**Lab Taks-4**

Submission Guidelines-

* Rename the file with your serial number only
* Must submit within time that will be discussed in class VUES
* Must include resources for all the section in the table
* *Question-3 is optional. There is no problem if you do not implement it.*

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| **Question- 1**  Design the given scenario |
| **Graph Plot (Picture)-** |
| **Code-**  **#include <windows.h>**  **#include <GL/glut.h>**  **#include <math.h>**  **void halfCircle(float radius, float cX, float cY)**  **{**  **glLineWidth(4);**  **glColor3f(0.0f, 0.0f, 0.0f);**  **glBegin(GL\_LINE\_STRIP);**  **for (int i = 0; i <= 100; i++)**  **{**  **float pi = 3.1416;**  **float angle = (i \* pi) / 100;**  **float x = radius \* cos(angle);**  **float y = radius \* sin(angle);**  **glVertex2f(x + cX, y + cY);**  **}**  **glEnd();**  **}**  **void circle(float radius, float cX, float cY)**  **{**  **glLineWidth(4);**  **glColor3f(0.0f, 0.0f, 0.0f);**  **glBegin(GL\_LINE\_STRIP);**  **for(int i=0; i<200; i++)**  **{**  **float pi=3.1416;**  **float A=(i\*2\*pi)/200;**  **float r=radius;**  **float x = r \* cos(A);**  **float y = r \* sin(A);**  **glVertex2f(x+cX,y+cY);**  **}**  **}**  **void mountain()**  **{**  **halfCircle(0.8, 2.3437874655997, 1.28366547372);**  **glLineWidth(4);**  **glBegin(GL\_LINES);**  **glVertex2f(0.8, 0.8);**  **glVertex2f(3.7465544801474, 0.8);**  **glEnd();**  **glLineWidth(4);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(1.0835641435689,0.7957474740175);**  **glVertex2f(1.5864593870888,1.0379038347448);**  **glVertex2f(2.0434025798512,1.4763846762845);**  **glVertex2f(2.20494815305,1.4763846762845);**  **glVertex2f(2.2508087169322,1.5487928090895);**  **glVertex2f(2.3437874655997,1.577366547372);**  **glVertex2f(2.4126496043057,1.527156142147);**  **glVertex2f(2.4957301848079,1.4948470275072);**  **glVertex2f(2.754203101926,1.2225273469721);**  **glVertex2f(3.4948033049898,0.7971808316264);**  **glEnd();**  **// first tree**  **glLineWidth(6);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(1.0834506601145,0.7993881613418);**  **glVertex2f(1.0845025034758, 1.3144537034304);**  **glVertex2f(0.9203046643105, 1.1547544352012);**  **glVertex2f(1.0845025034758, 1.3144537034304);**  **glVertex2f(1.2576974845131, 1.1547544352012);**  **glEnd();**  **glLineWidth(6);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(0.9315510916506, 1.0040523088441);**  **glVertex2f(1.0850397165315, 1.134679065338);**  **glVertex2f(1.2576974845131, 1.0018030233761);**  **glEnd();**  **glLineWidth(6);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(0.9158060933745, 0.855599467955);**  **glVertex2f(1.0834506601145, 0.9908694595956);**  **glVertex2f(1.2352046298329, 0.8668458952951);**  **glEnd();**  **// second tree**  **glLineWidth(6);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(3.4948033049898, 0.7971808316264);**  **glVertex2f(3.4948901711105, 1.3102742544035);**  **glVertex2f(3.3285784069733, 1.1631523092052);**  **glVertex2f(3.4948901711105, 1.3102742544035);**  **glVertex2f(3.6867883604996, 1.1695489155181);**  **glEnd();**  **glLineWidth(6);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(3.3381733164427, 1.0096337576939);**  **glVertex2f(3.4951466448885, 