Android OpenGL Part 8 – Alpha Blend

[Pemrograman OpenGL Android 08][Level: Mahir]

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Persiapan

Sebelum mengikuti tutorial ini, ada baiknya pembaca telah membaca beberapa tutorial sebagai berikut:

- Pemrograman Dasar Android 01 - Instalasi di http://www.javaclopedia.com/
- Pemrograman Android OpenGL 01 – Hello Android OpenGL di http://javaclopedia.com/40/android-opengl-part-1.php
- Pemrograman Android OpenGL 02 – Polygon di OpenGL http://javaclopedia.com/40/android-opengl-part-2.php
- Pemrograman Android OpenGL 03 –Transformasi http://javaclopedia.com/69/tutorial-dasar-android-opengl-part-3-transformasi.php
- Pemrograman Android OpenGL 04-Color http://javaclopedia.com/75/tutorial-dasar-android-opengl-part-4-color.php
- Pemrograman Android OpenGL 05-Cube http://javaclopedia.com/79/tutorial-dasar-android-opengl-part-5-cube.php
- Pemrograman Android OpenGL 06-Texture http://javaclopedia.com/83/tutorial-dasar-android-opengl-part-6-texture.php
- Pemrograman Android OpenGL 07-Lighting http://javaclopedia.com/87/tutorial-dasar-android-opengl-part-7-lighting.php

Pendahuluan

Satu hal lagi yang menarik di dalam OpenGL adalah **Alpha Blending**. Dengan menggunakan fitur ini, kita bisa membuat sebuah objek 3D menjadi memiliki kesan dibuat dari bahan kaca tembus pandang.

Alpha Blending

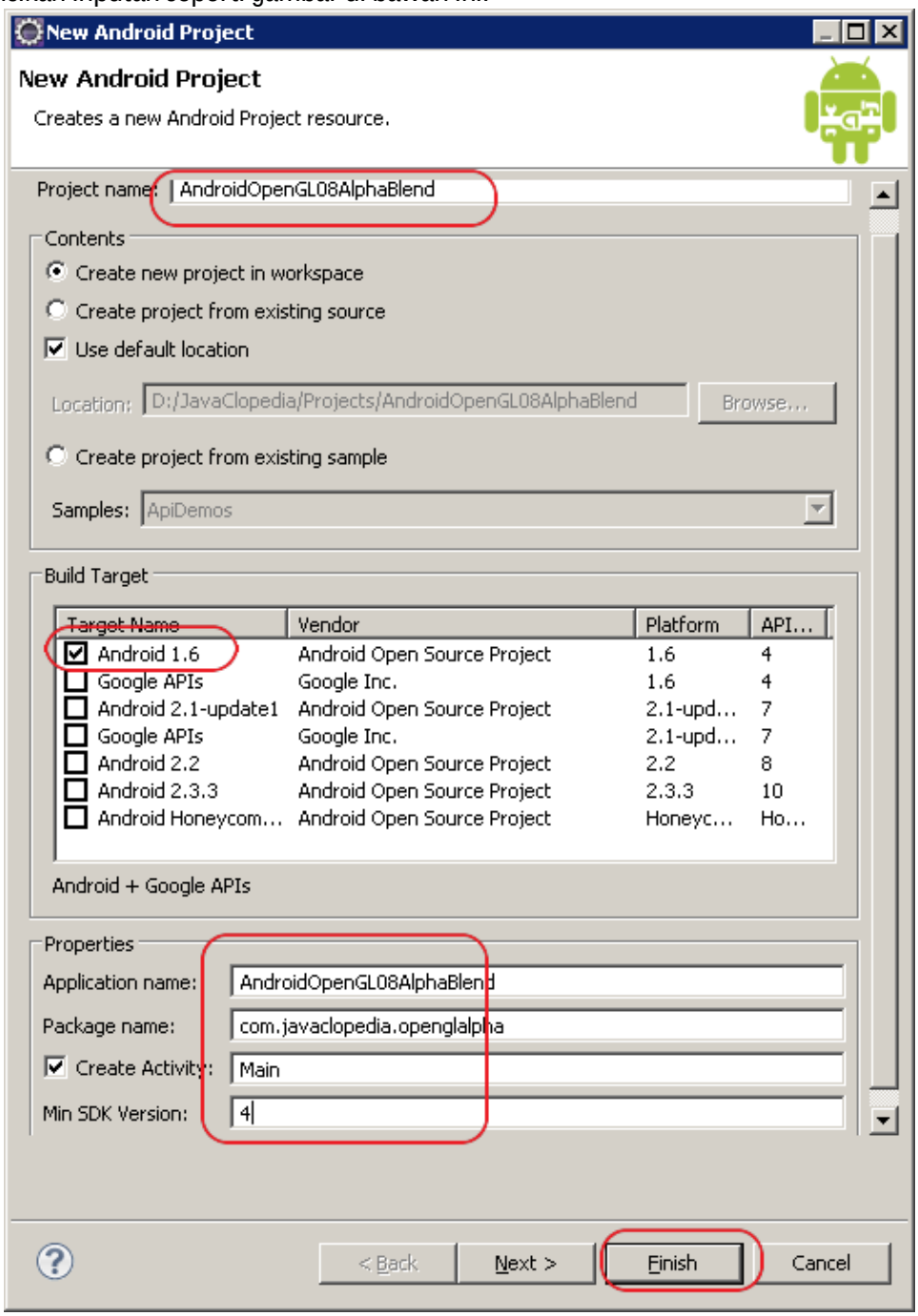
Untuk mengaktifkan AlphaBlending kita dapat menggunakan perintah sebagai berikut:

```
gl.glEnable(GL10.GL_BLEND);
gl.glBlendFunc(GL10.GL_SRC_ALPHA, GL10.GL_ONE);
```

