**Lab Taks-2**

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| **Question- 1**  Draw a Rainbow Flag   |  | | --- | |  | |  | |  | |  | |  | |  | |  | |
| **Graph Plot (Picture)-** |
| **Code-**  #include <windows.h> // for MS Windows  #include <GL/glut.h> // GLUT, include glu.h and gl.h  #include <math.h>  /\* Handler for window-repaint event. Call back when the window first appears and  whenever the window needs to be re-painted. \*/  void display() {  glClearColor(1.0f, 1.0f, 1.0f, 1.0f); // Set background color to black and opaque  glClear(GL\_COLOR\_BUFFER\_BIT); // Clear the color buffer (background)  glLineWidth(7.5);  // Green  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(1.0f, 0.0f, 0.0f); //RED  glVertex2f(-0.7f, -0.5f);  glVertex2f(0.7f, -0.5f);  glVertex2f(0.7f, -0.3f);  glVertex2f(-0.7f, -0.3f);  glEnd();  // YELLOW  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(1.0f, 1.0f, 0.0f); //RED  glVertex2f(-0.7f, -0.3f);  glVertex2f(0.7f, -0.3f);  glVertex2f(0.7f, -0.1f);  glVertex2f(-0.7f, -0.1f);  glEnd();  // ORANGE  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(1.0f, 0.5f, 0.0f); //Orange  glVertex2f(-0.7f, -0.1f);  glVertex2f(0.7f, -0.1f);  glVertex2f(0.7f, 0.1f);  glVertex2f(-0.7f, 0.1f);  glEnd();  // GREEN  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 1.0f, 0.0f); //GREEN  glVertex2f(-0.7f, 0.1f);  glVertex2f(0.7f, 0.1f);  glVertex2f(0.7f, 0.3f);  glVertex2f(-0.7f, 0.3f);  glEnd();  // CYAN  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 1.0f, 1.0f); //CYAN  glVertex2f(-0.7f, 0.3f);  glVertex2f(0.7f, 0.3f);  glVertex2f(0.7f, 0.5f);  glVertex2f(-0.7f, 0.5f);  glEnd();  // BLUE  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 1.0f); //BLUE  glVertex2f(-0.7f, 0.5f);  glVertex2f(0.7f, 0.5f);  glVertex2f(0.7f, 0.7f);  glVertex2f(-0.7f, 0.7f);  glEnd();  // PURPLE  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(1.0f, 0.0f, 1.0); //PURPLE  glVertex2f(-0.7f, 0.7f);  glVertex2f(0.7f, 0.7f);  glVertex2f(0.7f, 0.9f);  glVertex2f(-0.7f, 0.9f);  glEnd();  glFlush(); // Render now  }  /\* Main function: GLUT runs as a console application starting at main() \*/  int main(int argc, char\*\* argv) {  glutInit(&argc, argv); // Initialize GLUT  glutInitWindowSize(720, 520);// Set the window's initial width & height  glutCreateWindow("OpenGL Setup Test");  //gluOrtho2D(-0.1,0.7,-0.1,0.3); // Create a window with the given title  //glutInitWindowSize(320, 320);// Set the window's initial width & height  glutDisplayFunc(display);// Register display callback handler for window re-paint  glutMainLoop(); // Enter the event-processing loop  return 0;  } |
| **Output Screenshot (Full Screen)-** |

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| **Question- 2**  Draw 4X4 Chess Board |
| **Graph Plot (Picture)-** |
| **Code-**  #include <windows.h> // for MS Windows  #include <GL/glut.h> // GLUT, include glu.h and gl.h  #include <math.h>  /\* Handler for window-repaint event. Call back when the window first appears and  whenever the window needs to be re-painted. \*/  void display() {  glClearColor(1.0f, 1.0f, 1.0f, 1.0f); // Set background color to black and opaque  glClear(GL\_COLOR\_BUFFER\_BIT); // Clear the color buffer (background)  glLineWidth(1);  // OUTLINE  glBegin(GL\_LINES); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-2.0f, -2.0f);  glVertex2f(-2.0f, 2.0f);  glVertex2f(-2.0f, 2.0f);  glVertex2f(2.0f, 2.0f);  glVertex2f(2.0f, 2.0f);  glVertex2f(2.0f, -2.0f);  glVertex2f(2.0f, -2.0f);  glVertex2f(-2.0f, -2.0f);  glEnd();  // Green  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-2.0f, 1.0f);  glVertex2f(-2.0f, 2.0f);  glVertex2f(-1.0f, 2.0f);  glVertex2f(-1.0f, 1.