1.1303327274563);**  **glVertex2f(3.6516070257783, 1.0224269703198);**  **glEnd();**  **glLineWidth(6);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(3.3349750132862, 0.865710115652);**  **glVertex2f(3.4955011412297, 0.9786983518675);**  **glVertex2f(3.6516070257783, 0.8401236904001);**  **glEnd();**  **glLineWidth(4);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(1.3258431161921, 1.4607465006533);**  **glVertex2f(1.7418695073305, 1.4588770139633);**  **glEnd();**  **glLineWidth(4);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(1.3127807707644, 1.7568263303487);**  **glVertex2f(2.06502243058, 1.7561695520155);**  **glEnd();**  **glLineWidth(4);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(2.7743906684665, 1.3605416652837);**  **glVertex2f(3.167732063185, 1.3694812424364);**  **glEnd();**  **glLineWidth(4);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(2.6647077267095, 1.7558699698494);**  **glVertex2f(3.2394771098702, 1.7615479272658);**  **glEnd();**  **glLineWidth(4);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(2.3434157872205, 1.6102367226492);**  **glVertex2f(2.3233394158905, 1.3912892950179);**  **glVertex2f(2.3765043451345, 1.3749308552505);**  **glVertex2f(2.4378484942622, 1.3381243657738);**  **glVertex2f(2.3765043451345, 1.2461081420822);**  **glVertex2f(2.3765043451345, 1.0886581593211);**  **glVertex2f(2.2988017562394, 0.9905075207167);**  **glEnd();**  **glLineWidth(4);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(2.1986063126641, 0.8800880522868);**  **glVertex2f(2.0434025798512, 0.7932776810438);**  **glEnd();**  **// left inner lines**  **glLineWidth(4);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(2.0526337554626, 1.3886885079766);**  **glVertex2f(2.2418728554955, 1.3979196835879);**  **glEnd();**  **glLineWidth(4);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(1.9233972969035, 1.2594520494175);**  **glVertex2f(2.2972599091637, 1.2594520494175);**  **glEnd();**  **glLineWidth(4);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(1.7710828993161, 1.1440623542755);**  **glVertex2f(2.2972599091637, 1.1532935298868);**  **glEnd();**  **glLineWidth(4);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(1.6649243797854, 0.9963635444937);**  **glVertex2f(2.1726390384103, 1.0148258957164);**  **glEnd();**  **glLineWidth(4);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(1.6947056858873, 0.6023869461706);**  **glVertex2f(1.6947056858873, 0.2834647844519);**  **glVertex2f(1.6947056858873, 0.2834647844519);**  **glVertex2f(1.6947056858873, 0.2834647844519);**  **glVertex2f(1.6947056858873, 0.2834647844519);**  **glVertex2f(1.6947056858873, 0.2834647844519);**  **glEnd();**  **}**  **void mountainText()**  **{**  **// M**  **glLineWidth(4);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(0.7562619498324, 0.1882044599452);**  **glVertex2f(0.7719864177985, 0.6075236057062);**  **glVertex2f(0.8977821615267, 0.1855837152842);**  **glVertex2f(1.0628890751701, 0.6101443503672);**  **glVertex2f(1.0681305644921, 0.1960666939283);**  **glEnd();**  **// O**  **circle(0.2,1.4, 0.4);**  **glEnd();**  **// U**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(1.6947056858873f, 0.6023869461706f);**  **glVertex2f(1.6947056858873f, 0.2834647844519f);**  **glVertex2f(1.7f, 0.25f);**  **glVertex2f(1.714018504563f, 0.2232984146937f);**  **glVertex2f(1.7336093550002f, 0.2043197783326f);**  **glVertex2f(1.7605467743514f, 0.1902388545809f);**  **glVertex2f(1.8070750441397f, 0.1853411419716f);**  **glVertex2f(1.8395223901764f, 0.1859533560477f);**  **glVertex2f(1.879316305127f, 0.1877899982762f);**  **glVertex2f(1.9111514370875f, 0.2092174909419f);**  **glVertex2f(1.9301300734485f, 0.2477869777402f);**  **glVertex2f(1.9338973071763f, 0.2834647844519f);**  **glVertex2f(1.9322708933493f, 0.6078413883927f);**  **glEnd();**  **// N**  **glLineWidth(4);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(2.132236485787f, 0.1907008676117f);**  **glVertex2f(2.1321528968605f, 0.5891783930791f);**  **glVertex2f(2.4f, 0.2f);**  **glVertex2f(2.4f, 0.6f);**  **glEnd();**  **// T**  **glLineWidth(4);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(2.5121608727063f, 0.5970406270621f);**  **glVertex2f(2.8f, 0.6f);**  **glVertex2f(2.6589225737226f, 0.5996613717231f);**  **glVertex2f(2.6611028982753f, 0.1998067330673f);**  **glEnd();**  **// A**  **glLineWidth(4);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(2.8843066145691f, 0.1882044599452f);**  **glVertex2f(3.0336890602464f, 0.6075236057062f);**  **glVertex2f(3.2f, 0.2f);**  **glVertex2f(3.146359442055f, 0.3288952141909f);**  **glVertex2f(3.146359442055f, 0.3288952141909f);**  **glVertex2f(2.9314800184672f, 0.3271039269785f);**  **glEnd();**  **// I**  **glLineWidth(4);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(3.3699297311171, 0.6031453904821);**  **glVertex2f(3.3691443768552, 0.2065496725723);**  **glEnd();**  **// N**  **glLineWidth(4);**  **glBegin(GL\_LINE\_STRIP);**  **glVertex2f(3.5604587371086f, 0.1960666939283f);**  **glVertex2f(3.5604587371086f, 0.6153858396892f);**  **glVertex2f(3.8f, 0.2f);**  **glVertex2f(3.8f, 0.6f);**  **glEnd();**  **}**  **void display()**  **{**  **glClearColor(1.0f, 1.0f, 1.0f, 1.0f);**  **glClear(GL\_COLOR\_BUFFER\_BIT);**  **mountain();**  **mountainText();**  **glFlush();**  **}**  **int main(int argc, char\*\* argv)**  **{**  **glutInit(&argc, argv);**  **glutInitWindowSize(1080, 1080);**  **glutInitWindowPosition(100, 100);**  **glutCreateWindow("Mountain");**  **gluOrtho2D(-2, 5, -2, 5);**  **glutDisplayFunc(display);**  **glutMainLoop();**  **return 0;**  **}** |
| **Output Screenshot (Full Screen)-** |

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| **Question- 2**  Design the given scenario  Drawing Lighthouse Line Stock Illustrations – 1,639 Drawing Lighthouse Line  Stock Illustrations, Vectors & Clipart - Dreamstime |
| **Graph Plot (Picture)-** |
| **Code-**  **#include <windows.h>**  **#include <GL/glut.h>**  **void display() {**  **glClearColor(1,1,1,1);**  **glClear(GL\_COLOR\_BUFFER\_BIT);**  **glLineWidth(4.5);**  **glBegin(GL\_LINES);**  **glColor3f(0,0,0);**  **glVertex2f(-6.7000537707086,-0.0136884939117);**  **glVertex2f(-3.8,-0.01);**  **glEnd();**  **glBegin(GL\_LINES);**  **glColor3f(0,0,0);**  **glVertex2f(-3.8,-0.01);**  **glVertex2f(-0.3244958412324,1.3241055997837);**  **glEnd();**  **glBegin(GL\_LINES);//1**  **glColor3f(0,0,0);**  **glVertex2f(0.3235667551552,4.1039530527093);**  **glVertex2f(0.4600009859736,1.3241055997837);**  **glEnd();**  **glBegin(GL\_LINES);//2**  **glColor3f(0,0,0);**  **glVertex2f(-0.3244958412324,1.3241055997837);**  **glVertex2f(0.4600009859736,1.3241055997837);**  **glEnd();**  **glBegin(GL\_LINES);//3**  **glColor3f(0,0,0);**  **glVertex2f(-0.2221701681185,4.1039530527093);**  **glVertex2f(0.3235667551552,4.1039530527093);**  **glEnd();**  **glBegin(GL\_LINES);//4**  **glColor3f(0,0,0);**  **glVertex2f(0.4600009859736,1.3241055997837);**  **glVertex2f(3.58,-0.01);**  **glEnd();**  **glBegin(GL\_LINES);//5**  **glColor3f(0,0,0);**  **glVertex2f(3.58,-0.01);**  **glVertex2f(7,0);**  **glEnd();**  **glBegin(GL\_LINES);//6**  **glColor3f(0,0,0);**  **glVertex2f(-0.2221701681185,4.1039530527093);**  **glVertex2f(-0.3244958412324,1.3241055997837);**  **glEnd();**  **glBegin(GL\_LINES);//7**  **glColor3f(0,0,0);**  **glVertex2f(-0.2187293559951,4.2378025289271);**  **glVertex2f(0.371604441557,4.2361907373152);**  **glEnd();**  **glBegin(GL\_LINES);//8**  **glColor3f(0,0,0);**  **glVertex2f(-0.2187293559951,4.2378025289271);**  **glVertex2f(-0.2221701681185,4.1039530527093);**  **glEnd();**  **glBegin(GL\_LINES);//9**  **glColor3f(0,0,0);**  **glVertex2f(0.371604441557,4.2361907373152);**  **glVertex2f(0.3235667551552,4.1039530527093);**  **glEnd();**  **glBegin(GL\_LINES);//10**  **glColor3f(0,0,0);**  **glVertex2f(-0.2447595032916,4.3615528955895);**  **glVertex2f(0.3924981346027,4.3580706134152);**  **glEnd();**  **glBegin(GL\_LINES);//11**  **glColor3f(0,0,0);**  **glVertex2f(-0.2447595032916,4.3615528955895);**  **glVertex2f(-0.2187293559951,4.2378025289271);**  **glEnd();**  **glBegin(GL\_LINES);//12**  **glColor3f(0,0,0);**  **glVertex2f(0.3924981346027,4.3580706134152);**  **glVertex2f(0.371604441557,4.2361907373152);**  **glEnd();**  **glBegin(GL\_LINES);//13**  **glColor3f(0,0,0);**  **glVertex2f(-0.2586886319888,4.4834327716895);**  **glVertex2f(0.40294498112552823,4.493879618212363);**  **glEnd();**  **glBegin(GL\_LINES);//14**  **glColor3f(0,0,0);**  **glVertex2f(-0.2586886319888,4.4834327716895);**  **glVertex2f(-0.2447595032916,4.3615528955895);**  **glEnd();**  **glBegin(GL\_LINES);//15**  **glColor3f(0,0,0);**  **glVertex2f(0.40294498112552823,4.493879618212363);**  **glVertex2f(0.3924981346027,4.3580706134152);**  **glEnd();**  **glBegin(GL\_LINES);//16**  **glColor3f(0,0,0);**  **glVertex2f(-0.1565438357542,4.8717308709587);**  **glVertex2f(0.2983879913261,4.8734411409853);**  **glEnd();**  **glBegin(GL\_LINES);//17**  **glColor3f(0,0,0);**  **glVertex2f(-0.1565438357542,4.8717308709587);**  **glVertex2f(-0.1604658373433,4.5069236695836);**  **glEnd();**  **glBegin(GL\_LINES);//18**  **glColor3f(0,0,0);**  **glVertex2f(0.2983879913261,4.8734411409853);**  **glVertex2f(0.3060282836201,4.5133140000078);**  **glEnd();**  **glBegin(GL\_LINES);//19**  **glColor3f(0,0,0);**  **glVertex2f(-0.0522173641305,4.7981892598141);**  **glVertex2f(-0.0518302201326,4.5165091652199);**  **glEnd();**  **glBegin(GL\_LINES);//20**  **glColor3f(0,0,0);**  **glVertex2f(0.2,4.8);**  **glVertex2f(0.1973926664095,4.522899495644);**  **glEnd();**  **glBegin(GL\_LINES);//21**  **glColor3f(0,0,0);**  **glVertex2f(-0.0522173641305,4.7981892598141);**  **glVertex2f(0.2,4.8);**  **glEnd();**  **glBegin(GL\_LINES);//22**  **glColor3f(0,0,0);**  **glVertex2f(-0.233505986952,4.8717308709587);**  **glVertex2f(-0.1565438357542,4.8717308709587);**  **glEnd();**  **glBegin(GL\_LINES);//23**  **glColor3f(0,0,0);**  **glVertex2f(0.2983879913261,4.8734411409853);**  **glVertex2f(0.3770604125505,4.8734411409853);**  **glEnd();**  **glBegin(GL\_LINES);//24**  **glColor3f(0,0,0);**  **glVertex2f(0.0800292384252,5.3276503593308);**  **glVertex2f(-0.233505986952,4.8717308709587);**  **glEnd();**  **glBegin(GL\_LINES);//25**  **glColor3f(0,0,0);**  **glVertex2f(0.0800292384252,5.3276503593308);**  **glVertex2f(0.3770604125505,4.8734411409853);**  **glEnd();**  **glBegin(GL\_LINES);//26**  **glColor3f(0,0,0);**  **glVertex2f(0.758450865889,4.7861242068015);**  **glVertex2f(3.6576782707807,5.3318611300752);**  **glEnd();**  **glBegin(GL\_LINES);//27**  **glColor3f(0,0,0);**  **glVertex2f(0.8266679812982,4.5644185817215);**  **glVertex2f(4.2631051700375,4.6241085577046);**  **glEnd();**  **glBegin(GL\_LINES);//28**  **glColor3f(0,0,0);**  **glVertex2f(0.8096137024459,4.3256586777893);**  **glVertex2f(3.6917868284853,3.7799217545155);**  **glEnd();**  **glBegin(GL\_LINES);//29**  **glColor3f(0,0,0);**  **glVertex2f(-3.4,5.29);**  **glVertex2f(-0.54,4.81);**  **glEnd();**  **glBegin(GL\_LINES);//30**  **glColor3f(0,0,0);**  **glVertex2f(-4.02,4.57);**  **glVertex2f(-0.5973643028692,4.5558914422954);**  **glEnd();**  **glBegin(GL\_LINES);//32**  **glColor3f(0,0,0);**  **glVertex2f(-3.4880645683348,3.7287589179586);**  **glVertex2f(-0.5973643028692,4.2915501200847);**  **glEnd();**  **glBegin(GL\_LINES);//33**  **glColor3f(0,0,0);**  **glVertex2f(0.0198939419541,3.9401967525009);**  **glVertex2f(0.1382915358798,3.9332321881523);**  **glEnd();**  **glBegin(GL\_LINES);//34**  **glColor3f(0,0,0);**  **glVertex2f(0.0059648132569,3.6720610250809);**  **glVertex2f(0.1382915358798,3.6755433072552);**  **glEnd();**  **glBegin(GL\_LINES);//35**  **glColor3f(0,0,0);**  **glVertex2f(0.0198939419541,3.9401967525009);**  **glVertex2f(0.0059648132569,3.6720610250809);**  **glEnd();**  **glBegin(GL\_LINES);//36**  **glColor3f(0,0,0);**  **glVertex2f(0.1382915358798,3.9332321881523);**  **glVertex2f(0.1382915358798,3.6755433072552);**  **glEnd();**  **glBegin(GL\_LINES);//37**  **glColor3f(0,0,0);**  **glVertex2f(-0.001493761326,2.2694133357807);**  **glVertex2f(0.1388946384011,2.2719658521394);**  **glEnd();**  **glBegin(GL\_LINES);//38**  **glColor3f(0,0,0);**  **glVertex2f(0,2);**  **glVertex2f(0.1388946384011,2.0039516344786);**  **glEnd();**  **glBegin(GL\_LINES);//39**  **glColor3f(0,0,0);**  **glVertex2f(-0.001493761326,2.2694133357807);**  **glVertex2f(0,2);**  **glEnd();**  **glBegin(GL\_LINES);//40**  **glColor3f(0,0,0);**  **glVertex2f(0.1388946384011,2.2719658521394);**  **glVertex2f(0.1388946384011,2.0039516344786);**  **glEnd();**  **glFlush();**  **}**  **int main(int argc, char\*\* argv) {**  **glutInit(&argc, argv); // Initialize GLUT**  **glutCreateWindow("OpenGL Setup"); // Create a window with the given title**  **glutInitWindowSize(320, 320);**  **gluOrtho2D(-7,7,-7,7); // 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- 3**  Design the given scenario  Traffic Light Drawing Vector Images (over 2,300) |
| **Graph Plot (Picture)-** |
| **Code-** |
| **Output Screenshot (Full Screen)-** |