ANDROID IN ACTION!

Tidak perlu berlama-lama, mari kita praktikan di dalam pemrograman:

1. Buka Editor Eclipse
2. Buat project baru dengan cara *File > New > Other > Android > Android Project > Next*.
3. Isikan inputan seperti gambar di bawah ini:



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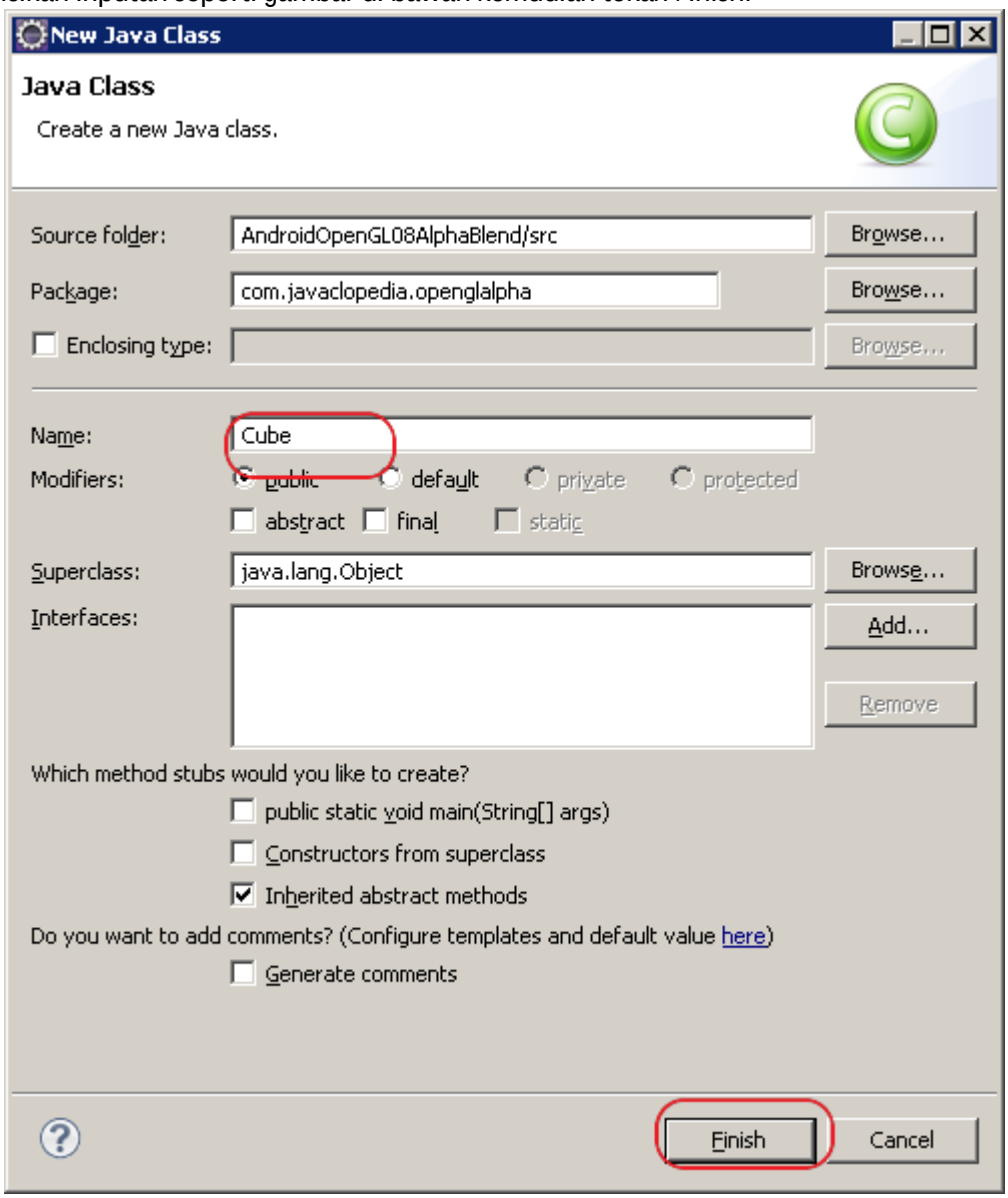
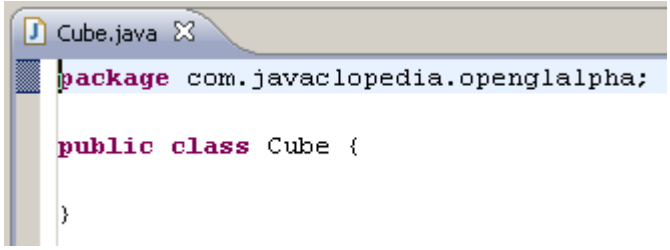
4. Tekan Finish
5. Expand Project AndroidOpenGL08AlphaBlend masuk ke bagian src kemudian klik kanan package *com.javaclopedia.openglalpha* > *New* > *Class*.
6. Isikan inputan seperti gambar di bawah kemudian tekan Finish.



