**Lab Taks-2**

Submission Guidelines-

* Rename the file to your id only. If your id is 18-XXXXX-1, then the file name must be 18-XXXXX-1.docx.
* Must submit within time that will be discussed in class VUES to the section named Lab Tak-2
* Must include resources for all the section in the table

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| **Question- 1**  Draw a Rainbow Flag   |  | | --- | |  | |  | |  | |  | |  | |  | |  | |
| **Graph Plot (Picture)-**  **A screen shot of a graph  Description automatically generated** |
| **Code-**  **#include <windows.h>**  **#include <GL/glut.h>**  **void rectangle() {**  **glBegin(GL\_POLYGON);**  **glColor3f(0.4f, 0.3f, 0.5f);**  **glVertex2f(-80.0, 80.0);**  **glVertex2f(80.0, 80.0);**  **glVertex2f(80.0, 60.0);**  **glVertex2f(-80.0, 60.0);**  **glEnd();**  **glLineWidth(1);**  **glBegin(GL\_LINES);**  **glColor3f(0.0f, 0.0f, 0.0f);**  **glVertex2f(-80.0, 80.0);**  **glVertex2f(80.0, 80.0);**  **glVertex2f(80.0, 80.0);**  **glVertex2f(80.0, 60.0);**  **glVertex2f(80.0, 60.0);**  **glVertex2f(-80.0, 60.0);**  **glVertex2f(-80.0, 60.0);**  **glVertex2f(-80.0, 80.0);**  **glEnd();**  **glBegin(GL\_POLYGON);**  **glColor3f(0.3f, 0.4f, 0.8f);**  **glVertex2f(-80.0, 60.0);**  **glVertex2f(80.0, 60.0);**  **glVertex2f(80.0, 40.0);**  **glVertex2f(-80.0, 40.0);**  **glEnd();**  **glLineWidth(1);**  **glBegin(GL\_LINES);**  **glColor3f(0.0f, 0.0f, 0.0f);**  **glVertex2f(-80.0, 60.0);**  **glVertex2f(80.0, 60.0);**  **glVertex2f(80.0, 60.0);**  **glVertex2f(80.0, 40.0);**  **glVertex2f(80.0, 40.0);**  **glVertex2f(-80.0, 40.0);**  **glVertex2f(-80.0, 40.0);**  **glVertex2f(-80.0, 60.0);**  **glEnd();**  **glBegin(GL\_POLYGON);**  **glColor3f(0.1f, .8f, 0.85f);**  **glVertex2f(-80.0, 40.0);**  **glVertex2f(80.0, 40.0);**  **glVertex2f(80.0, 20.0);**  **glVertex2f(-80.0, 20.0);**  **glEnd();**  **glLineWidth(1);**  **glBegin(GL\_LINES);**  **glColor3f(0.0f, 0.0f, 0.0f);**  **glVertex2f(-80.0, 40.0);**  **glVertex2f(80.0, 40.0);**  **glVertex2f(80.0, 40.0);**  **glVertex2f(80.0, 20.0);**  **glVertex2f(80.0, 20.0);**  **glVertex2f(-80.0, 20.0);**  **glVertex2f(-80.0, 20.0);**  **glVertex2f(-80.0, 40.0);**  **glEnd();**  **glBegin(GL\_POLYGON);**  **glColor3f(0.0f, 0.6f, 0.0f);**  **glVertex2f(-80.0, 20.0);**  **glVertex2f(80.0, 20.0);**  **glVertex2f(80.0, 0.0);**  **glVertex2f(-80.0, 0.0);**  **glEnd();**  **glLineWidth(1);**  **glBegin(GL\_LINES);**  **glColor3f(0.0f, 0.0f, 0.0f);**  **glVertex2f(-80.0, 20.0);**  **glVertex2f(80.0, 20.0);**  **glVertex2f(80.0, 20.0);**  **glVertex2f(80.0, 0.0);**  **glVertex2f(80.0, 0.0);**  **glVertex2f(-80.0,0.0);**  **glVertex2f(-80.0, 0.0);**  **glVertex2f(-80.0, 20.0);**  **glEnd();**  **glBegin(GL\_POLYGON);**  **glColor3f(1.0f, 0.5f, 0.0f);**  **glVertex2f(-80.0, 0.0);**  **glVertex2f(80.0, 0.0);**  **glVertex2f(80.0, -20.0);**  **glVertex2f(-80.0, -20.0);**  **glEnd();**  **glLineWidth(1);**  **glBegin(GL\_LINES);**  **glColor3f(0.0f, 0.0f, 0.0f);**  **glVertex2f(-80.0, 0.0);**  **glVertex2f(80.0, 0.0);**  **glVertex2f(80.0, 0.0);**  **glVertex2f(80.0, -20.0);**  **glVertex2f(80.0, -20.0);**  **glVertex2f(-80.0,-20.0);**  **glVertex2f(-80.0, -20.0);**  **glVertex2f(-80.0, 0.0);**  **glEnd();**  **glBegin(GL\_POLYGON);**  **glColor4f(1.0f, 1.0f, 0.0f, 0.0f);**  **glVertex2f(-80.0, -20.0);**  **glVertex2f(80.0, -20.0);**  **glVertex2f(80.0, -40.0);**  **glVertex2f(-80.0, -40.0);**  **glEnd();**  **glLineWidth(1);**  **glBegin(GL\_LINES);**  **glColor3f(0.0f, 0.0f, 0.0f);**  **glVertex2f(-80.0,-20.0);**  **glVertex2f(80.0, -20.0);**  **glVertex2f(80.0, -20.0);**  **glVertex2f(80.0, -40.0);**  **glVertex2f(80.0, -40.0);**  **glVertex2f(-80.0,-40.0);**  **glVertex2f(-80.0, -40.0);**  **glVertex2f(-80.0, -20.0);**  **glEnd();**  **glBegin(GL\_POLYGON);**  **glColor4f(1.0f, 0.0f, 0.0f, 0.0f);**  **glVertex2f(-80.0, -40.0);**  **glVertex2f(80.0, -40.0);**  **glVertex2f(80.0, -60.0);**  **glVertex2f(-80.0, -60.0);**  **glEnd();**  **glLineWidth(1);**  **glBegin(GL\_LINES);**  **glColor3f(0.0f, 0.0f, 0.0f);**  **glVertex2f(-80.0,-40.0);**  **glVertex2f(80.0, -40.0);**  **glVertex2f(80.0, -40.0);**  **glVertex2f(80.0, -60.0);**  **glVertex2f(80.0, -60.0);**  **glVertex2f(-80.0,-60.0);**  **glVertex2f(-80.0, -60.0);**  **glVertex2f(-80.0, -40.0);**  **glEnd();**  **}**  **void display() {**  **glClearColor(1.0, 1.0, 1.0, 1.0);**  **glClear(GL\_COLOR\_BUFFER\_BIT);**  **rectangle();**  **glFlush();**  **}**  **int main(int argc, char\*\* argv) {**  **glutInit(&argc, argv);**  **glutCreateWindow("OpenGL Setup");**  **glutInitWindowSize(420, 420);**  **glutInitWindowPosition(80, 80);**  **glutDisplayFunc(display);**  **gluOrtho2D(-170, 170, -170, 170);**  **glutMainLoop();**  **return 0;**  **}** |
| **Output Screenshot (Full Screen)-**  **A screenshot of a computer  Description automatically generated** |

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| **Question- 2**  Draw 4X4 Chess Board |
| **Graph Plot (Picture)-**  **A grid with lines and dots  Description automatically generated** |
| **Code-**  **#include <windows.h>**  **#include <GL/glut.h>**  **void square() {**  **glBegin(GL\_POLYGON);**  **glColor3f(0.0f, 0.0f, 0.0f);**  **glVertex2f(-40.0, 40.0);**  **glVertex2f(-20.0, 40.0);**  **glVertex2f(-20.0, 20.0);**  **glVertex2f(-40.0, 20.0);**  **glEnd();**  **glBegin(GL\_POLYGON);**  **glColor3f(1.0f, 1.0f, 1.0f);**  **glVertex2f(-20.0, 40.0);**  **glVertex2f(0.0, 40.0);**  **glVertex2f(0.0, 20.0);**  **glVertex2f(-20.0, 20.0);**  **glEnd();**  **glBegin(GL\_POLYGON);**  **glColor3f(0.0f, 0.0f, 0.0f);**  **glVertex2f(0.0, 40.0);**  **glVertex2f(20.0, 40.0);**  **glVertex2f(20.0, 20.0);**  **glVertex2f(0.0, 20.0);**  **glEnd();**  **glBegin(GL\_POLYGON);**  **glColor3f(1.0f, 1.0f, 1.0f);**  **glVertex2f(20.0, 40.0);**  **glVertex2f(40.0, 40.0);**  **glVertex2f(40.0, 20.0);**  **glVertex2f(20.0, 20.0);**  **glEnd();**  **glBegin(GL\_POLYGON);**  **glColor3f(1.0f, 1.0f, 1.0f);**  **glVertex2f(-40.0, 20.0);**  **glVertex2f(-20.0, 20.0);**  **glVertex2f(-20.0, 0.0);**  **glVertex2f(-40.0, 0.0);**  **glEnd();**  **glBegin(GL\_POLYGON); ///square6**  **glColor3f(0.0f, 0.0f, 0.0f);**  **glVertex2f(-20.0, 20.0);**  **glVertex2f(0.0, 20.0);**  **glVertex2f(0.0, 0.0);**  **glVertex2f(-20.0, 0.0);**  **glEnd();**  **glBegin(GL\_POLYGON); ///square7**  **glColor3f(1.0f, 1.0f, 1.0f);**  **glVertex2f(0.0, 20.0);**  **glVertex2f(20.0, 20.0);**  **glVertex2f(20.0, 0.0);**  **glVertex2f(0.0, 0.0);**  **glEnd();**  **glBegin(GL\_POLYGON); ///square8**  **glColor3f(0.0f, 0.0f, 0.0f);**  **glVertex2f(20.0, 20.0);**  **glVertex2f(40.0, 20.0);**  **glVertex2f(40.0, 0.0);**  **glVertex2f(20.0, 0.0);**  **glEnd();**  **glBegin(GL\_POLYGON); ///square9**  **glColor3f(0.0f, 0.0f, 0.0f);**  **glVertex2f(-40.0, 0.0);**  **glVertex2f(-20.0, 0.0);**  **glVertex2f(-20.0, -20.0);**  **glVertex2f(-40.0, -20.0);**  **glEnd();**  **glBegin(GL\_POLYGON); ///square10**  **glColor3f(1.0f, 1.0f, 1.0f);**  **glVertex2f(-20.0, 0.0);**  **glVertex2f(0.0, 0.0);**  **glVertex2f(0.0, -20.0);**  **glVertex2f(-20.0, -20.0);**  **glEnd();**  **glBegin(GL\_POLYGON); ///square11**  **glColor3f(0.0f, 0.0f, 0.0f);**  **glVertex2f(0.0, 0.0);**  **glVertex2f(20.0, 0.0);**  **glVertex2f(20.0, -20.0);**  **glVertex2f(0.0, -20.0);**  **glEnd();**  **glBegin(GL\_POLYGON); ///square12**  **glColor3f(1.0f, 1.0f, 1.0f);**  **glVertex2f(20.0, 0.0);**  **glVertex2f(40.0, 0.0);**  **glVertex2f(40.0, -20.0);**  **glVertex2f(20.0, -20.0);**  **glEnd();**  **glBegin(GL\_POLYGON); ///square13**  **glColor3f(1.0f, 1.0f, 1.0f);**  **glVertex2f(-40.0, -20.0);**  **glVertex2f(-20.0, -20.0);**  **glVertex2f(-20.0, -40.0);**  **glVertex2f(-40.0, -40.0);**  **glEnd();**  **glBegin(GL\_POLYGON); ///square14**  **glColor3f(0.0f, 0.0f, 0.0f);**  **glVertex2f(-20.0, -20.0);**  **glVertex2f(0.0, -20.0);**  **glVertex2f(0.0, -40.0);**  **glVertex2f(-20.0, -40.0);**  **glEnd();**  **glBegin(GL\_POLYGON); ///square15**  **glColor3f(1.0f, 1.0f, 1.0f);**  **glVertex2f(0.0, -20.0);**  **glVertex2f(20.0, -20.0);**  **glVertex2f(20.0, -40.0);**  **glVertex2f(0.0, -40.0);**  **glEnd();**  **glBegin(GL\_POLYGON); ///square16**  **glColor3f(0.0f, 0.0f, 0.0f);**  **glVertex2f(20.0, -20.0);**  **glVertex2f(40.0, -20.0);**  **glVertex2f(40.0, -40.0);**  **glVertex2f(20.0, -40.0);**  **glEnd();**  **glLineWidth(2);**  **glBegin(GL\_LINES); ///BlackBoarder**  **glColor3f(0.0f, 0.0f, 0.0f);**  **glVertex2f(-40.0, 40.0);**  **glVertex2f(40.0, 40.0);**  **glVertex2f(40.0, 40.0);**  **glVertex2f(40.0, -40.0);**  **glVertex2f(40.0, -40.0);**  **glVertex2f(-40.0, -40.0);**  **glVertex2f(-40.0, -40.0);**  **glVertex2f(-40.0, 40.0);**  **glEnd();**  **}**  **void display() {**  **glClearColor(1.0, 1.0, 1.0, 1.0);**  **glClear(GL\_COLOR\_BUFFER\_BIT);**  **square();**  **glFlush();**  **}**  **int main(int argc, char\*\* argv) {**  **glutInit(&argc, argv);**  **glutCreateWindow("OpenGL Setup");**  **glutInitWindowSize(420, 420);**  **glutInitWindowPosition(80, 80);**  **glutDisplayFunc(display);**  **gluOrtho2D(-170, 170, -170, 170);**  **glutMainLoop();**  **return 0;**  **}** |
