draw(void)
{
    glClear(GL_COLOR_BUFFER_BIT);
    glColor3f(1, 1, 1);
    glLoadIdentity();
    glBegin(GL_POLYGON);
    glVertex3f(0, 0, 0);
    glVertex3f(100, 0, 0);
    glVertex3f(100, 30);
    glVertex3f(100, 60);
    glEnd();

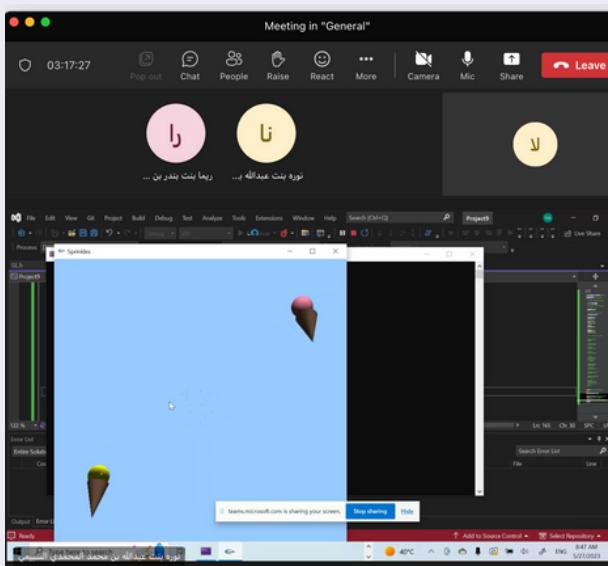
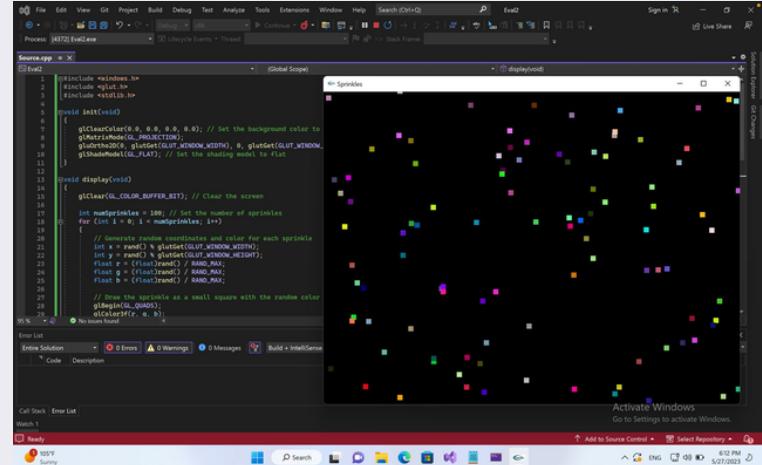
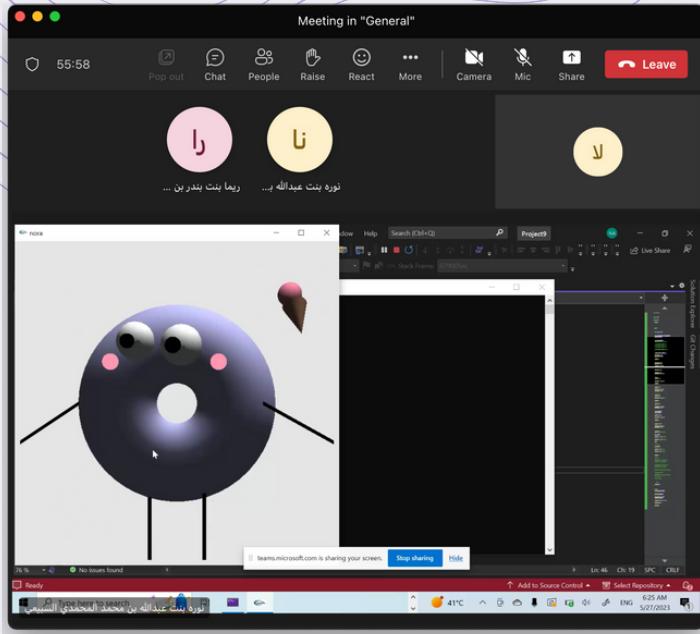
    glColor3f(1, 0.5, 0);
    glBegin(GL_POINTS);
    for (int i = 0; i < numPoints;
        float angle = i * (2 * M_PI / numPoints));
        glVertex3f(Radius * cos(angle), Radius * sin(angle), 0);
    glEnd();
}
```



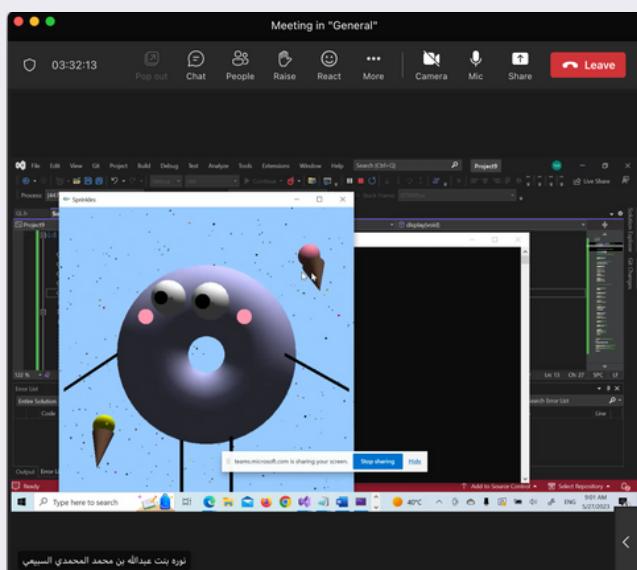
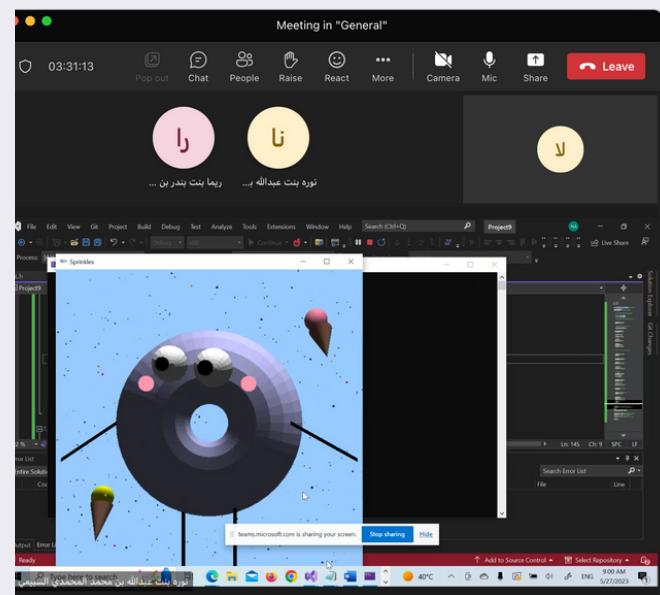