7. Akan muncul source code baru seperti gambar di bawah:



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8. Lengkapi kode program menjadi seperti berikut ini:

```
package com.javaclopedia.openglalpha;

import java.nio.ByteBuffer;
import java.nio.ByteOrder;
import java.nio.FloatBuffer;
import java.nio.IntBuffer;

import javax.microedition.khronos.opengles.GL10;

import android.content.Context;
import android.graphics.Bitmap;
import android.graphics.BitmapFactory;
import android.opengl.GLU;

public class Cube {
   Context context;
   float box[] = new float[] {
               // FRONT
                0.5f, -0.5f,  0.5f,
                0.5f,  0.5f,  0.5f,
               -0.5f, -0.5f,  0.5f,
               -0.5f,  0.5f,  0.5f,
               // BACK
               -0.5f, -0.5f, -0.5f,
               -0.5f,  0.5f, -0.5f,
                0.5f, -0.5f, -0.5f,
                0.5f,  0.5f, -0.5f,
               // LEFT
               -0.5f, -0.5f,  0.5f,
               -0.5f,  0.5f,  0.5f,
               -0.5f, -0.5f, -0.5f,
               -0.5f,  0.5f, -0.5f,
               // RIGHT
                0.5f, -0.5f, -0.5f,
                0.5f,  0.5f, -0.5f,
                0.5f, -0.5f,  0.5f,
                0.5f,  0.5f,  0.5f,
               // TOP
               -0.5f,  0.5f,  0.5f,
                0.5f,  0.5f,  0.5f,
                -0.5f,  0.5f, -0.5f,
                0.5f,  0.5f, -0.5f,
               // BOTTOM
               -0.5f, -0.5f,  0.5f,
               -0.5f, -0.5f, -0.5f,
                0.5f, -0.5f,  0.5f,
                0.5f, -0.5f, -0.5f,
         };

   float texCoords[] = new float[] {
               // FRONT
                0.0f, 1.0f,
                0.0f, 0.0f,
                1.0f, 1.0f,
                1.0f, 0.0f,
               // BACK
                1.0f, 0.0f,
                1.0f, 1.0f,
                0.0f, 0.0f,
```

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```
                0.0f, 1.0f,
               // LEFT
                1.0f, 0.0f,
                1.0f, 1.0f,
                0.0f, 0.0f,
                0.0f, 1.0f,
               // RIGHT
                1.0f, 0.0f,
                1.0f, 1.0f,
                0.0f, 0.0f,
                0.0f, 1.0f,
               // TOP
                0.0f, 0.0f,
                1.0f, 0.0f,
                0.0f, 1.0f,
                1.0f, 1.0f,
               // BOTTOM
                1.0f, 0.0f,
                1.0f, 1.0f,
                0.0f, 0.0f,
                0.0f, 1.0f
        };

    FloatBuffer cubeBuff;
    FloatBuffer texBuff;

    float xrot = 0.0f;
    float yrot = 0.0f;

    int tex;

    public Cube(Context context) {
        this.context = context;
        cubeBuff = makeFloatBuffer(box);
        texBuff = makeFloatBuffer(texCoords);
    }

    float lightAmbient[] = new float[] { 0.3f, 0.3f, 0.3f, 1.0f };
    float lightDiffuse[] = new float[] { 0.6f, 0.6f, 0.6f, 1.0f };
    float[] lightPos = new float[] {0,0,3,1};

    float matAmbient[] = new float[] { 1f, 1f, 1f, 1.0f };
    float matDiffuse[] = new float[] { 1f, 1f, 1f, 1.0f };

    protected void init(GL10 gl) {
        gl.glEnable(GL10.GL_LIGHTING);
        gl.glEnable(GL10.GL_LIGHT0);
        gl.glMaterialfv(GL10.GL_FRONT_AND_BACK, GL10.GL_AMBIENT,
matAmbient, 0);
        gl.glMaterialfv(GL10.GL_FRONT_AND_BACK, GL10.GL_DIFFUSE,
matDiffuse, 0);

        gl.glLightfv(GL10.GL_LIGHT0, GL10.GL_AMBIENT, lightAmbient, 0);
        gl.glLightfv(GL10.GL_LIGHT0, GL10.GL_DIFFUSE, lightDiffuse, 0);
        gl.glLightfv(GL10.GL_LIGHT0, GL10.GL_POSITION, lightPos, 0);