| **Output Screenshot (Full Screen)-**  **A screenshot of a computer  Description automatically generated** |

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| **Question- 3**  Create the batman logo given below- |
| **Graph Plot (Picture)-**  **A graph with lines and dots  Description automatically generated** |
| **Code-**  **#include <windows.h> // for MS Windows**  **#include <GL/glut.h> // GLUT, include glu.h and gl.h**  **void polygon1(){**  **glBegin(GL\_POLYGON);**  **glColor3ub(0,0,0);**  **glVertex2f(-8.0f, 6.3f);**  **glVertex2f(-13.0f, 7.0f);**  **glVertex2f(-15.0f, 10.0f);**  **glVertex2f(-35.0f, 10.0f);**  **glVertex2f(-23.0f, 3.0f);**  **glVertex2f(-22.0f, -5.0f);**  **glVertex2f(-15.0f, -6.0f);**  **glVertex2f(-6.8f, -10.0f);**  **glEnd();**  **}**  **void triangle1() {**  **glBegin(GL\_POLYGON);**  **glColor3ub(0, 0, 0);**  **glVertex2f(-4.8, 6.2);**  **glVertex2f(-6.8f, 10.0f);**  **glVertex2f(-8.0f, 6.3f);**  **glEnd();**  **}**  **void triangle2() {**  **glBegin(GL\_POLYGON);**  **glColor3ub(0,0, 0);**  **glVertex2f(-1.6, 6.2);**  **glVertex2f(0.0f, 10.0f);**  **glVertex2f(1.5f, 6.3f);**  **glEnd();**  **}**  **void polygon2()**  **{**  **glBegin(GL\_POLYGON);**  **glColor3ub(0,0,0);**  **glVertex2f(1.5f, 6.3f);**  **glVertex2f(7.0f, 7.0f);**  **glVertex2f(9.0f, 10.0f);**  **glVertex2f(30.0f, 10.0f);**  **glVertex2f(18.0f, 3.0f);**  **glVertex2f(17.0f, -5.0f);**  **glVertex2f(10.0f, -6.0f);**  **glVertex2f(1.8f, -10.0f);**  **glEnd();**  **}**  **void polygon3()**  **{**  **glBegin(GL\_POLYGON);**  **glColor3ub(0,0,0);**  **glVertex2f(-8.0f, 6.3f);**  **glVertex2f(-6.8f, -10.0f);**  **glVertex2f(-2.8f, -17.0f);**  **glVertex2f(1.8f, -10.0f);**  **glVertex2f(1.5f, 6.3f);**  **glVertex2f(-1.6, 6.2);**  **glVertex2f(-4.8f, 6.2f);**  **glEnd();**  **}**  **void display() {**  **glClearColor(1.0, 1.0, 1.0, 1.0);**  **glClear(GL\_COLOR\_BUFFER\_BIT); // Clear the color buffer with current clearing color**  **polygon1();**  **triangle1();**  **triangle2();**  **polygon2();**  **polygon3();**  **glFlush(); // Render now**  **}**  **/\* Main function: GLUT runs as a console application starting at main() \*/**  **int main(int argc, char\*\* argv) {**  **glutInit(&argc, argv);**  **glutCreateWindow("OpenGL Setup");**  **glutInitWindowSize(420, 420);**  **glutInitWindowPosition(80, 80);**  **glutDisplayFunc(display);**  **gluOrtho2D(-90, 90, -90, 90);**  **glutMainLoop();**  **return 0;**  **}** |
| **Output Screenshot (Full Screen)-** |