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-2.0f, -1.0f);  glVertex2f(-2.0f, 0.0f);  glVertex2f(-1.0f, 0.0f);  glVertex2f(-1.0f, -1.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-1.0f, 0.0f);  glVertex2f(-1.0f, 1.0f);  glVertex2f(0.0f, 1.0f);  glVertex2f(0.0f, 0.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-1.0f, -2.0f);  glVertex2f(-1.0f, -1.0f);  glVertex2f(0.0f, -1.0f);  glVertex2f(0.0f, -2.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(0.0f, 1.0f);  glVertex2f(0.0f, 2.0f);  glVertex2f(1.0f, 2.0f);  glVertex2f(1.0f, 1.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(0.0f, -1.0f);  glVertex2f(0.0f, 0.0f);  glVertex2f(1.0f, 0.0f);  glVertex2f(1.0f, -1.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(1.0f, 0.0f);  glVertex2f(1.0f, 1.0f);  glVertex2f(2.0f, 1.0f);  glVertex2f(2.0f, 0.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(1.0f, -2.0f);  glVertex2f(1.0f, -1.0f);  glVertex2f(2.0f, -1.0f);  glVertex2f(2.0f, -2.0f);  glEnd();  glFlush(); // Render now  }  /\* Main function: GLUT runs as a console application starting at main() \*/  int main(int argc, char\*\* argv) {  glutInit(&argc, argv); // Initialize GLUT  glutInitWindowSize(520, 520);// Set the window's initial width & height  glutCreateWindow("OpenGL Setup Test");  //gluOrtho2D(-0.1,0.7,-0.1,0.3); // Create a window with the given title  //glutInitWindowSize(320, 320);// Set the window's initial width & height  glutDisplayFunc(display);// Register display callback handler for window re-paint  gluOrtho2D(-3,3,-3,3);  glutMainLoop(); // Enter the event-processing loop  return 0;  } |
| **Output Screenshot (Full Screen)-** |

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| **Question- 3**  Create the batman logo given below- |
| **Graph Plot (Picture)-** |
| **Code-**  #include <windows.h> // for MS Windows  #include <GL/glut.h> // GLUT, include glu.h and gl.h  #include <math.h>  /\* Handler for window-repaint event. Call back when the window first appears and  whenever the window needs to be re-painted. \*/  void display() {  glClearColor(1.0f, 1.0f, 1.0f, 1.0f); // Set background color to black and opaque  glClear(GL\_COLOR\_BUFFER\_BIT); // Clear the color buffer (background)  glLineWidth(1);  // OUTLINE  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(0.0f, -30.0f);  glVertex2f(-2.1f, -24.8f);  glVertex2f(2.1f, -24.8f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-2.1f, -24.8f);  glVertex2f(-5.1f, -20.1f);  glVertex2f(5.1f, -20.1f);  glVertex2f(2.1f, -24.8f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-5.1f, -20.1f);  glVertex2f(-10.1f, -15.1f);  glVertex2f(10.1f, -15.1f);  glVertex2f(5.1f, -20.1f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-10.1f, -15.1f);  glVertex2f(-15.1f, -12.0f);  glVertex2f(-15.1f, -12.0f);  glVertex2f(15.1f, -12.0f);  glVertex2f(10.1f, -15.1f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-15.1f, -12.0f);  glVertex2f(-20.0f, -10.0f);  glVertex2f(20.0f, -10.0f);  glVertex2f(15.1f, -12.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-20.0f, -10.0f);  glVertex2f(-24.9f, -9.3f);  glVertex2f(24.9f, -9.3f);  glVertex2f(20.0f, -10.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-34.0f, -10.0f);  glVertex2f(-28.0f, -6.0f);  glVertex2f(-33.0f, -9.8f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-33.0f, -9.8f);  glVertex2f(-28.0f, -6.0f);  glVertex2f(-32.0f, -9.6f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-32.0f, -9.6f);  glVertex2f(-28.0f, -6.0f);  glVertex2f(-31.0f, -9.4f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-31.0f, -9.4f);  glVertex2f(-28.0f, -6.0f);  glVertex2f(-24.9f, -9.3f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-24.9f, -9.3f);  glVertex2f(-28.0f, -6.0f);  glVertex2f(-28.0f, -6.0f);  glVertex2f(28.0f, -6.0f);  glVertex2f(24.9f, -9.3f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(24.9f, -9.3f);  glVertex2f(28.0f, -6.0f);  glVertex2f(31.0f, -9.4f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(31.0f, -9.4f);  glVertex2f(28.0f, -6.0f);  glVertex2f(32.0f, -9.6f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(32.0f, -9.6f);  glVertex2f(28.0f, -6.0f);  glVertex2f(33.0f, -9.8f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(33.0f, -9.8f);  glVertex2f(28.0f, -6.0f);  glVertex2f(34.0f, -10.