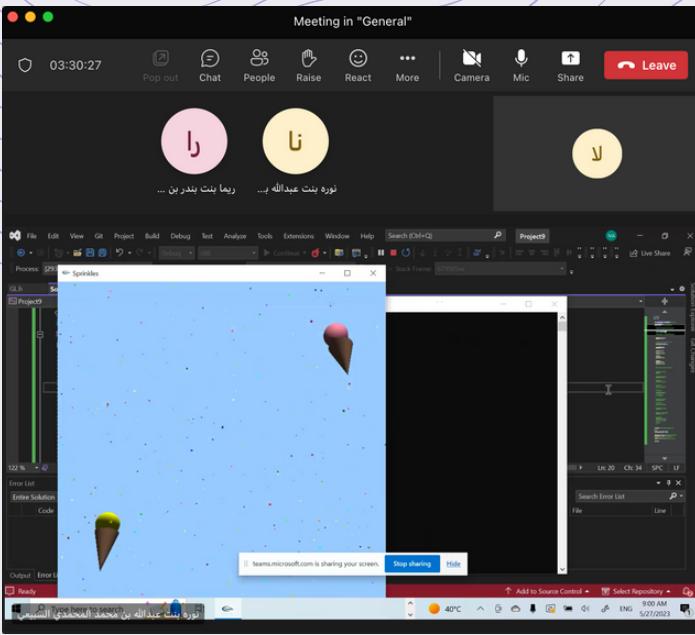
We started with a simple code using polygon then changed to sphere and tours. Then, we changed the smoothness and location of the legs of our object.



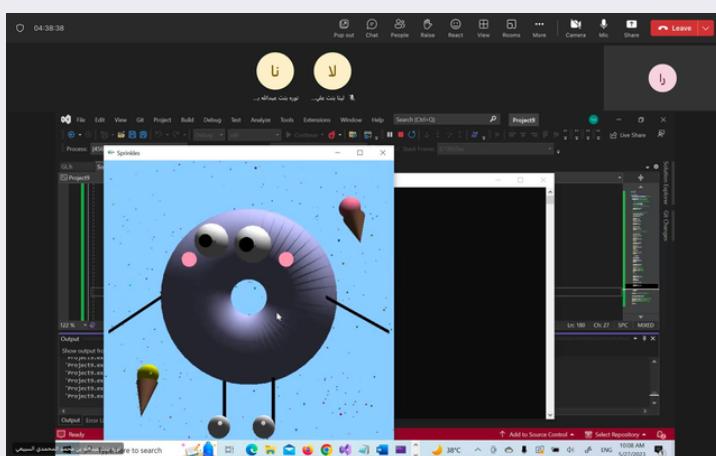
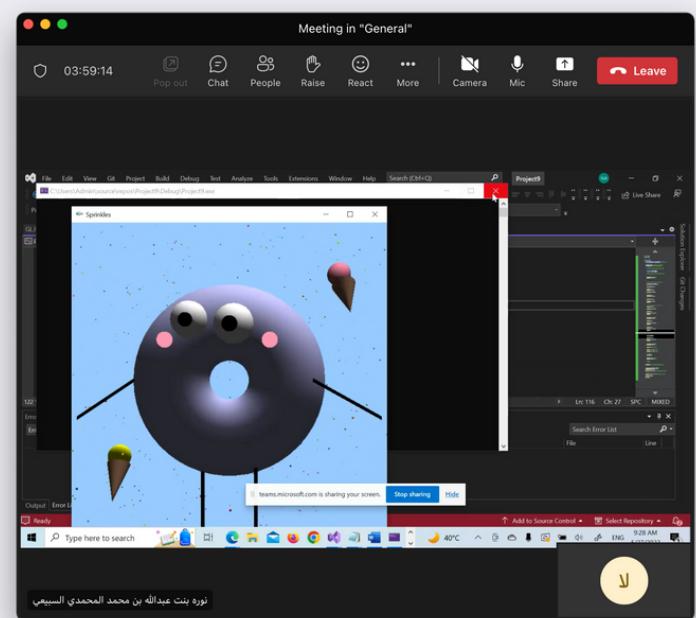
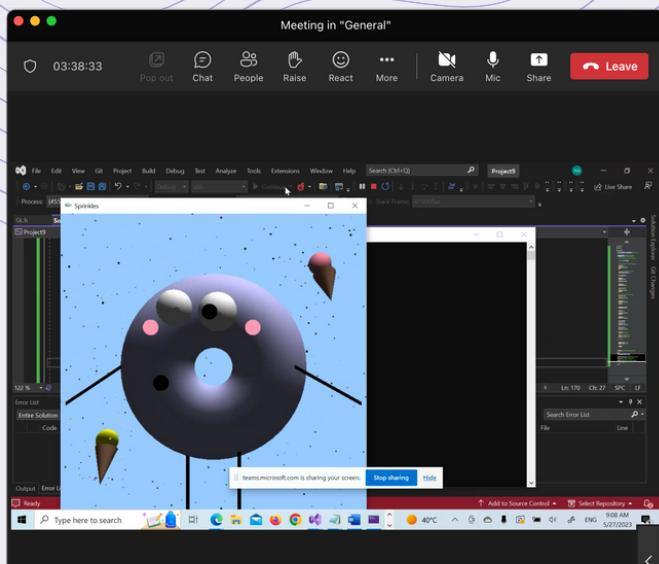
We added checks and altered the position of eyes, legs and checks. Also, we changed the color of object's body and eyes. Then, we added light and adjusted it.



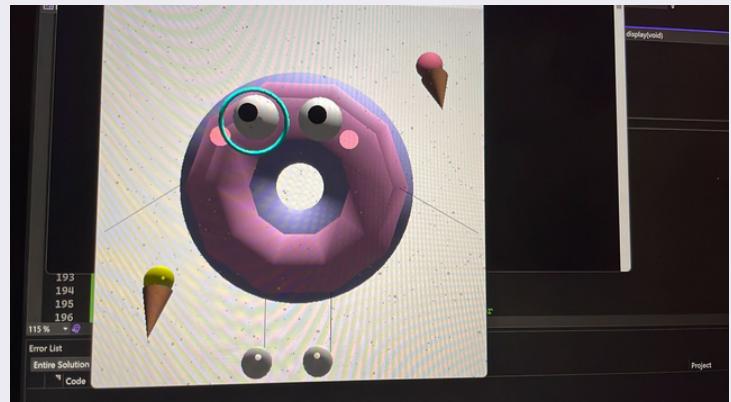
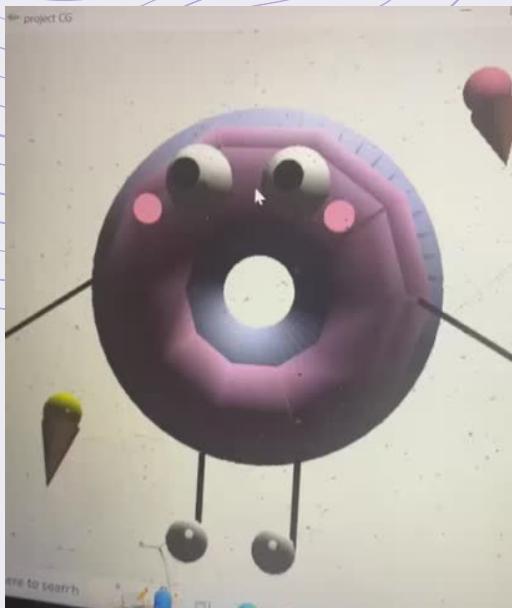
We solved light issues and started on the background. We have added ice cream cones and confetti to the background.



