**LAPORAN**

**GRAFIKA DAN PENGOLAHAN CITRA**

Objek Rumah 3D

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**JURUSAN TEKNIK INFORMATIKA**

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1. **Latar Belakang Masalah**

Saat ini perkembangan teknologi sangat maju. Dengan bantuan software yang terus berkembang dan support dari hardware, sehingga mempermudah kita menyelesaikan berbagai masalah yang kita hadapi. Salah satu masalah yang ada bagaimana mendesainsuatu gambar dengan 2D atau 3D.Desain merupakan suatu cara membuat atau menciptakan sesuatu dalam betuk visual.Saat ini banyak software untuk mendesain sesuatu. Salah satunya adalah openGL.

OpenGL (Open Graphic Library) adalah suatu spesifikasi grafik yang low-level dan juga menyediakan fungsi untuk pembuatan grafik primitif termasuk titik, garis dan lingkaran. OpenGL di gunakan untuk mendefinisikan suatu objek 2 dimensi maupun objek 3 dimensi. OpenGl juga merupakan suatu antarmuka pemograman aplikasi *application programing interface* (API) yang tidak tergantung pada peranti atau platform yang digunakan, sehingga OpenGL dapat berjalan pada sistem operasi Windows, UNIX dan sistem operasi lainnya.

Rumah merupakan suatu bangunan yang dijadikan tempat tinggal sementara dalam jangka waktu tertentu. Rumah berbentuk ruangan yang dibatasi oleh atap dan dinding, biasanya memiliki jalan masuk berupa pintu, bisa berjendela ataupun tidak. Memiliki alas yaitu lantai bisa berupa tanah, ubin, keramik atau bahan lainnya. Untuk itu, rumah dapat digambar dengan komputer dengan animasi 3D agar tampak lebih menarik dan untuk orang yang ingin melihat bangunan rumah tidak harus datang ke lokasi nya secara langsung.

Pembuatan Objek rumah minimalis 3D ini dibuat dengan tools devc++ dan menggunakan aplikasi interface yaitu OpenGL. Objek rumah minimalis 3D ini dibuat dengan berbagai macam fungsi yang disediakan oleh OpenGL.

Objek 3D dalam OpenGL sendiri akan lebih dinamis apabila adanya interkasi user dengan objek tersebut, interaksi tersebut bias berupa interaksi menggunakan keyboard maupun interaksi menggunakan mouse, Oleh karena itu kami menambahkan salah satu interaksi yaitu interaksi menggunakan keyboard.

1. **Identifikasi Masalah**

Berdasarkan uraian latarbelakang di atas, maka dapat dirumuskan masalah dalam penulisan laporan tugas besar ini adalah :

Bagaimana membangun suatu objek 3D berbentuk bangunan rumah minimalis dengan menggunakan librari OpenGL dengan tools DevC++*.*

1. **Maksud dan Tujuan**
   1. **Maksud**

Maksud dari penulisan ini adalah untuk Membuat aplikasi rumah minimalis 3D dengan menggunakan OpenGL yang menampilkan objek-objek seperti rumah, pohon, halaman, pagar, kincir angin dan lain sebagainya.

* 1. **Tujuan**

Adapun tujuan dari pembuatan objek rumah minimalis 3D ini adalah sebagai berikut :

1. Menampilkan objek simulasi berupa rumah minimalis 3D.
2. Mengetahui fungsi-fungsi pada openGL dengan menggunakan empat unsur yaitu coloring, lighting, blending, dan mapping.

**4. BatasanMasalah**

Dalam pembuatan aplikasi ini, penulis membatasi beberapa masalah sebagai berikut:

1. Aplikasi berbetuk 3D yang dapat dirotasikan, diperbesar dan perkecil.
2. Aplikasi dibangun menggunakan librari OpenGL.
3. Objek yang terlibat dalam pembuatan tugas ini yaitu.
   1. Libglut32.a
   2. Libglu32.a
   3. Libopengl32.a
   4. LibSOIL.a
4. Menggunakan tools Dev C++.
5. **Souce Code**