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-28.0f, -6.0f);  glVertex2f(-25.0f, 0.0f);  glVertex2f(25.0f, 0.0f);  glVertex2f(28.0f, -6.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-34.0f, 10.0f);  glVertex2f(-40.0f, 12.0f);  glVertex2f(-14.0f, 12.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-28.0f, 6.0f);  glVertex2f(-34.0f, 10.0f);  glVertex2f(-14.0f, 12.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-25.0f, 0.0f);  glVertex2f(-28.0f, 6.0f);  glVertex2f(-14.0f, 12.0f);  glVertex2f(-10.0f, 3.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-25.0f, 0.0f);  glVertex2f(-10.0f, 3.0f);  glVertex2f(-10.0f, 0.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-10.0f, 0.0f);  glVertex2f(-10.0f, 3.0f);  glVertex2f(-8.0f, 2.0f);  glVertex2f(-8.0f, 0.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-8.0f, 0.0f);  glVertex2f(-8.0f, 2.0f);  glVertex2f(-6.0f, 2.0f);  glVertex2f(-6.0f, 0.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-6.0f, 0.0f);  glVertex2f(-6.0f, 2.0f);  glVertex2f(-5.0f, 3.0f);  glVertex2f(-3.0f, 3.0f);  glVertex2f(-3.0f, 0.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-5.0f, 3.0f);  glVertex2f(-4.0f, 8.0f);  glVertex2f(-3.0f, 3.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(-3.0f, 0.0f);  glVertex2f(-3.0f, 3.0f);  glVertex2f(0.0f, 4.0f);  glVertex2f(3.0f, 3.0f);  glVertex2f(3.0f, 0.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(5.0f, 3.0f);  glVertex2f(4.0f, 8.0f);  glVertex2f(3.0f, 3.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(6.0f, 0.0f);  glVertex2f(6.0f, 2.0f);  glVertex2f(5.0f, 3.0f);  glVertex2f(3.0f, 3.0f);  glVertex2f(3.0f, 0.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(8.0f, 0.0f);  glVertex2f(8.0f, 2.0f);  glVertex2f(6.0f, 2.0f);  glVertex2f(6.0f, 0.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(10.0f, 0.0f);  glVertex2f(10.0f, 3.0f);  glVertex2f(8.0f, 2.0f);  glVertex2f(8.0f, 0.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(25.0f, 0.0f);  glVertex2f(10.0f, 3.0f);  glVertex2f(10.0f, 0.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(25.0f, 0.0f);  glVertex2f(28.0f, 6.0f);  glVertex2f(14.0f, 12.0f);  glVertex2f(10.0f, 3.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(28.0f, 6.0f);  glVertex2f(34.0f, 10.0f);  glVertex2f(14.0f, 12.0f);  glEnd();  glBegin(GL\_POLYGON); // These vertices form a closed polygon  glColor3f(0.0f, 0.0f, 0.0f); //BLACK  glVertex2f(34.0f, 10.0f);  glVertex2f(40.0f, 12.0f);  glVertex2f(14.0f, 12.0f);  glEnd();  glFlush(); // Render now  }  /\* Main function: GLUT runs as a console application starting at main() \*/  int main(int argc, char\*\* argv) {  glutInit(&argc, argv); // Initialize GLUT  glutInitWindowSize(520, 520);// Set the window's initial width & height  glutCreateWindow("OpenGL Setup Test");  //gluOrtho2D(-0.1,0.7,-0.1,0.3); // Create a window with the given title  //glutInitWindowSize(320, 320);// Set the window's initial width & height  glutDisplayFunc(display);// Register display callback handler for window re-paint  gluOrtho2D(-45,45,-45,30);  glutMainLoop(); // Enter the event-processing loop  return 0;  } |
| **Output Screenshot (Full Screen)-** |