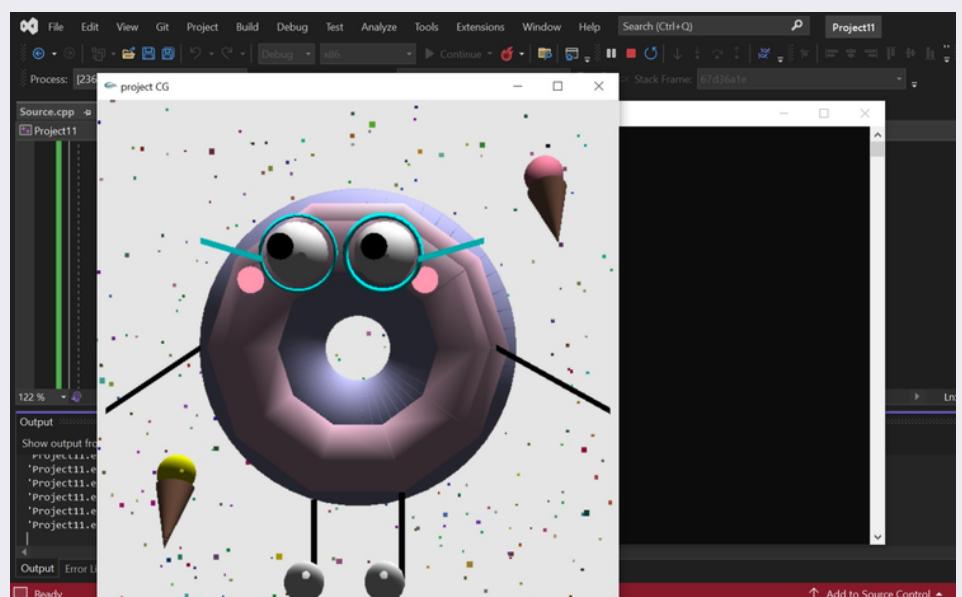
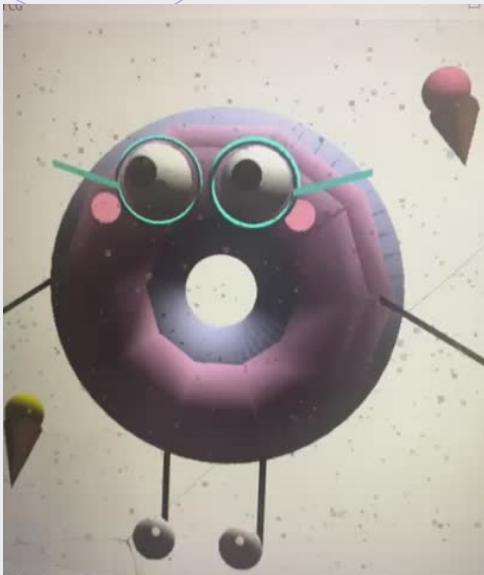
We increased number of confetti and their size in the background. We returned our object and changed shade mode from flat to smooth.



We started animation and there are some issues that we faced such as we started with rotate, and it was not what we wanted. Then, we added shoes to our object's feet.



We added pinkish glaz to our donut, and we made the motion of our object as jumping in the air. Also, we started to add glasses to it.



We continued to add glasses to our object. Also, we have changed the confetti size and the position of the right ice cream ball.

Difficulties Faced and Solution:

- *Coordinates difficulties:*

A problem that happened many times that we want the objects in a certain position and it does not appear in that position. We solved that by trial and error, trying many coordinates till reached the desired position.

- *Lighting difficulties:*

As we started on lighting we faced difficulty in changing its properties. As shown in the previous pictures the objects appeared almost completely white. We solved it by only changing the position of the light and other properties left it on default values.

- *Animation difficulties:*

We faced multiple issues such as moving in wrong direction or the wrong movement. We started the rotate then figured out we wanted translate. Then, we had issues with how fast is it and the range of motion. We solved it by trial and error and retuning to lad's slides and the given exercises.

- *Confetti difficulties:*

We wanted to create confetti shape and did not know how. At first, we made each one individually, but it was redundant and changed it to loop. Then, we were not satisfied with how it looked, so we researched how to make them and saw videos. At the end, we learnt how and made adjustments to the code.

Final Code:

The Project Final Code:

```
//NOURAH_ABDULLAH_ALSUBAIE-442003253
//LEENA_ALI_ALMATER-442003539
//REEMA_BANDAR_ALFALEH-442003907

#include<windows.h>
#include<glut.h>

GLfloat x = 0.0f;
GLfloat y = 0.0f;
GLfloat z = 0.0f;

GLfloat var1 = 0.0f;
GLfloat var2 = 0.0f;

void backG0 {

    int numSprinkles = 500; // Set the number of sprinkles
    glPushMatrix();
    for (int i = 0; i < numSprinkles; i++)
    {
        // Generate random coordinates for each sprinkle
        int t = rand() % 100 - 50;
        int n = rand() % 100 - 50;
        int l = rand() % 100 - 50;

        // Generate random color for each sprinkle
        float r = (float)rand() / RAND_MAX;
        float g = (float)rand() / RAND_MAX;
        float b = (float)rand() / RAND_MAX;
```

```
// Draw the sprinkle as a small square with the random color
glBegin(GL_QUADS);
	glColor3f(r, g, b);
	glVertex3f(t, n, l);
	glVertex3f(t + 0.5, n, l);
	glVertex3f(t + 0.5, n + 0.5, l);
	glVertex3f(t, n + 0.5, l);
	glEnd();

glPopMatrix();

}

glFlush();

}

void display(void)
{
    glClear(GL_COLOR_BUFFER_BIT | GL_DEPTH_BUFFER_BIT); // Clear the screen
    glEnable(GL_LIGHTING);
    glEnable(GL_LIGHT0);
    glEnable(GL_COLOR_MATERIAL);
    glShadeModel(GL_SMOOTH); // Set the shading model to smooth

    backG(); //call the background method
}
```

```
//-----  
glPushMatrix();  
glTranslated(0, var2, 0); //to animate the whole object  
  
GLfloat pos[] = { 30,100,0,0 };  
glLightfv(GL_LIGHT0, GL_POSITION, pos);  
  
//Draw icecream1  
glPushMatrix();  
glColor3f(0.9, 0.5, 0.6);  
glTranslated(29.5, 27.3, 0);  
glutSolidSphere(3, 50, 30);  
glPopMatrix();  
  
glPushMatrix();  
glColor3f(0.7, 0.5, 0.4);  
glTranslated(30, 25, 0);  
glRotated(59, 1, 0, 0);  
glutSolidCone(3, 11, 30, 20);  
glPopMatrix();  
  
//Draw icecream2  
glPushMatrix();  
glColor3f(1, 1, 0);  
glTranslated(-28.8, -20, 0);  
glutSolidSphere(3, 50, 30);  
glPopMatrix();  
  
glPushMatrix();  
glColor3f(0.7, 0.5, 0.4);  
glTranslated(-29, -22, 0);  
glRotated(55, 1, 0, 0);  
glutSolidCone(3, 10, 30, 20);  
glPopMatrix();
```

//-----

```
//body  
glColor3f(0.7, 0.7, 0.9);  
glPushMatrix();  
glutSolidTorus(10, 15, 15, 50);  
glPopMatrix();
```

```
glPushMatrix();  
glColor3f(1, 0.8, 0.9);  
glutSolidTorus(6, 18, 5, 10);  
glPopMatrix();
```

```
//left eye  
glColor3f(1, 1, 1);  
glPushMatrix();  
glTranslatef(x - 9, y + 14, 6);  
glutSolidSphere(4.6, 20, 15);  
glPopMatrix();
```

```
//right eye  
glColor3f(1, 1, 1);  
glPushMatrix();  
glTranslatef(x + 4, y + 14, 6);  
glutSolidSphere(4.6, 20, 15);  
glPopMatrix();
```

```
//left eye pupil  
glColor3f(0, 0, 0);  
glPushMatrix();  
glTranslatef(var1, 0, 0);  
glTranslatef(x - 12, y + 15, 6);  
glutSolidSphere(2, 20, 10);  
glPopMatrix();
```

```
//right eye pupil  
glColor3f(0, 0, 0);  
glPushMatrix();  
glTranslatef(var1, 0, 0);  
glTranslatef(x + 2, y + 15, 6);  
glutSolidSphere(2, 20, 10);  
glPopMatrix();  
  