**5.1 Program Utama (*main.c*)**

|  |
| --- |
| **#include <stdio.h>**  **#include <stdlib.h>**  **#include <string.h>**  **#include <stdarg.h>**  **#include <SOIL.h>**  **#include <GL/glut.h>**  **#include "rumah.h"**  **#include "pohon.h"**  **#include "kincir.h"**  **#include "besimain.h"**  **float z\_pos = -5.0f;**  **float y\_pos = -5.0f;**  **float x\_pos = -5.0f;**  **float xRot, yRot, zRot, sudutk;**  **float rot = 0.0f;**  **GLfloat LightAmbient[] = {0.0f, 0.0f, 0.0f, 1.0f};**  **GLfloat LightDiffuse[] = {0.2f, 0.2f, 0.2f, 1.0f};**  **GLfloat LightPosition[] = {0.0f, 2.0f, 0.0f, 0.0f};**  **// penyimpanan 1 texture**  **GLuint tex\_2d,txTop,txBottom,txFront,txBack,txLeft,txRight;**  **/\* penyimpanan 1 texture \*/**  **//GLuint texture[1];**  **void init();**  **void myKeyboard(int key, int x, int y);**  **void Keyboard(unsigned char key, int x, int y);**  **void myDisplay(void);**  **void myTimeOut(int);**  **void resize(int, int);**  **int main(int argc, char\* argv[])**  **{**  **glutInit(&argc, argv);**  **glutInitDisplayMode(GLUT\_DEPTH | GLUT\_DOUBLE | GLUT\_RGBA);**  **//glutInitDisplayMode(GLUT\_DOUBLE | GLUT\_DEPTH);**  **glutInitWindowSize(1360, 768);**  **glutInitWindowPosition(0, 0);**  **glutCreateWindow("PEMANDANGAN");**  **glutFullScreen();**  **glutDisplayFunc(myDisplay);**  **glutIdleFunc(myDisplay);**  **glutSpecialFunc(myKeyboard);**  **glutKeyboardFunc(Keyboard);**  **glutReshapeFunc(resize);**  **glutTimerFunc(100, myTimeOut, 0);**  **init();**  **glutMainLoop();**  **return 0;**  **}**  **GLuint LoadGLTextures()**  **{**  **/\* load file image \*/**  **tex\_2d = SOIL\_load\_OGL\_texture("img/grass.jpg", SOIL\_LOAD\_AUTO, SOIL\_CREATE\_NEW\_ID, SOIL\_FLAG\_INVERT\_Y);**  **txTop = SOIL\_load\_OGL\_texture ("img/sky.jpg",SOIL\_LOAD\_AUTO, SOIL\_CREATE\_NEW\_ID, SOIL\_FLAG\_INVERT\_Y);**  **//txBottom = SOIL\_load\_OGL\_texture (BOTTOM,SOIL\_LOAD\_RGB,SOIL\_CREATE\_NEW\_ID,0);**  **txFront = SOIL\_load\_OGL\_texture ("img/sky.jpg", SOIL\_LOAD\_AUTO, SOIL\_CREATE\_NEW\_ID, SOIL\_FLAG\_INVERT\_Y);**  **//txBack = SOIL\_load\_OGL\_texture (BACK,SOIL\_LOAD\_RGB,SOIL\_CREATE\_NEW\_ID,0);**  **//txLeft = SOIL\_load\_OGL\_texture (LEFT,SOIL\_LOAD\_RGB,SOIL\_CREATE\_NEW\_ID,0);**  **//txRight = SOIL\_load\_OGL\_texture (RIGHT,SOIL\_LOAD\_RGB,SOIL\_CREATE\_NEW\_ID,0);**  **/\* pengecekan eror \*/**  **if(tex\_2d == 0)**  **{**  **printf( "kesalahan load pada file SOIL : '%s'\n", SOIL\_last\_result() );**  **}**    **if (txFront == 0)**  **{**  **printf( "kesalahan load pada file SOIL : '%s'\n", SOIL\_last\_result() );**  **}**  **if (txTop == 0)**  **{**  **printf( "kesalahan load pada file SOIL : '%s'\n", SOIL\_last\_result() );**  **}**    **// menentukan tipe texture dari image**  **glBindTexture(GL\_TEXTURE\_2D, tex\_2d);**  **glTexParameteri(GL\_TEXTURE\_2D,GL\_TEXTURE\_WRAP\_S,GL\_REPEAT);**  **glTexParameteri(GL\_TEXTURE\_2D,GL\_TEXTURE\_WRAP\_T,GL\_REPEAT);**  **}**  **void init()**  **{**  **LoadGLTextures();**  **//glEnable(GL\_TEXTURE\_2D);**  **glShadeModel(GL\_SMOOTH);**  **glClearColor(0.0f, 0.7f, 0.9f, 0.0f);**  **glClearDepth(1.0f);**  **glEnable(GL\_DEPTH\_TEST);**  **glDepthFunc(GL\_LEQUAL);**  **glHint(GL\_PERSPECTIVE\_CORRECTION\_HINT, GL\_NICEST);**  **glLightfv(GL\_LIGHT0, GL\_AMBIENT, LightAmbient);**  **glLightfv(GL\_LIGHT0, GL\_DIFFUSE, LightDiffuse);**  **glLightfv(GL\_LIGHT0, GL\_POSITION, LightPosition);**  **glEnable(GL\_LIGHT0);**  **}**  **void myKeyboard(int key, int x, int y)**  **{**  **switch(key)**  **{**  **case GLUT\_KEY\_LEFT :**  **x\_pos -= 2.0f;**  **y\_pos -= 2.0f;**  **z\_pos -= 2.0f;**  **yRot -= 2.0f;**  **x\_pos += 2.0f;**  **y\_pos += 2.0f;**  **z\_pos += 2.0f;**  **break;**    **case GLUT\_KEY\_RIGHT :**  **x\_pos -= 2.0f;**  **y\_pos -= 2.0f;**  **z\_pos -= 2.0f;**  **yRot += 2.0f;**  **x\_pos += 2.0f;**  **y\_pos += 2.0f;**  **z\_pos += 2.0f;**  **break;**  **case GLUT\_KEY\_UP :**  **xRot += 1.0f;**  **break;**  **case GLUT\_KEY\_DOWN : xRot -= 1.0f;break;**  **}**  **}**  **void Keyboard(unsigned char key, int x, int y)**  **{**  **switch(key)**  **{**  **case 'w':**  **z\_pos += 0.5f;**  **break;**  **case 's':**  **z\_pos -= 0.5f;**  **break;**  **case 'a':**  **x\_pos += 0.5f;**  **break;**  **case 'd':**  **x\_pos -= 0.5f;**  **break;**  **case ',':**  **y\_pos -= 0.5f;**  **break;**  **case '.':**  **y\_pos += 0.5f;**  **break;**  **case 27:**  **exit(0);**  **break;**  **default:**  **break;**  **}**  **}**  **void kipas()**  **{**  **//Kipas**  **glPushMatrix();**  **glTranslatef(0.0, 23.0, 6.5);**  **glColor4f(0.5, 0.5, 0.5, 1.0);**  **glScalef(2.15, 2.0, 0.55);**  **glRotatef(sudutk, 0.0f, 0.0f, 1.0f);**  **glutWireTorus(1, 5, 10, 15);**  **glPopMatrix();**  **glPushMatrix();**  **glTranslatef(0.0, 23.0, 6.5);**  **glColor4f(0.5, 0.5, 0.5, 1.0);**  **glScalef(1.15, 1.0, 0.55);**  **glRotatef(sudutk, 0.0f, 0.0f, 1.0f);**  **glutWireTorus(1, 5, 10, 15);**  **glPopMatrix();**  **glPushMatrix();**  **glTranslatef(0.0, 23.0, 6.5);**  **glColor4f(0.5, 0.5, 0.5, 1.0);**  **glScalef(0.55, 0.5, 0.55);**  **glRotatef(sudutk, 0.0f, 0.0f, 1.0f);**  **glutWireTorus(1, 5, 10, 15);**  **glPopMatrix();**  **glPushMatrix();**  **glTranslatef(0.0, 23.0, 6.5);**  **glColor4f(0.5, 0.5, 0.5, 1.0);**  **glScalef(3.15, 3.0, 0.55);**  **glRotatef(sudutk, 0.0f, 0.0f, 1.0f);**  **glutWireTorus(1, 5, 10, 15);**  **glPopMatrix();**  **}**  **//PUTAR KIPAS**  **void putar()**  **{**  **sudutk += 0.1f;**  **if (sudutk > 360){**  **sudutk -= 360;**  **}**  **//glutPostRedisplay();**  **//glutTimerFunc(100, putar, 0);**  **}**  **void home()**  **{**  **//kincir bodi**  **glPushMatrix();**  **glScalef(0.1, 0.1, 0.1);**  **glTranslatef(65.0, 18.0, -250.0);**  **glRotatef(90, 0.0, 1.0, 0.0);**  **kincir();**  **kipas();**  **putar();**  **glPopMatrix();**    **//rumah**  **glPushMatrix();**  **glTranslatef(0.5, 0.0, -20.0);**  **glScalef(0.5, 0.5, 0.5);**  **rumah();**  **glPopMatrix();**    **//pohon3**  **glPushMatrix();**  **glTranslatef(5.5,0.0,-20.0);**  **glScalef(0.05, 0.05, 0.05);**  **glRotatef(90,0,1,0);**  **pohon();**  **//ranting1**  **ranting();**  **//ranting2**  **glPushMatrix();**  **glScalef(1.5, 1.5, 1.5);**  **glTranslatef(0,25,25);**  **glRotatef(250,1,0,0);**  **ranting();**  **glPopMatrix();**  **//ranting3**  **glPushMatrix();**  **glScalef(1.8, 1.8, 1.8);**  **glTranslatef(0,-6,21.5);**  **glRotatef(-55,1,0,0);**  **ranting();**  **glPopMatrix();**  **glPopMatrix();**  **glPushMatrix();**  **glTranslatef(-2.3f,0,-29);**  **BesiMain();**  **glPopMatrix();**  **glPushMatrix();**  **glTranslatef(-2.3f,0,-26);**  **BesiMain();**  **glPopMatrix();**  **}**  **void myDisplay(void)**  **{**  **glPolygonMode(GL\_FRONT\_AND\_BACK, GL\_FILL);**  **glLoadIdentity();**  **glTranslatef(x\_pos, y\_pos, z\_pos);**  **glRotatef(xRot,1.0f,0.0f,0.0f);**  **glRotatef(yRot,0.0f, 1.0f,0.0f);**  **glEnable(GL\_DEPTH\_TEST);//kedalaman**  **glEnable(GL\_LIGHTING);//cahaya**  **glEnable(GL\_LIGHT0);//lampu**  **glClear(GL\_COLOR\_BUFFER\_BIT | GL\_DEPTH\_BUFFER\_BIT);**  **glEnable(GL\_COLOR\_MATERIAL);//warna**  **//glRotatef(zRot,0.0f,0.0f,1.0f);**  **glEnable(GL\_BLEND); // enable BLENDING**  **glColor3f(1.0, 1.0, 1.0); // Set warna BLENDING**  **glEnable(GL\_TEXTURE\_2D);**  **glPushMatrix();**  **glBindTexture(GL\_TEXTURE\_2D, tex\_2d);**  **glTranslatef(5.5,0.0,-20.0);**  **glBegin(GL\_QUADS);**  **//// depan**  **// glNormal3f( 0.0f, 0.0f, 1.0f);**  **// glTexCoord2f(0.0f, 0.0f); glVertex3f(-1.0f, -1.0f, 1.0f);**  **// glTexCoord2f(1.0f, 0.0f); glVertex3f( 1.0f, -1.0f, 1.0f);**  **// glTexCoord2f(1.0f, 1.0f); glVertex3f( 1.0f, 1.0f, 1.0f);**  **// glTexCoord2f(0.0f, 1.0f); glVertex3f(-1.0f, 1.0f, 1.0f);**  **// // belakang**  **// glNormal3f( 0.0f, 0.0f,-1.0f);**  **// glTexCoord2f(1.0f, 0.0f); glVertex3f(-1.0f, -1.0f, -1.0f);**  **// glTexCoord2f(1.0f, 1.0f); glVertex3f(-1.0f, 1.0f, -1.0f);**  **// glTexCoord2f(0.0f, 1.0f); glVertex3f( 1.0f, 1.0f, -1.0f);**  **// glTexCoord2f(0.0f, 0.0f); glVertex3f( 1.0f, -1.0f, -1.0f);**  **// atas**  **glNormal3f( 0.0f, 1.0f, 0.0f);**  **glTexCoord2f(0.0f, 1.0f); glVertex3f(-100, 0.005f, -100);**  **glTexCoord2f(0.0f, 0.0f); glVertex3f(-100, 0.005f, 100);**  **glTexCoord2f(1.0f, 0.0f); glVertex3f( 100, 0.005f, 100);**  **glTexCoord2f(1.0f, 1.0f); glVertex3f( 100, 0.005f, -100);**  **//// bawah**  **// glNormal3f( 0.0f,-1.0f, 0.0f);**  **// glTexCoord2f(1.0f, 1.0f); glVertex3f(-1.0f, -1.0f, -1.0f);**  **// glTexCoord2f(0.0f, 1.0f); glVertex3f( 1.0f, -1.0f, -1.0f);**  **// glTexCoord2f(0.0f, 0.0f); glVertex3f( 1.0f, -1.0f, 1.0f);**  **// glTexCoord2f(1.0f, 0.0f); glVertex3f(-1.0f, -1.0f, 1.0f);**  **// // kanan**  **// glNormal3f( 0.3f, 0.0f, 0.0f);**  **// glTexCoord2f(1.0f, 0.0f); glVertex3f( 0.3f, -0.3f, -0.3f);**  **// glTexCoord2f(1.0f, 1.0f); glVertex3f( 0.3f, 0.3f, -0.3f);**  **// glTexCoord2f(0.0f, 1.0f); glVertex3f( 0.3f, 0.3f, 0.3f);**  **// glTexCoord2f(0.0f, 0.0f); glVertex3f( 0.3f, -0.3f, 0.3f);**  **// // kiri**  **// glNormal3f(-0.3f, 0.0f, 0.0f);**  **// glTexCoord2f(0.0f, 0.0f); glVertex3f(-0.3f, -0.3f, -0.3f);**  **// glTexCoord2f(1.0f, 0.0f); glVertex3f(-0.3f, -0.3f, 0.3f);**  **// glTexCoord2f(1.0f, 1.0f); glVertex3f(-0.3f, 0.3f, 0.3f);**  **// glTexCoord2f(0.0f, 1.0f); glVertex3f(-0.3f, 0.3f, -0.3f);**  **glEnd();**  **glPopMatrix();**  **glDisable(GL\_TEXTURE\_2D);**  **//SkyBox**  **glEnable(GL\_TEXTURE\_2D);**  **glPushMatrix();**    **// glTranslatef(5.5,0.0,-20.0);**  **glBindTexture(GL\_TEXTURE\_2D, txFront);**  **glBegin(GL\_QUADS);**  **// depan**    **glNormal3f( 0.0f, 0.0f, 1.0f);**  **glTexCoord2f(0.0f, 0.0f); glVertex3f(-50.0f, -50.0f, 50.0f);**  **glTexCoord2f(1.0f, 0.0f); glVertex3f( 50.0f, -50.0f, 50.0f);**  **glTexCoord2f(1.0f, 1.0f); glVertex3f( 50.0f, 50.0f, 50.0f);**  **glTexCoord2f(0.0f, 1.0f); glVertex3f(-50.0f, 50.0f, 50.0f);**  **// belakang**  **//glNormal3f( 0.0f, 0.0f,-1.0f);**  **glTexCoord2f(1.0f, 0.0f); glVertex3f(-50.0f, -50.0f, -50.0f);**  **glTexCoord2f(1.0f, 1.0f); glVertex3f(-50.0f, 50.0f, -50.0f);**  **glTexCoord2f(0.0f, 1.0f); glVertex3f( 50.0f, 50.0f, -50.0f);**  **glTexCoord2f(0.0f, 0.0f); glVertex3f( 50.0f, -50.0f, -50.0f);**  **glEnd();**  **// atas**  **glBindTexture(GL\_TEXTURE\_2D, txTop);**  **glBegin(GL\_QUADS);**  **//glNormal3f( 0.0f, 1.0f, 0.0f);**  **glTexCoord2f(0.0f, 1.0f); glVertex3f(-50, 50.0f, -50);**  **glTexCoord2f(0.0f, 0.0f); glVertex3f(-50, 50.0f, 50);**  **glTexCoord2f(1.0f, 0.0f); glVertex3f( 50, 50.0f, 50);**  **glTexCoord2f(1.0f, 1.0f); glVertex3f( 50, 50.0f, -50);**  **glEnd();**    **glBegin(GL\_QUADS);**  **// bawah**  **glNormal3f( 0.0f,-1.0f, 0.0f);**  **glTexCoord2f(1.0f, 1.0f); glVertex3f(-50.0f, -50.0f, -50.0f);**  **glTexCoord2f(0.0f, 1.0f); glVertex3f( 50.0f, -50.0f, -50.0f);**  **glTexCoord2f(0.0f, 0.0f); glVertex3f( 50.0f, -50.0f, 50.0f);**  **glTexCoord2f(1.0f, 0.0f); glVertex3f(-50.0f, -50.0f, 50.0f);**  **// kanan**  **glNormal3f( 0.3f, 0.0f, 0.0f);**  **glTexCoord2f(1.0f, 0.0f); glVertex3f( 50.0f, -50.0f, -50.0f);**  **glTexCoord2f(1.0f, 1.0f); glVertex3f( 50.0f, 50.0f, -50.0f);**  **glTexCoord2f(0.0f, 1.0f); glVertex3f( 50.0f, 50.0f, 50.0f);**  **glTexCoord2f(0.0f, 0.0f); glVertex3f( 50.0f, -50.0f, 50.0f);**  **// kiri**  **glNormal3f(-0.3f, 0.0f, 0.0f);**  **glTexCoord2f(0.0f, 0.0f); glVertex3f(-50.0f, -50.0f, -50.0f);**  **glTexCoord2f(1.0f, 0.0f); glVertex3f(-50.0f, -50.0f, 50.0f);**  **glTexCoord2f(1.0f, 1.0f); glVertex3f(-50.0f, 50.0f, 50.0f);**  **glTexCoord2f(0.0f, 1.0f); glVertex3f(-50.0f, 50.0f, -50.0f);**  **glEnd();**  **glPopMatrix();**  **glDisable(GL\_TEXTURE\_2D);**  **home();**  **int i;**  **for(i=10;i<=40;i+=10)**  **{**  **glPushMatrix();**  **glTranslatef(i,0,0);**  **home();**  **glPopMatrix();**  **}**  **for(i=-40;i<=0;i+=10)**  **{**  **glPushMatrix();**  **glTranslatef(i,0,0);**  **home();**  **glPopMatrix();**  **}**    **glFlush();**  **//xRot+=0.1f;**  **// yRot+=0.1f;**  **// zRot+=0.1f;**  **// sudutk+= 1.0f;**  **glutSwapBuffers();**  **}**  **void myTimeOut(int id)**  **{**  **rot += 5.0f;**  **glutPostRedisplay();**  **glutTimerFunc(100, myTimeOut, 0);**  **}**  **void resize(int width, int height)**  **{**  **glViewport(1, 0, width, height);**  **glMatrixMode(GL\_PROJECTION);**  **glLoadIdentity();**  **gluPerspective(45.0, (GLdouble)width / (GLdouble)height, 1.0, 300.0);**  **glMatrixMode(GL\_MODELVIEW);**  **glLoadIdentity();**  **}** |