        gl.glEnable(GL10.GL_BLEND);
        gl.glDisable(GL10.GL_DEPTH_TEST);
        gl.glBlendFunc(GL10.GL_SRC_ALPHA, GL10.GL_ONE);
```

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```
        gl.glClearColor(0.0f, 0.0f, 0.0f, 1.0f);
        gl.glClearDepthf(1.0f);

        gl.glVertexPointer(3, GL10.GL_FLOAT, 0, cubeBuff);
        gl.glEnableClientState(GL10.GL_VERTEX_ARRAY);
        gl.glTexCoordPointer(2, GL10.GL_FLOAT, 0, texBuff);
        gl.glEnableClientState(GL10.GL_TEXTURE_COORD_ARRAY);

        gl.glShadeModel(GL10.GL_SMOOTH);

        gl.glEnable(GL10.GL_TEXTURE_2D);
        tex = loadTexture(gl, R.drawable.icon);
    }

    public void onDrawFrame(GL10 gl) {
        gl.glClear(GL10.GL_COLOR_BUFFER_BIT |
GL10.GL_DEPTH_BUFFER_BIT);

        gl.glMatrixMode(GL10.GL_MODELVIEW);
        gl.glLoadIdentity();
        GLU.gluLookAt(gl, 0, 0, 3, 0, 0, 0, 0, 1, 0);

        gl.glRotatef(xrot, 1, 0, 0);
        gl.glRotatef(yrot, 0, 1, 0);

        gl.glColor4f(1.0f, 0, 0, 1.0f);
        gl.glDrawArrays(GL10.GL_TRIANGLE_STRIP, 0, 4);
        gl.glDrawArrays(GL10.GL_TRIANGLE_STRIP, 4, 4);

        gl.glColor4f(0, 1.0f, 0, 1.0f);
        gl.glDrawArrays(GL10.GL_TRIANGLE_STRIP, 8, 4);
        gl.glDrawArrays(GL10.GL_TRIANGLE_STRIP, 12, 4);

        gl.glColor4f(0, 0, 1.0f, 1.0f);
        gl.glDrawArrays(GL10.GL_TRIANGLE_STRIP, 16, 4);
        gl.glDrawArrays(GL10.GL_TRIANGLE_STRIP, 20, 4);

        xrot += 1.0f;
        yrot += 0.5f;
    }

    protected static FloatBuffer makeFloatBuffer(float[] arr) {
        ByteBuffer bb = ByteBuffer.allocateDirect(arr.length*4);
        bb.order(ByteOrder.nativeOrder());
        FloatBuffer fb = bb.asFloatBuffer();
        fb.put(arr);
        fb.position(0);
        return fb;
    }

    protected static ByteBuffer makeByteBuffer(Bitmap bmp) {
        ByteBuffer bb =
ByteBuffer.allocateDirect(bmp.getHeight()*bmp.getWidth()*4);
        bb.order(ByteOrder.BIG_ENDIAN);
        IntBuffer ib = bb.asIntBuffer();

        for (int y = 0; y < bmp.getHeight(); y++)
            for (int x=0;x<bmp.getWidth();x++) {
                int pix = bmp.getPixel(x, bmp.getHeight()-y-1);
                // Convert ARGB -> RGBA
```