//Set the animation on the eyes  
if (var1 > 2)  
    var1 = 0;  
else  
    var1 += 0.002;  
  
glDisable(GL_LIGHTING);  
glDisable(GL_LIGHT0);  
  
//left cheek  
glColor3f(1, 0.6, 0.7);  
glPushMatrix();  
glTranslatef(x - 16, y + 10, 6);  
glutSolidSphere(2, 20, 10);  
glPopMatrix();  
  
//right cheek  
glColor3f(1, 0.6, 0.7);  
glPushMatrix();  
glTranslatef(x + 10, y + 10, 6);  
glutSolidSphere(2, 20, 10);  
glPopMatrix();
```

```
//Draw the legs
glColor3f(0, 0, 0); // black color
glLineWidth(7.0f);
glBegin(GL_LINES);
// glScaled(z, z, z);
glVertex2f(x - 7, y - 24); //left leg
glVertex2f(x - 7, y - 35);

glVertex2f(x + 7, y - 23); //right leg
glVertex2f(x + 7, y - 37);
glEnd();

//Draw the arms
glPushMatrix();
glLineWidth(7.0f);
glBegin(GL_LINES);
glVertex2f(x - 25, y); //left arm
glVertex2f(x - 40, y - 10);

glVertex2f(x + 22, y); //right arm
glVertex2f(x + 40, y - 10);

glEnd();

glPopMatrix();

glEnable(GL_LIGHTING);
glEnable(GL_LIGHT0);
```

```
//Draw the Shoes
```

```
glPushMatrix();
glColor3f(1, 1, 1); //white color
glTranslatef(x - 8, y - 35, 6);
	glutSolidSphere(3, 18, 15);
glPopMatrix();
```

```
glPushMatrix();
glColor3f(1, 1, 1); //white color
glTranslatef(x + 4, y - 35, 6);
	glutSolidSphere(3, 18, 15);
glPopMatrix();
```

```
//-----
```

```
//Draw the glasses
```

```
//left lens
glPushMatrix();
glColor3f(0, 1, 1);
glTranslated(-9.5, 15, 0);
glScaled(0.3, 0.3, 0.35);
	glutSolidTorus(1, 20, 30, 30);
glPopMatrix();
```

```
glPushMatrix();
glColor3f(0, 1, 1);
glTranslated(4, 15, 0);
glScaled(0.3, 0.3, 0.35);
	glutSolidTorus(1.5, 20, 30, 30);
glPopMatrix();
```

```
//Set the animation on the whole object
if (var2 > 10)
    var2 = 0;
else
    var2 += 0.01;

glPopMatrix();

glutSwapBuffers(); // Swap the buffers to display the new scene

}

void main() {
    glutInitDisplayMode(GLUT_DOUBLE | GLUT_RGB);
    glutInitWindowSize(600, 600);
    glutInitWindowPosition(100, 100);

    glutCreateWindow("project CG");
    glClearColor(0.9, 0.9, 0.9, 0.5);

    glMatrixMode(GL_PROJECTION);
    gluPerspective(45, 1, 1, 1000); // Set the perspective view

    glMatrixMode(GL_MODELVIEW);
    glLoadIdentity();

    gluLookAt(0, 0, 100, 0, 0, 0, 0, 1, 0); // Set the camera position
    glutDisplayFunc(display);
    glutIdleFunc(display);

    glutMainLoop();
}
```

Students contribution in the project:

Our group met frequently both online and at the college's campus as we worked on the project entirely together. Together, the team has been able to develop the code and animate our project by taking advantage of the strengths and abilities of each team member. Our team collaborated to make sure the project was completed to the best of everyone's abilities. Together, we overcame any difficulties we encountered while working on this project by providing each other with feedback, suggestions, and collaboration. To ensure that the project is successfully completed, effective communication and task collaboration have been essential. Overall, each student's participation was important to the project's success, and the group's ability to collaborate effectively was significant to its completion.