**5.2 Posedur pembuatan rumah (rumah.h)**

|  |
| --- |
| **void rumah(void) {**  **//atap**  **glPushMatrix();**  **glScaled(0.8, 1.0, 0.8);**  **glTranslatef(0.0, 4.85, -1.9);**  **glRotated(45, 0, 1, 0);**  **glRotated(-90, 1, 0, 0);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3d(0.803921568627451, 0.5215686274509804, 0.2470588235294118);**  **glutSolidCone(4., 1., 3, 1);**  **glPopMatrix();**    **//atap**  **glPushMatrix();**  **glScaled(0.8, 1.0, 0.8);**  **glTranslatef(0.0, 4.85, 2.1);**  **glRotated(45, 0, 1, 0);**  **glRotated(-90, 1, 0, 0);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3d(0.803921568627451, 0.5215686274509804, 0.2470588235294118);**  **glutSolidCone(4.2, 1.5, 4, 1);**  **glPopMatrix();**    **//lantai 1**  **glPushMatrix();**  **glScaled(1.115, 0.03, 2.2);**  **glTranslatef(0.0, 0, 0.0);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.3402, 0.3412, 0.3117);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//lantai 2 depan**  **glPushMatrix();**  **glScaled(1.015, 0.03, 1.2);**  **glTranslatef(0.0,80, 1.7);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.4613, 0.4627, 0.4174);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//lantai 2 belakang**  **glPushMatrix();**  **glScaled(0.5, 0.03, 0.8);**  **glTranslatef(2.5,80, -2.8);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.4613, 0.4627, 0.4174);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//lantai 3**  **glPushMatrix();**  **glScaled(1.015, 0.03, 1.8);**  **glTranslatef(0.0,160, 0.3);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.3402, 0.3412, 0.3117);**  **glutSolidCube(5.0);**  **glPopMatrix();**      **//Dinding Kiri Bawah**  **glPushMatrix();**  **glScaled(0.035, 0.5, 1.6);**  **glTranslatef(-70.0, 2.45, 0.0);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.4613, 0.4627, 0.4174);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//Dinding Kanan Bawah**  **glPushMatrix();**  **glScaled(0.035, 0.5, 1.6);**  **glTranslatef(70.0, 2.45, 0.0);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.4613, 0.4627, 0.4174);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//Dinding Kiri Atas**  **glPushMatrix();**  **glScaled(0.035, 0.5, 1.8);**  **glTranslatef(-70.0, 7.45, 0.3);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.4613, 0.4627, 0.4174);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//Dinding Kanan Atas**  **glPushMatrix();**  **glScaled(0.035, 0.5, 1.8);**  **glTranslatef(70.0, 7.45, 0.3);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.4613, 0.4627, 0.4174);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//Dinding Belakang bawah**  **glPushMatrix();**  **//glScaled(0.035, 0.5, 0.8);**  **glScaled(1.015, 0.5, 0.07);**  **glTranslatef(0, 2.45,-58);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.4613, 0.4627, 0.4174);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//Dinding Belakang atas**  **glPushMatrix();**  **//glScaled(0.035, 0.5, 0.8);**  **glScaled(1.015, 0.5, 0.07);**  **glTranslatef(0, 7.45,-58);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.4613, 0.4627, 0.4174);**  **glutSolidCube(5.0);**  **glPopMatrix();**        **//Dinding Depan bawah**  **glPushMatrix();**  **glScaled(1.015, 0.5, 0.035);**  **glTranslatef(0, 2.45,116);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.4613, 0.4627, 0.4174);**  **glutSolidCube(5.0);**  **glPopMatrix();**  **//Dinding Depan atas**  **glPushMatrix();**  **glScaled(1.015, 0.5, 0.035);**  **glTranslatef(0, 7.45,116);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.4613, 0.4627, 0.4174);**  **glutSolidCube(5.0);**  **glPopMatrix();**  **//list hitam atas**  **glPushMatrix();**  **glScaled(0.35, 0.5, 0.035);**  **glTranslatef(1, 7.2,124);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.1412, 0.1389, 0.1356);**  **glutSolidCube(5.0);**  **glPopMatrix();**  **//list hitam atas**  **glPushMatrix();**  **glScaled(0.35, 0.43, 0.035);**  **glTranslatef(1, 3.5,124);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.1412, 0.1389, 0.1356);**  **glutSolidCube(5.0);**  **glPopMatrix();**  **//pintu atas**  **glPushMatrix();**  **glScaled(0.18, 0.35, 0.035);**  **glTranslatef(-8, 9.5,118);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.0980, 0.0608, 0.0077);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pintu bawah**  **glPushMatrix();**  **glScaled(0.18, 0.35, 0.035);**  **glTranslatef(-8, 2.5,118);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.0980, 0.0608, 0.0077);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis**  **glPushMatrix();**  **glScaled(0.18, 0.017, 0.035);**  **glTranslatef(-8, 110.5,118);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0, 0, 0);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis atas kiri**  **glPushMatrix();**  **glScaled(0.18, 0.017, 0.035);**  **glTranslatef(-8, 254,118);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **//glColor3f(0.3402, 0.3412, 0.3117);**  **glColor3f(0, 0, 0);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis atas kanan**  **glPushMatrix();**  **glScaled(0.10, 0.017, 0.035);**  **glTranslatef(18, 254,118);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0, 0, 0);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis jedela atas**  **glPushMatrix();**  **glScaled(0.08, 0.017, 0.035);**  **glTranslatef(22.5, 245,118);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.3402, 0.3412, 0.3117);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis jedela bawah**  **glPushMatrix();**  **glScaled(0.08, 0.017, 0.035);**  **glTranslatef(22.5, 165,118);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.3402, 0.3412, 0.3117);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis jedela kiri**  **glPushMatrix();**  **glScaled(0.017,0.28, 0.035);**  **glTranslatef(96.6, 