## Part : B Microproject Report

### 1.0 Summary

In this project, we did some animations by using the <graphics.h> header file.

### 2.0 Course action addressed

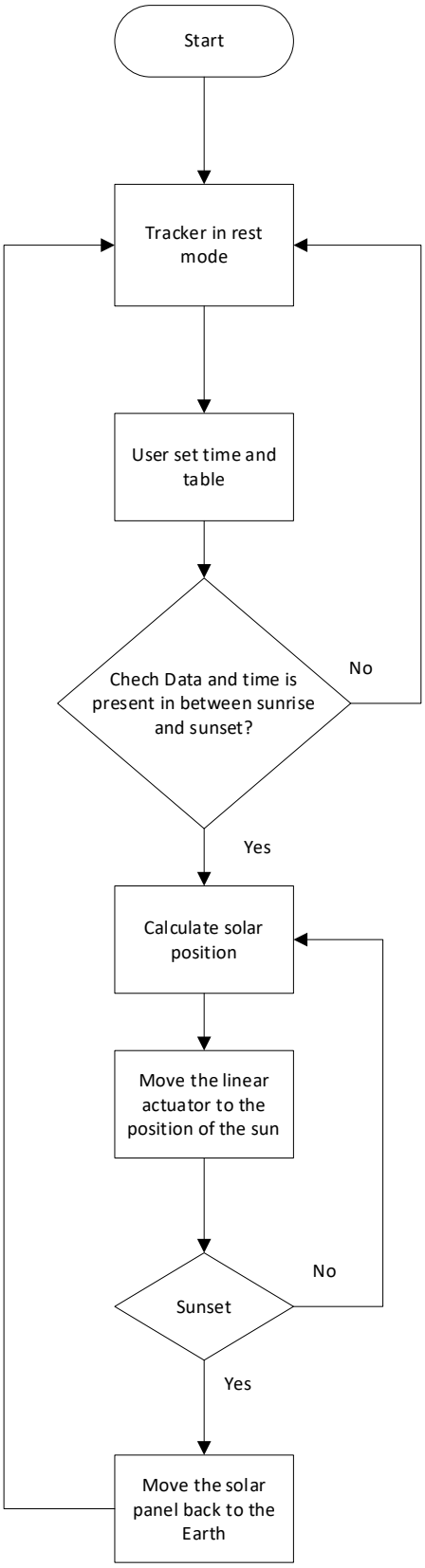
- Manipulate visual and geometric information of images.
- Implement Polygon Algorithm.
- Implement standard Algorithms to draw various Graphics Objects using C

### 3.0 Actual methodology

**a) Algorithm:**

Step 1: Start.
Step 2: Initialize the graphics library.
Step 3: Create a window of a desired size.
Step 4: Draw a circle to represent the sun in the center of the window.
Step 5: Draw a set of concentric circles around the sun to represent the orbits of the planets.
Step 6: Draw each planet along its respective orbit.
Step 7: Add details such as rings (for Saturn), moons, clouds, etc.
Step 8: Use color and shading to make the scene more realistic.
Step 9: Add a light source to simulate the sun's light.
Step 10: Simulate the motion of the planets by changing their positions on the orbits.
Step 11: End.

**b.)Flowchart:**


Start
Tracker in rest mode
User set time and table
Chech Data and time is present in between sunrise and sunset?
No
Yes
Calculate solar position
Move the linear actuator to the position of the sun
Sunset
No
Yes
Move the solar panel back to the Earth

