**Lab Taks-4**

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| --- |
| **Question- 1**  Draw the scenario of a traffic signal |
| **Graph Plot (Picture)-**  **(Not Needed)** |
| **Code-**  **#include<stdio.h>**  **#include<GL/glut.h>**  **#include <GL/gl.h>**  **#include <stdlib.h>**  **#define SPEED 40.0 //speed of traffic**  **float i=0.0; //movement of car**  **float m=0.0; //movement of clouds**  **float n=0.0; //movement of plane along x-axis**  **float o=0.0; // and y-axis**  **float c=0.0; //movement of comet SS**  **int light=1; //1 for green-light, 0 for red-light**  **int day=1; //1 for day ,0 for night**  **int plane=0; //1 for plane**  **int comet=0; //1 for comet**  **void draw\_pixel(GLint cx, GLint cy)**  **{**  **glBegin(GL\_POINTS);**  **glVertex2i(cx,cy);**  **glEnd();**  **}**  **void plotpixels(GLint h,GLint k, GLint x,GLint y)**  **{**  **draw\_pixel(x+h,y+k);**  **draw\_pixel(-x+h,y+k);**  **draw\_pixel(x+h,-y+k);**  **draw\_pixel(-x+h,-y+k);**  **draw\_pixel(y+h,x+k);**  **draw\_pixel(-y+h,x+k);**  **draw\_pixel(y+h,-x+k);**  **draw\_pixel(-y+h,-x+k);**  **}**  **void draw\_circle(GLint h, GLint k, GLint r)**  **{**  **GLint d=1-r, x=0, y=r;**  **while(y>x)**  **{**  **plotpixels(h,k,x,y);**  **if(d<0) d+=2\*x+3;**  **else**  **{**  **d+=2\*(x-y)+5;**  **--y;**  **}**  **++x;**  **}**  **plotpixels(h,k,x,y);**  **}**  **void draw\_object()**  **{**  **int l;**  **if(day==1)**  **{**  **//sky**  **glColor3f(0.0,0.9,0.9);**  **glBegin(GL\_POLYGON);**  **glVertex2f(0,450);**  **glVertex2f(0,700);**  **glVertex2f(1100,700);**  **glVertex2f(1100,450);**  **glEnd();**  **//sun**  **for(l=0;l<=35;l++)**  **{**  **glColor3f(1.0,0.9,0.0);**  **draw\_circle(100,625,l);**  **}**  **//plane**  **if(plane==1)**  **{**  **glColor3f(1.0,1.0,1.0);**  **glBegin(GL\_POLYGON);**  **glVertex2f(925+n,625+o);**  **glVertex2f(950+n,640+o);**  **glVertex2f(1015+n,640+o);**  **glVertex2f(1030+n,650+o);**  **glVertex2f(1050+n,650+o);**  **glVertex2f(1010+n,625+o);**  **glEnd();**  **glColor3f(0.8,0.8,0.8);**  **glBegin(GL\_LINE\_LOOP);**  **glVertex2f(925+n,625+o);**  **glVertex2f(950+n,640+o);**  **glVertex2f(1015+n,640+o);**  **glVertex2f(1030+n,650+o);**  **glVertex2f(1050+n,650+o);**  **glVertex2f(1010+n,625+o);**  **glEnd();**  **}**  **//cloud1**  **for(l=0;l<=20;l++)**  **{**  **glColor3f(1.0,1.0,1.0);**  **draw\_circle(160+m,625,l);**  **}**  **for(l=0;l<=35;l++)**  **{**  **glColor3f(1.0,1.0,1.0);**  **draw\_circle(200+m,625,l);**  **draw\_circle(225+m,625,l);**  **}**  **for(l=0;l<=20;l++)**  **{**  **glColor3f(1.0,1.0,1.0);**  **draw\_circle(265+m,625,l);**  **}**  **//cloud2**  **for(l=0;l<=20;l++)**  **{**  **glColor3f(1.0,1.0,1.0);**  **draw\_circle(370+m,615,l);**  **}**  **for(l=0;l<=35;l++)**  **{**  **glColor3f(1.0,1.0,1.0);**  **draw\_circle(410+m,615,l);**  **draw\_circle(435+m,615,l);**  **draw\_circle(470+m,615,l);**  **}**  **for(l=0;l<=20;l++)**  **{**  **glColor3f(1.0,1.0,1.0);**  **draw\_circle(500+m,615,l);**  **}**  **//grass**  **glColor3f(0.0,0.9,0.0);**  **glBegin(GL\_POLYGON);**  **glVertex2f(0,160);**  **glVertex2f(0,450);**  **glVertex2f(1100,450);**  **glVertex2f(1100,160);**  **glEnd();**  **//pond**  **glColor3f(0.0,0.9,0.9);**  **glBegin(GL\_POLYGON);**  **glVertex2f(25,350);**  **glVertex2f(25,375);**  **glVertex2f(50,400);**  **glVertex2f(75,410);**  **glVertex2f(100,420);**  **glVertex2f(200,420);**  **glVertex2f(225,410);**  **glVertex2f(250,405);**  **glVertex2f(275,390);**  **glVertex2f(300,375);**  **glVertex2f(310,350);**  **glVertex2f(300,320);**  **glVertex2f(275,300);**  **glVertex2f(250,295);**  **glVertex2f(225,290);**  **glVertex2f(200,285);**  **glVertex2f(175,280);**  **glVertex2f(150,280);**  **glVertex2f(125,280);**  **glVertex2f(100,290);**  **glVertex2f(75,300);**  **glVertex2f(50,310);**  **glEnd();**  **}**  **else**  **{**  **//sky**  **glColor3f(0.0,0.0,0.0);**  **glBegin(GL\_POLYGON);**  **glVertex2f(0,450);**  **glVertex2f(0,700);**  **glVertex2f(1100,700);**  **glVertex2f(1100,450);**  **glEnd();**  **//moon**  **int l;**  **for(l=0;l<=35;l++)**  **{**  **glColor3f(1.0,1.0,1.0);**  **draw\_circle(100,625,l);**  **}**  **//star1**  **glColor3f(1.0,1.0,1.0);**  **glBegin(GL\_TRIANGLES);**  **glVertex2f(575,653);**  **glVertex2f(570,645);**  **glVertex2f(580,645);**  **glVertex2f(575,642);**  **glVertex2f(570,650);**  **glVertex2f(580,650);**  **glEnd();**  **//star2**  **glColor3f(1.0,1.0,1.0);**  **glBegin(GL\_TRIANGLES);**  **glVertex2f(975,643);**  **glVertex2f(970,635);**  **glVertex2f(980,635);**  **glVertex2f(975,632);**  **glVertex2f(970,640);**  **glVertex2f(980,640);**  **glEnd();**  **//star3**  **glColor3f(1.0,1.0,1.0);**  **glBegin(GL\_TRIANGLES);**  **glVertex2f(875,543);**  **glVertex2f(870,535);**  **glVertex2f(880,535);**  **glVertex2f(875,532);**  **glVertex2f(870,540);**  **glVertex2f(880,540);**  **glEnd();**  **//star4**  **glColor3f(1.0,1.0,1.0);**  **glBegin(GL\_TRIANGLES);**  **glVertex2f(375,598);**  **glVertex2f(370,590);**  **glVertex2f(380,590);**  **glVertex2f(375,587);**  **glVertex2f(370,595);**  **glVertex2f(380,595);**  **glEnd();**  **//star5**  **glColor3f(1.0,1.0,1.0);**  **glBegin(GL\_TRIANGLES);**  **glVertex2f(750,628);**  **glVertex2f(745,620);**  **glVertex2f(755,620);**  **glVertex2f(750,618);**  **glVertex2f(745,625);**  **glVertex2f(755,625);**  **glEnd();**  **//star6**  **glColor3f(1.0,1.0,1.0);**  **glBegin(GL\_TRIANGLES);**  **glVertex2f(200,628);**  **glVertex2f(195,620);**  **glVertex2f(205,620);**  **glVertex2f(200,618);**  **glVertex2f(195,625);**  **glVertex2f(205,625);**  **glEnd();**  **//star7**  **glColor3f(1.0,1.0,1.0);**  **glBegin(GL\_TRIANGLES);**  **glVertex2f(500,543);**  **glVertex2f(495,535);**  **glVertex2f(505,535);**  **glVertex2f(500,532);**  **glVertex2f(495,540);**  **glVertex2f(505,540);**  **glEnd();**  **//comet**  **if(comet==1)**  **{**  **for(l=0;l<=7;l++)**  **{**  **glColor3f(1.0,1.0,1.0);**  **draw\_circle(300+c,675,l);**  **}**  **glColor3f(1.0,1.0,1.0);**  **glBegin(GL\_TRIANGLES);**  **glVertex2f(200+c,675);**  **glVertex2f(300+c,682);**  **glVertex2f(300+c,668);**  **glEnd();**  **}**  **//Plane**  **if(plane==1)**  **{**  **for(l=0;l<=1;l++)**  **{**  **glColor3f(1.0,0.0,0.0);**  **draw\_circle(950+n,625+o,l);**  **glColor3f(1.0,1.0,0.0);**  **draw\_circle(954+n,623+o,l);**  **}**  **}**  **//grass**  **glColor3f(0.0,0.3,0.0);**  **glBegin(GL\_POLYGON);**  **glVertex2f(0,160);**  **glVertex2f(0,450);**  **glVertex2f(1100,450);**  **glVertex2f(1100,160);**  **glEnd();**  **//pond**  **glColor3f(0.0,0.0,0.4);**  **glBegin(GL\_POLYGON);**  **glVertex2f(25,350);**  **glVertex2f(25,375);**  **glVertex2f(50,400);**  **glVertex2f(75,410);**  **glVertex2f(100,420);**  **glVertex2f(200,420);**  **glVertex2f(225,410);**  **glVertex2f(250,405);**  **glVertex2f(275,390);**  **glVertex2f(300,375);**  **glVertex2f(310,350);**  **glVertex2f(300,320);**  **glVertex2f(275,300);**  **glVertex2f(250,295);**  **glVertex2f(225,290);**  **glVertex2f(200,285);**  **glVertex2f(175,280);**  **glVertex2f(150,280);**  **glVertex2f(125,280);**  **glVertex2f(100,290);**  **glVertex2f(75,300);**  **glVertex2f(50,310);**  **glEnd();**  **}**  **//road boundary**  **glColor3f(1.0,1.0,1.0);**  **glBegin(GL\_POLYGON);**  **glVertex2f(0,150);**  **glVertex2f(0,160);**  **glVertex2f(1100,160);**  **glVertex2f(1100,150);**  **glEnd();**  **//road**  **glColor3f(0.2,0.2,0.2);**  **glBegin(GL\_POLYGON);**  **glVertex2f(0,0);**  **glVertex2f(0,150);**  **glVertex2f(1100,150);**  **glVertex2f(1100,0);**  **glEnd();**  **//tree**  **glColor3f(0.9,0.2,0.0);**  **glBegin(GL\_POLYGON);**  **glVertex2f(350,325);**  **glVertex2f(350,395);**  **glVertex2f(365,395);**  **glVertex2f(365,325);**  **glEnd();**  **for(l=0;l<=30;l++)**  **{**  **glColor3f(0.0,0.5,0.0);**  **draw\_circle(340,400,l);**  **draw\_circle(380,400,l);**  **}**  **for(l=0;l<=25;l++)**  **{**  **glColor3f(0.0,0.5,0.0);**  **draw\_circle(350,440,l);**  **draw\_circle(370,440,l);**  **}**  **for(l=0;l<=20;l++)**  **{**  **glColor3f(0.0,0.5,0.0);**  **draw\_circle(360,465,l);**  **}**  **//back compound**  **glColor3f(0.9,0.9,0.9);**  **glBegin(GL\_POLYGON);**  **glVertex2f(550,375);**  **glVertex2f(600,425);**  **glVertex2f(825,425);**  **glVertex2f(850,375);**  **glEnd();**  **//house**  **glColor3f(0.0,0.2,0.2);**  **glBegin(GL\_POLYGON);**  **glVertex2f(600,375);**  **glVertex2f(600,450);**  **glVertex2f(650,525);**  **glVertex2f(700,450);**  **glVertex2f(700,375);**  **glEnd();**  **//door**  **glColor3f(0.5,0.0,0.0);**  **glBegin(GL\_POLYGON);**  **glVertex2f(640,375);**  **glVertex2f(640,410);**  **glVertex2f(660,410);**  **glVertex2f(660,375);**  **glEnd();**  **//roof**  **glColor3f(0.5,0.0,0.0);**  **glBegin(GL\_POLYGON);**  **glVertex2f(700,450);**  **glVertex2f(650,525);**  **glVertex2f(750,525);**  **glVertex2f(780,450);**  **glEnd();**  **//**  **glColor3f(0.8,0.8,0.2);**  **glBegin(GL\_POLYGON);**  **glVertex2f(700,375);**  **glVertex2f(700,450);**  **glVertex2f(780,450);**  **glVertex2f(780,375);**  **glEnd();**  **//window**  **glColor3f(0.5,0.0,0.0);**  **glBegin(GL\_POLYGON);**  **glVertex2f(725,400);**  **glVertex2f(725,420);**  **glVertex2f(740,420);**  **glVertex2f(740,400);**  **glEnd();**  **//compound**  **glColor3f(0.7,0.7,0.7);**  **glBegin(GL\_POLYGON);**  **glVertex2f(550,325);**  **glVertex2f(550,375);**  **glVertex2f(850,375);**  **glVertex2f(850,325);**  **glEnd();**  **//gate using mesh**  **int a,b;**  **float x[3],y[3];**  **float x0=600,y0=325;;**  **glColor3f(0.0,0.0,0.0);**  **for(a=0;a<3;a++)**  **x[a]=x0+a\*25;**  **for(b=0;b<3;b++)**  **y[b]=y0+b\*25;**  **for(a=0;a<2;a++)**  **for(b=0;b<2;b++)**  **{**  **glColor3f(0.0,0.0,0.0);**  **glBegin(GL\_LINE\_LOOP);**  **glVertex2f(x[a],y[b]);**  **glVertex2f(x[a],y[b+1]);**  **glVertex2f(x[a+1],y[b+1]);**  **glVertex2f(x[a+1],y[b]);**  **glEnd();**  **}**  **//signal**  **glColor3f(1.0,0.0,0.0);**  **glBegin(GL\_POLYGON);**  **glVertex2f(1060,160);**  **glVertex2f(1060,350);**  **glVertex2f(1070,350);**  **glVertex2f(1070,160);**  **glEnd();**  **glColor3f(0.7,0.7,0.7);**  **glBegin(GL\_POLYGON);**  **glVertex2f(1040,350);**  **glVertex2f(1040,500);**  **glVertex2f(1090,500);**  **glVertex2f(1090,350);**  **glEnd();**  **for(l=0;l<=20;l++)**  **{**  **glColor3f(0.0,0.0,0.0);**  **draw\_circle(1065,475,l);**  **glColor3f(1.0,1.0,0.0);**  **draw\_circle(1065,425,l);**  **glColor3f(0.0,0.0,0.0);**  **draw\_circle(1065,375,l);**  **}**  **//car 1**  **glColor3f(0.9,0.2,0.0);**  **glBegin(GL\_POLYGON);**  **glVertex2f(25+i,50);**  **glVertex2f(25+i,125);**  **glVertex2f(75+i,200);**  **glVertex2f(175+i,200);**  **glVertex2f(200+i,125);**  **glVertex2f(250+i,115);**  **glVertex2f(250+i,50);**  **glEnd();**  **//windows**  **glColor3f(0.1,0.1,0.1);**  **glBegin(GL\_POLYGON);**  **glVertex2f(35+i,125);**  **glVertex2f(80+i,190);**  **glVertex2f(115+i,190);**  **glVertex2f(115+i,125);**  **glEnd();**  **glColor3f(0.1,0.1,0.1);**  **glBegin(GL\_POLYGON);**  **glVertex2f(125+i,125);**  **glVertex2f(125+i,190);**  **glVertex2f(170+i,190);**  **glVertex2f(190+i,125);**  **glEnd();**  **for(l=0;l<20;l++)**  **{**  **glColor3f(0.0,0.0,0.0);**  **draw\_circle(75+i,50,l);**  **draw\_circle(175+i,50,l);**  **}**  **//car2**  **glColor3f(0.0,0.0,1.0);**  **glBegin(GL\_POLYGON);**  **glVertex2f(-470+i,50);**  **glVertex2f(-470+i,112);**  **glVertex2f(-400+i,125);**  **glVertex2f(-372+i,210);**  **glVertex2f(-210+i,210);**  **glVertex2f(-180+i,125);**  **glVertex2f(-135+i,125);**  **glVertex2f(-110+i,50);**  **glEnd();**  **//windows**  **glColor3f(0.1,0.1,0.1);**  **glBegin(GL\_POLYGON);**  **glVertex2f(-410+i,125);**  **glVertex2f(-364+i,200);**  **glVertex2f(-300+i,200);**  **glVertex2f(-300+i,125);**  **glEnd();**  **glColor3f(0.1,0.1,0.1);**  **glBegin(GL\_POLYGON);**  **glVertex2f(-290+i,125);**  **glVertex2f(-290+i,200);**  **glVertex2f(-217+i,200);**  **glVertex2f(-192+i,125);**  **glEnd();**  **for(l=0;l<30;l++)**  **{**  **glColor3f(0.0,0.0,0.0);**  **draw\_circle(-350+i,50,l);**  **draw\_circle(-200+i,50,l);**  **}**  **//bus**  **glColor3f(0.7,0.0,0.9);**  **glBegin(GL\_POLYGON);**  **glVertex2f(350+i,50);**  **glVertex2f(350+i,275);**  **glVertex2f(722+i,275);**  **glVertex2f(750+i,175);**  **glVertex2f(750+i,50);**  **glEnd();**  **glColor3f(1.0,1.0,1.0);**  **glBegin(GL\_POLYGON);**  **glVertex2f(650+i,175);**  **glVertex2f(650+i,260);**  **glVertex2f(720+i,260);**  **glVertex2f(745+i,175);**  **glEnd();**  **glColor3f(1.0,1.0,1.0);**  **glBegin(GL\_POLYGON);**  **glVertex2f(550+i,175);**  **glVertex2f(550+i,260);**  **glVertex2f(625+i,260);**  **glVertex2f(625+i,175);**  **glEnd();**  **glColor3f(1.0,1.0,1.0);**  **glBegin(GL\_POLYGON);**  **glVertex2f(450+i,175);**  **glVertex2f(450+i,260);**  **glVertex2f(525+i,260);**  **glVertex2f(525+i,175);**  **glEnd();**  **glColor3f(1.0,1.0,1.0);**  **glBegin(GL\_POLYGON);**  **glVertex2f(375+i,175);**  **glVertex2f(375+i,260);**  **glVertex2f(425+i,260);**  **glVertex2f(425+i,175);**  **glEnd();**  **for(l=0;l<30;l++)**  **{**  **glColor3f(0.0,0.0,0.0);**  **draw\_circle(450+i,50,l);**  **draw\_circle(625+i,50,l);**  **}**  **glFlush();**  **}**  **void traffic\_light()**  **{**  **int l;**  **if(light==1)**  **{**  **for(l=0;l<=20;l++)**  **{**  **glColor3f(0.0,0.0,0.0);**  **draw\_circle(1065,475,l);**  **//glColor3f(1.0,1.0,0.0);**  **//draw\_circle(1065,425,l);**  **glColor3f(0.0,0.7,0.0);**  **draw\_circle(1065,375,l);**  **}**  **}**  **else**  **{**  **for(l=0;l<=20;l++)**  **{**  **glColor3f(1.0,0.0,0.0);**  **draw\_circle(1065,475,l);**  **//glColor3f(0.0,0.0,0.0);**  **//draw\_circle(1065,425,l);**  **glColor3f(0.0,0.0,0.0);**  **draw\_circle(1065,375,l);**  **}**  **}**  **}**  **void idle()**  **{**  **glClearColor(1.0,1.0,1.0,1.0);**  **if(light==0 && (i>=330 && i<=750)) //value of i when first vehicle is near the traffic-signal//650**  **{**  **i+=SPEED/10;**  **++m;**  **n-=2;**  **o+=0.2;**  **c+=2;**  **}**  **if(light==0 && (i>=830 && i<=1100)) //value of i when second vehicle is near the traffic-signal//900**  **{**  **i+=SPEED/10;**  **++m;**  **n-=2;**  **o+=0.2;**  **c+=2;**  **}**  **if(light==0 && (i>=1200 && i<=1620))**  **{**  **i+=SPEED/10;**  **++m;**  **n-=2;**  **o+=0.2;**  **c+=2;**  **}**  **if(light==0)**  **{**  **i=i;**  **++m;**  **n-=2;**  **o+=0.2;**  **c+=2;**  **}**  **else**  **{**  **i+=SPEED/10;**  **++m;**  **n-=2;**  **o+=0.2;**  **c+=2;**  **}**  **if(i>1630)**  **i=0.0;**  **if(m>1100)**  **m=0.0;**  **if( o>75)**  **{**  **plane=0;**  **}**  **if(c>500)**  **{**  **comet=0;**  **}**  **glutPostRedisplay();**  **}**  **void keyboardFunc( unsigned char key, int x, int y )**  **{**  **switch( key )**  **{**  **case 'g':**  **case 'G':**  **light=1;**  **break;**  **case 'r':**  **case 'R':**  **light=0;**  **break;**  **};**  **}**  **void myinit()**  **{**  **glClearColor(1.0,1.0,1.0,1.0);**  **glColor3f(0.0,0.0,1.0);**  **glPointSize(2.0);**  **glMatrixMode(GL\_PROJECTION);**  **glLoadIdentity();**  **gluOrtho2D(0.0,1100.0,0.0,700.0);**  **}**  **void display()**  **{**  **glClear(GL\_COLOR\_BUFFER\_BIT);**  **draw\_object();**  **traffic\_light();**  **glFlush();**  **}**  **int main(int argc,char\*\* argv)**  **{**  **int c\_menu;**  **printf("Press 'r' or 'R' to change the signal light to red \n");**  **printf("Press 'g' or 'G' to change the signal light to green \n");**  **glutInit(&argc,argv);**  **glutInitDisplayMode(GLUT\_SINGLE|GLUT\_RGB);**  **glutInitWindowSize(1100.0,700.0);**  **glutInitWindowPosition(0,0);**  **glutCreateWindow("Traffic Control");**  **glutDisplayFunc(display);**  **glutIdleFunc(idle);**  **glutKeyboardFunc(keyboardFunc);;**  **myinit();**  **glutAddMenuEntry("Aeroplane",1);**  **glutAddMenuEntry("Comet",2);**  **glutAttachMenu(GLUT\_RIGHT\_BUTTON);**  **glutMainLoop();**  **return 0;**  **}** |
| **Output Screenshot (Full Screen)-** |