12.5,118);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.3402, 0.3412, 0.3117);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis jedela kanan**  **glPushMatrix();**  **glScaled(0.017,0.28, 0.035);**  **glTranslatef(115.1, 12.5,118);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.3402, 0.3412, 0.3117);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//jendela bawah (kanan Bawah)**  **//alis atas kanan (kanan Bawah)**  **glPushMatrix();**  **glScaled(0.10, 0.017, 0.035);**  **glTranslatef(18, 110.5,118);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0, 0, 0);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis jedela atas (kanan Bawah)**  **glPushMatrix();**  **glScaled(0.08, 0.017, 0.035);**  **glTranslatef(22.5, 101.5,118);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.3402, 0.3412, 0.3117);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis jedela bawah (kanan Bawah)**  **glPushMatrix();**  **glScaled(0.08, 0.017, 0.035);**  **glTranslatef(22.5, 22.0,118);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.3402, 0.3412, 0.3117);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis jedela kiri (kanan Bawah)**  **glPushMatrix();**  **glScaled(0.017,0.28, 0.035);**  **glTranslatef(96.6, 3.8,118);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.3402, 0.3412, 0.3117);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis jedela kanan (kanan Bawah)**  **glPushMatrix();**  **glScaled(0.017,0.28, 0.035);**  **glTranslatef(115.1, 3.8,118);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.3402, 0.3412, 0.3117);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis jedela atas (tengah1)**  **glPushMatrix();**  **glScaled(0.08, 0.017, 0.035);**  **glTranslatef(0, 119.5,128);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis jedela bawah (tengah1)**  **glPushMatrix();**  **glScaled(0.08, 0.017, 0.035);**  **glTranslatef(0, 40.0,128);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis jedela kiri (tengah1)**  **glPushMatrix();**  **glScaled(0.017,0.28, 0.035);**  **glTranslatef(-9.6, 4.8,128);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis jedela kanan (tengah1)**  **glPushMatrix();**  **glScaled(0.017,0.28, 0.035);**  **glTranslatef(9.5, 4.8,128);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**  **//alis jedela atas (tengah2)**  **glPushMatrix();**  **glScaled(0.08, 0.017, 0.035);**  **glTranslatef(9, 119.5,128);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis jedela bawah (tengah2)**  **glPushMatrix();**  **glScaled(0.08, 0.017, 0.035);**  **glTranslatef(9, 40.0,128);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis jedela kiri (tengah2)**  **glPushMatrix();**  **glScaled(0.017,0.28, 0.035);**  **glTranslatef(33, 4.8,128);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis jedela kanan (tengah2)**  **glPushMatrix();**  **glScaled(0.017,0.28, 0.035);**  **glTranslatef(51.7, 4.8,128);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**        **//alis tiang kiri atas orange**  **glPushMatrix();**  **glScaled(0.06, 0.037, 0.095);**  **glTranslatef(-41, 115,51.5);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis tiang kiri bawah orange**  **glPushMatrix();**  **glScaled(0.06, 0.037, 0.095);**  **glTranslatef(-41, 80,51.5);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**  **//alis tiang kanan atas orange**  **glPushMatrix();**  **glScaled(0.06, 0.037, 0.095);**  **glTranslatef(41, 115,51.5);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//alis tiang kanan bawah orange**  **glPushMatrix();**  **glScaled(0.06, 0.037, 0.095);**  **glTranslatef(41, 80,51.5);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**  **//orange 3 di tengah**  **glPushMatrix();**  **glScaled(0.017,0.33, 0.035);**  **glTranslatef(-16.6, 12,125);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**  **//orange 3 di tengah**  **glPushMatrix();**  **glScaled(0.017,0.33, 0.035);**  **glTranslatef(-6.6, 12,125);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//orange 3 di tengah**  **glPushMatrix();**  **glScaled(0.017,0.33, 0.035);**  **glTranslatef(3.6, 12,125);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**  **//pagar atas 1**  **glPushMatrix();**  **glScaled(.88, 0.017, 0.017);**  **glTranslatef(-.01, 149,290);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**  **//pagar atas 1**  **glPushMatrix();**  **glScaled(.88, 0.017, 0.017);**  **glTranslatef(-.01, 159,290);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar atas 1**  **glPushMatrix();**  **glScaled(.88, 0.017, 0.017);**  **glTranslatef(-.01, 169,290);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar atas 1**  **glPushMatrix();**  **glScaled(.88, 0.017, 0.017);**  **glTranslatef(-.01, 179,290);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(0.3402, 0.3412, 0.3117);**  **glutSolidCube(5.0);**  **glPopMatrix();**      **//lampu kanan atas**  **glPushMatrix();**  **glScaled(0.05, 0.05, 0.05);**  **glTranslatef(34.5, 95.4, 96);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE); //untuk memunculkan warna**  **glColor3ub(252, 243, 169);**  **glutSolidSphere(2.0,20,50);**  **glPopMatrix();**    **//lampu kiri atas**  **glPushMatrix();**  **glScaled(0.05, 0.05, 0.05);**  **glTranslatef(-32.5, 95.4, 96);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3ub(252, 243, 169);**  **glutSolidSphere(2.0,20,50);**  **glPopMatrix();**  **//lampu kanan atas**  **glPushMatrix();**  **glScaled(0.05, 0.05, 0.05);**  **glTranslatef(34.5, 47, 96);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE); //untuk memunculkan warna**  **glColor3ub(252, 243, 169);**  **glutSolidSphere(2.0,20,50);**  **glPopMatrix();**    **//lampu kiri atas**  **glPushMatrix();**  **glScaled(0.05, 0.05, 0.05);**  **glTranslatef(-32.5, 47, 96);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3ub(252, 