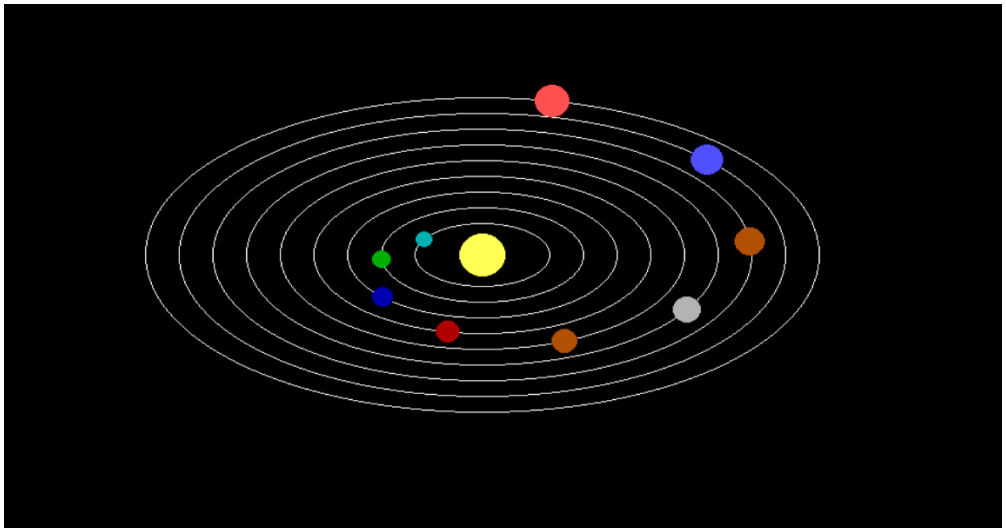
**c.) Source code:**

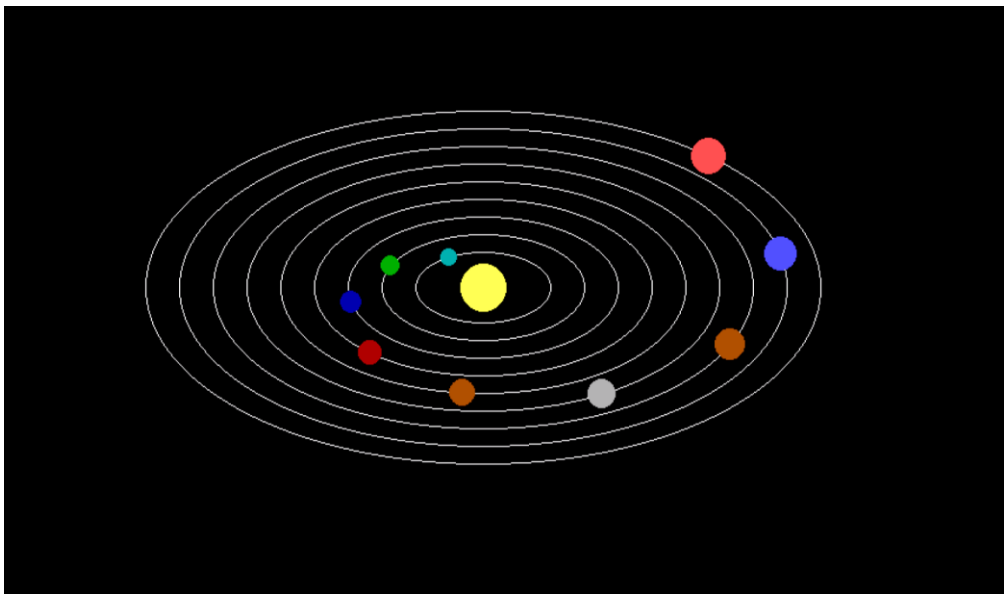
```
#include <stdio.h>
#include <stdlib.h>
#include <GL/glut.h>
#include <math.h>
#define PI 3.1416

// Define global variables
GLfloat hour = 0.0, minute = 0.0, second = 0.0, millisecond = 0.0;
GLfloat days = 0.0, months = 0.0, years = 0.0;

// function to initialize
void init(void)
{
    // glClearColor (red, green, blue, alpha)
    glClearColor(0.0, 0.0, 0.0, 0.0);
    glMatrixMode(GL_PROJECTION);
    glLoadIdentity();
    gluOrtho2D(-1.0, 1.0, -1.0, 1.0);
}

// Function to draw Objects
void drawObjects(void)
{
    // Draw Sun
    glColor3f(1.0, 1.0, 0.0);
    glPushMatrix();
    glTranslatef(0.0, 0.0, -1.0);
    glutWireSphere(0.1, 20, 16);
    glPopMatrix();

    // Draw 2D grid along X-Y axis
    glColor3f(1.0, 1.0, 1.0);
    glPushMatrix();
    glTranslatef(0.0, 0.0, -1.0);
    glBegin(GL_LINES);

    // Loop to draw grid along X-axis
    for (float i = -1; i <= 1; i = i + 0.001) {
            glVertex3f(i, -1, 0);
            glVertex3f(i, 1, 0);
    }
```

```
    // Loop to draw grid along Y-axis
    for (float i = -1; i <= 1; i = i + 0.001) {
            glVertex3f(-1, i, 0);
            glVertex3f(1, i, 0);
    }
    glEnd();
    glPopMatrix();

    // Draw Moon
    glColor3f(0.5, 0.5, 0.5);
    glPushMatrix();
    glTranslatef(0.0, 0.0, -1.0);
    glRotatef(days, 0.0, 1.0, 0.0);
    glTranslatef(0.2, 0.0, 0.0);
    glutWireSphere(0.05, 10, 8);
    glPopMatrix();
}

// Display Function
void display(void)
{
    glClear(GL_COLOR_BUFFER_BIT);
    drawObjects();
    glFlush();
}

// Reshape Function
void reshape(int w, int h)
{
    glViewport(0, 0, (GLsizei)w, (GLsizei)h);
    glMatrixMode(GL_PROJECTION);
    glLoadIdentity();
    gluOrtho2D(-1.0, 1.0, -1.0, 1.0);
    glMatrixMode(GL_MODELVIEW);
    glLoadIdentity();
}

// Timer Function
void timer(int value)
{
    millisecond = millisecond + 1;

    if (millisecond >= 100) {
            second = second + 1;
```

```
            millisecond = 0;
        }
        if (second >= 60) {
            minute = minute + 1;
            second = 0;
        }
        if (minute >= 60) {
            hour = hour + 1;
            minute = 0;
        }

        days = days + 5;
        if (days >= 360) {
            months = months + 1;
            days = 0;
        }
        if (months >= 12) {
            years = years + 1;
            months = 0;
        }
        glutPostRedisplay();
        glutTimerFunc(100, timer, 0);
    }

    // Main Function
    int main(int argc, char** argv)
    {
        glutInit(&argc, argv);
        glutInitDisplayMode(GLUT_RGB | GLUT_SINGLE);
        glutInitWindowSize(500, 500);
        glutInitWindowPosition(100, 100);
        glutCreateWindow("3D Solar System Simulation");
        init();
        glutDisplayFunc(display);
        glutReshapeFunc(reshape);
        glutTimerFunc(100, timer, 0);
        glutMainLoop();
        return 0;
    }
```

**4.0 Microproject output:**





**5.0 Actual resources used**

i. Google For References
ii. TurboC3 For Coding and Compiling

**6.0 Skills developed**

- We developed programming skills
- We developed searching skills
- We developed out team work skills
- We developed learning skills

**7.0 Application of Microproject**

- Animation
- Creating objects