243, 169);**  **glutSolidSphere(2.0,20,50);**  **glPopMatrix();**    **//pagar bawah I**  **glPushMatrix();**  **glScaled(.7, 0.017, 0.017);**  **glTranslatef(1, 50,400);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah I**  **glPushMatrix();**  **glScaled(.7, 0.017, 0.017);**  **glTranslatef(1, 40,400);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah I**  **glPushMatrix();**  **glScaled(.7, 0.017, 0.017);**  **glTranslatef(1, 30,400);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah I**  **glPushMatrix();**  **glScaled(.7, 0.017, 0.017);**  **glTranslatef(1, 20,400);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah I**  **glPushMatrix();**  **glScaled(.7, 0.017, 0.017);**  **glTranslatef(1, 10,400);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**      **//pagar bawah II**  **glPushMatrix();**  **glScaled(2.7, 0.017, 0.017);**  **glTranslatef(3, 50,400);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah II**  **glPushMatrix();**  **glScaled(2.7, 0.017, 0.017);**  **glTranslatef(3, 40,400);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah II**  **glPushMatrix();**  **glScaled(2.7, 0.017, 0.017);**  **glTranslatef(3, 30,400);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah II**  **glPushMatrix();**  **glScaled(2.7, 0.017, 0.017);**  **glTranslatef(3, 20,400);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah II**  **glPushMatrix();**  **glScaled(2.7, 0.017, 0.017);**  **glTranslatef(3, 10,400);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **// Batang Tiang Kanan**  **glPushMatrix();**  **glScaled(0.06, 0.2,0.06);**  **glTranslatef(43, 3,115.5);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **// Batang Tiang Kiri 1**  **glPushMatrix();**  **glScaled(0.06, 0.2,0.06);**  **glTranslatef(-42, 3,115.5);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **// Batang Tiang Kiri 2**  **glPushMatrix();**  **glScaled(0.06, 0.2,0.06);**  **glTranslatef(-20, 3,115.5);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**  **// Batang Tiang Kiri 3**  **glPushMatrix();**  **glScaled(0.06, 0.2,0.06);**  **glTranslatef(250, 3,115.5);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah III**  **glPushMatrix();**  **glScaled(0.017, 0.017, 5);**  **glTranslatef(875, 50, -1.1);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah III**  **glPushMatrix();**  **glScaled(0.017, 0.017, 5);**  **glTranslatef(875, 40, -1.1);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah III**  **glPushMatrix();**  **glScaled(0.017, 0.017, 5);**  **glTranslatef(875, 30, -1.1);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah III**  **glPushMatrix();**  **glScaled(0.017, 0.017, 5);**  **glTranslatef(875, 20, -1.1);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah III**  **glPushMatrix();**  **glScaled(0.017, 0.017, 5);**  **glTranslatef(875, 10, -1.1);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **// Batang Tiang Kiri 4**  **glPushMatrix();**  **glScaled(0.06, 0.2,0.06);**  **glTranslatef(250, 3, -300);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah IV**  **glPushMatrix();**  **glScaled(4.0, 0.017, 0.017);**  **glTranslatef(1.2, 50,-1060);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah IV**  **glPushMatrix();**  **glScaled(4.0, 0.017, 0.017);**  **glTranslatef(1.2, 40,-1060);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah IV**  **glPushMatrix();**  **glScaled(4.0, 0.017, 0.017);**  **glTranslatef(1.2, 30,-1060);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah IV**  **glPushMatrix();**  **glScaled(4.0, 0.017, 0.017);**  **glTranslatef(1.2, 20,-1060);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah IV**  **glPushMatrix();**  **glScaled(4.0, 0.017, 0.017);**  **glTranslatef(1.2, 10,-1060);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**  **//pagar bawah v**  **glPushMatrix();**  **glScaled(0.017, 0.017, 5);**  **glTranslatef(-300, 50, -1.1);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah v**  **glPushMatrix();**  **glScaled(0.017, 0.017, 5);**  **glTranslatef(-300, 40, -1.1);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah v**  **glPushMatrix();**  **glScaled(0.017, 0.017, 5);**  **glTranslatef(-300, 30, -1.1);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah v**  **glPushMatrix();**  **glScaled(0.017, 0.017, 5);**  **glTranslatef(-300, 20, -1.1);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah v**  **glPushMatrix();**  **glScaled(0.017, 0.017, 5);**  **glTranslatef(-300, 10, -1.1);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **// Batang Tiang kanan 5**  **glPushMatrix();**  **glScaled(0.06, 0.2,0.06);**  **glTranslatef(-85, 3, -300);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah vI**  **glPushMatrix();**  **glScaled(0.5, 0.017, 0.017);**  **glTranslatef(-7.5, 50,400);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah vI**  **glPushMatrix();**  **glScaled(0.5, 0.017, 0.017);**  **glTranslatef(-7.5, 40,400);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah vI**  **glPushMatrix();**  **glScaled(0.5, 0.017, 0.017);**  **glTranslatef(-7.5, 30,400);**  **//glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah vI**  **glPushMatrix();**  **glScaled(0.5, 0.017, 0.017);**  **glTranslatef(-7.5, 20,400);**  **glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//pagar bawah vI**  **glPushMatrix();**  **glScaled(0.5, 0.017, 0.017);**  **glTranslatef(-7.5, 10,400);**  **glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1,1,1);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **// Batang Tiang kanan 6**  **glPushMatrix();**  **glScaled(0.06, 0.2,0.06);**  **glTranslatef(-85, 3, 115.5);**  **glColorMaterial(GL\_FRONT\_AND\_BACK, GL\_AMBIENT\_AND\_DIFFUSE);**  **glColor3f(1.0000, 0.5252, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**  **}** |

**5.3 Prosedur pembuatan pohon (pohon.h)**

|  |
| --- |
| **void pohon(void){**  **//batang**  **GLUquadricObj \*pObj;**  **pObj =gluNewQuadric();**  **gluQuadricNormals(pObj, GLU\_SMOOTH);**  **glPushMatrix();**  **glColor3ub(104,70,14);**  **glRotatef(270,1,0,0);**  **gluCylinder(pObj, 4, 0.7, 30, 25, 25);**  **glPopMatrix();**  **}**  **//ranting**  **void ranting(void){**  **GLUquadricObj \*pObj;**  **pObj =gluNewQuadric();**  **gluQuadricNormals(pObj, GLU\_SMOOTH);**  **glPushMatrix();**  **glColor3ub(104,70,14);**  **glTranslatef(0,27,0);**  **glRotatef(330,1,0,0);**  **gluCylinder(pObj, 0.6, 0.1, 15, 25, 25);**  **glPopMatrix();**  **//daun**  **glPushMatrix();**  **glColor3ub(18,118,13);**  **glScaled(5, 5, 5);**  **glTranslatef(0,7,3);**  **glutSolidDodecahedron();**  **glPopMatrix();**  **}** |

**5.4 Prosedur pembuatan kincir (kincir.h)**

|  |
| --- |
| **//KINCIR**  **void kincir()**  **{ //Lantai**  **glPushMatrix();**  **glColor4f(0.8, 0.8, 0.8, 0.8);**  **glTranslatef(0.0, -15.0, 0.0);**  **glScalef(4.0, 1.09, 2.5);**  **glutSolidCube(6.0f);**  **glPopMatrix();**  **//Atap1**  **glPushMatrix();**  **glColor4f(0.8, 0.8, 0.8, 0.8);**  **glTranslatef(0.0, 0.0, 0.0);**  **glScalef(3.0,0.09,1.5);**  **glutSolidCube(6.0f);**  **glPopMatrix();**  **//Atap2**  **glPushMatrix();**  **glColor4f(0.8, 0.8, 0.8, 0.8);**  **glTranslatef(0.0, -7.0, 0.0);**  **glScalef(3.0,0.09,1.5);**  **glutSolidCube(6.0f);**  **glPopMatrix();**  **//Atap3**  **glPushMatrix();**  **glColor4f(0.8, 0.8, 0.8, 0.8);**  **glTranslatef(0.0, 7.0, 0.0);**  **glScalef(3.0,0.09,1.5);**  **glutSolidCube(6.0f);**  **glPopMatrix();**  **//Atap4**  **glPushMatrix();**  **glColor4f(0.8, 0.8, 0.8, 0.8);**  **glTranslatef(0.0, 14.0, 0.0);**  **glScalef(3.0,0.09,1.5);**  **glutSolidCube(6.0f);**  **glPopMatrix();**  **//Atap5**  **glPushMatrix();**  **glColor4f(0.8, 0.8, 0.8, 1.0);**  **glTranslatef(0.0, 21.0, 0.0);**  **glScalef(3.0,0.09,1.5);**  **glutSolidCube(6.0f);**  **glPopMatrix();**  **//Generator**  **glPushMatrix();**  **glColor4f(0.8, 0.8, 0.8, 0.8);**  **glTranslatef(0.0, 22.0, 0.0);**  **glScalef(2.0,0.59,1.0);**  **glutSolidCube(6.0f);**  **glPopMatrix();**    **/\*//Listrik Bawah**  **glPushMatrix();**  **glColor4f(1.8, 0.8, 0.8, 0.8);**  **glTranslatef(-1.0, 26.0, 0.0);**  **glScalef(0.1,0.1,0.1);**  **glutSolidSphere(5, 20, 30);**  **glPopMatrix();**  **//Listrik Tengah**  **glPushMatrix();**  **glColor4f(1.8, 0.8, 0.8, 0.8);**  **glTranslatef(-1.0, 27.0, 0.0);**  **glScalef(0.1,0.1,0.1);**  **glutSolidSphere(5, 20, 30);**  **glPopMatrix();**  **//Listrik Atas**  **glPushMatrix();**  **glColor4f(1.8, 0.8, 0.8, 0.8);**  **glTranslatef(-1.0, 28.0, 0.0);**  **glScalef(0.1,0.1,0.1);**  **glutSolidSphere(5, 20, 30);**  **glPopMatrix();**  **\*/**  **//Pemutar Depan**  **glPushMatrix();**  **glColor4f(0.8, 0.8, 0.8, 0.8);**  **glTranslatef(0.0, 23.0, 4.0);**  **glScalef(0.2,0.09,1.0);**  **glutSolidCube(6.0f);**  **glPopMatrix();**  **//Bulatan**  **glPushMatrix();**  **glColor4f(0.8, 0.8, 0.8, 0.8);**  **glTranslatef(0.0, 23.0, 6.5);**  **glScalef(0.2,0.2,0.2);**  **glutSolidSphere(5, 20, 30);**  **glPopMatrix();**  **//Pemutar Belakang**  **glPushMatrix();**  **glColor4f(0.8, 0.8, 0.8, 0.8);**  **glTranslatef(0.0, 22.0, -10.0);**  **glScalef(0.2,0.59,0.5);**  **glutSolidCube(6.0f);**  **glPopMatrix();**  **glPushMatrix();**  **glColor4f(0.8, 0.8, 0.8, 0.8);**  **glTranslatef(0.0, 22.0, -5.0);**  **glScalef(0.2,0.19,1.7);**  **glutSolidCube(6.0f);**  **glPopMatrix();**  **glPushMatrix();**  **glColor4f(1.0, 1.8, 0.8, 0.8);**  **glTranslatef(0.0, 22.0, -10.0);**  **glScalef(0.8, 0.1, 0.5);**  **glutSolidCube(6.0f);**  **glPopMatrix();**  **//Tiang Kiri Depan**  **glPushMatrix();**  **glColor4f(0.8, 0.8, 0.8, 0.8);**  **glTranslatef(-7.5, 0.0, 2.5);**  **glScalef(0.15,7.0,0.25);**  **glutSolidCube(6.0f);**  **glPopMatrix();**  **//Tiang Kiri Belakang**  **glPushMatrix();**  **glColor4f(0.8, 0.8, 0.8, 0.8);**  **glTranslatef(-7.5, 0.0, -2.5);**  **glScalef(0.15,7.0,0.25);**  **glutSolidCube(6.0f);**  **glPopMatrix();**  **//Tiang Kanan Depan**  **glPushMatrix();**  **glColor4f(0.8, 0.8, 0.8, 0.8);**  **glTranslatef(7.5, 0.0, 2.5);**  **glScalef(0.15,7.0,0.25);**  **glutSolidCube(6.0f);**  **glPopMatrix();**  **//Tiang Kanan Belakang**  **glPushMatrix();**  **glColor4f(0.8, 0.8, 0.8, 0.8);**  **glTranslatef(7.5, 0.0, -2.5);**  **glScalef(0.15,7.0,0.25);**  **glutSolidCube(6.0f);**  **glPopMatrix();**  **}** |

**5.5 Prosedur pembuatan besi gelantungan (besimain.h)**

|  |
| --- |
| **void BesiMain()**  **{**  **glPushMatrix();**  **glScaled(0.015, 0.2,0.015);**  **glTranslatef(60, 2.2f,50);**  **glColor3f(1.0, 0.0055, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//2**  **glPushMatrix();**  **glScaled(0.015, 0.2,0.015);**  **glTranslatef(265, 2.2f,50);**  **glColor3f(1.0, 0.0055, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//3**  **glPushMatrix();**  **glScaled(0.015, 0.2,0.015);**  **glTranslatef(60, 2.2f,100);**  **glColor3f(1.0, 0.0055, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//4**  **glPushMatrix();**  **glScaled(0.015, 0.2,0.015);**  **glTranslatef(265, 2.2f,100);**  **glColor3f(1.0, 0.0055, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//6\_1**  **glPushMatrix();**  **glScaled(0.8, 0.015,0.015);**  **glTranslatef(3, 65,75);**  **glColor3f(1.0, 0.0055, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **glPushMatrix();**  **glScaled(0.025, 0.015,0.015);**  **glTranslatef(300, 3,100);**  **glColor3f(1.0, 0.0055, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **//11111**  **glPushMatrix();**  **glRotatef(90,1,0,0);**  **glScaled(0.015, 0.2,0.015);**  **glTranslatef(57, 5.5,-55);**  **glColor3f(1.0, 0.6655, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **glPushMatrix();**  **glRotatef(90,1,0,0);**  **glScaled(0.015, 0.2,0.015);**  **glTranslatef(87, 5.5,-55);**  **glColor3f(1.0, 0.6655, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **glPushMatrix();**  **glRotatef(90,1,0,0);**  **glScaled(0.015, 0.2,0.015);**  **glTranslatef(117, 5.5,-55);**  **glColor3f(1.0, 0.6655, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **glPushMatrix();**  **glRotatef(90,1,0,0);**  **glScaled(0.015, 0.2,0.015);**  **glTranslatef(147, 5.5,-55);**  **glColor3f(1.0, 0.6655, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **glPushMatrix();**  **glRotatef(90,1,0,0);**  **glScaled(0.015, 0.2,0.015);**  **glTranslatef(177, 5.5,-55);**  **glColor3f(1.0, 0.6655, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **glPushMatrix();**  **glRotatef(90,1,0,0);**  **glScaled(0.015, 0.2,0.015);**  **glTranslatef(207, 5.5,-55);**  **glColor3f(1.0, 0.6655, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **glPushMatrix();**  **glRotatef(90,1,0,0);**  **glScaled(0.015, 0.2,0.015);**  **glTranslatef(237, 5.5,-55);**  **glColor3f(1.0, 0.6655, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**    **glPushMatrix();**  **glRotatef(90,1,0,0);**  **glScaled(0.015, 0.2,0.015);**  **glTranslatef(267, 5.5,-55);**  **glColor3f(1.0, 0.6655, 0.0157);**  **glutSolidCube(5.0);**  **glPopMatrix();**  **}** |

1. **Print Screen Program**

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