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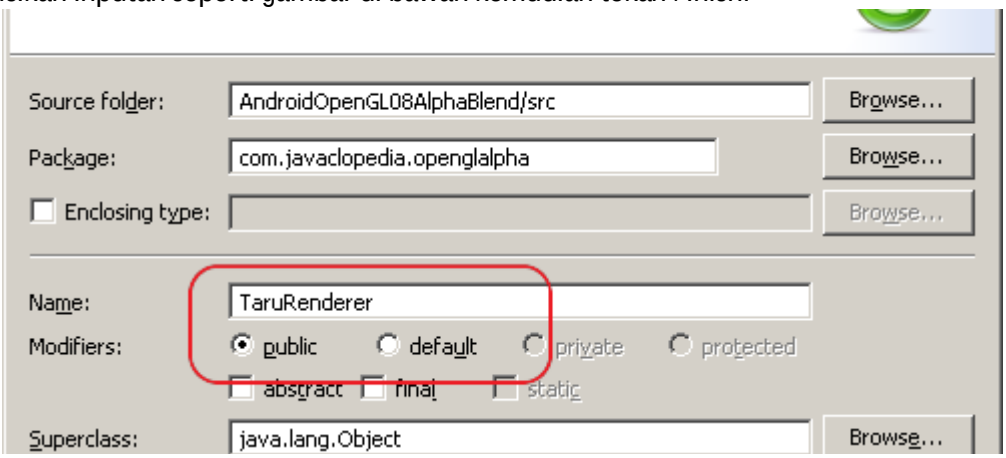
```
                        byte alpha = (byte)((pix >> 24)&0xFF);
                        byte red = (byte)((pix >> 16)&0xFF);
                        byte green = (byte)((pix >> 8)&0xFF);
                        byte blue = (byte)((pix)&0xFF);

                        ib.put(((red&0xFF) << 24) |
                                ((green&0xFF) << 16) |
                                ((blue&0xFF) << 8) |
                                ((alpha&0xFF)));
                }
        ib.position(0);
        bb.position(0);
        return bb;
    }

    protected int loadTexture(GL10 gl, int resource) {
        int[] tmp_tex = new int[1];

        gl.glGenTextures(1, tmp_tex, 0);
        int tex = tmp_tex[0];
        Bitmap bmp =
BitmapFactory.decodeResource(context.getResources(), resource);

        gl.glBindTexture(GL10.GL_TEXTURE_2D, tex);
        gl.glTexImage2D(GL10.GL_TEXTURE_2D, 0, GL10.GL_RGBA,
bmp.getWidth(), bmp.getHeight(), 0, GL10.GL_RGBA, GL10.GL_UNSIGNED_BYTE,
null);
        gl.glTexSubImage2D(GL10.GL_TEXTURE_2D, 0, 0, 0, bmp.getWidth(),
bmp.getHeight(), GL10.GL_RGBA, GL10.GL_UNSIGNED_BYTE,
makeByteBuffer(bmp));
        gl.glTexParameterf(GL10.GL_TEXTURE_2D,
GL10.GL_TEXTURE_MIN_FILTER, GL10.GL_LINEAR);
        gl.glTexParameterf(GL10.GL_TEXTURE_2D,
GL10.GL_TEXTURE_MAG_FILTER, GL10.GL_LINEAR);

        return tex;
    }
}
```

9. Expand Project AndroidOpenGL08AlphaBlend masuk ke bagian src kemudian klik kanan package *com.javaclopedia.openglalpha* > *New* > *Class*.
10. Isikan inputan seperti gambar di bawah kemudian tekan Finish.



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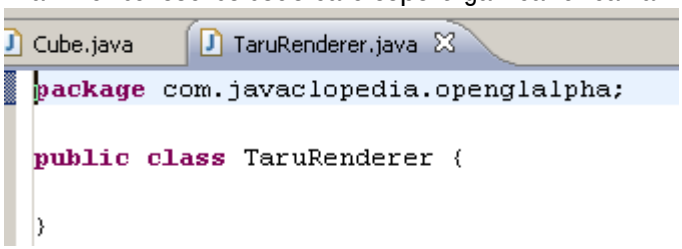
11. Akan muncul source code baru seperti gambar di bawah:



12. Lengkapi kode program menjadi seperti berikut ini:

```
package com.javaclopedia.openglalpha;

import javax.microedition.khronos.egl.EGLConfig;
import javax.microedition.khronos.opengles.GL10;

import android.content.Context;
import android.opengl.GLU;
import android.opengl.GLSurfaceView.Renderer;

public class TaruRenderer implements Renderer {
	private Cube cube;

	public TaruRenderer(Context context) {
		cube = new Cube(context);
	}

	public void onSurfaceCreated(GL10 gl, EGLConfig config) {
		gl.glClearColor(0.0f, 0.0f, 0.0f, 0.5f);
		gl.glShadeModel(GL10.GL_SMOOTH);
		gl.glClearDepthf(1.0f);
		gl.glEnable(GL10.GL_DEPTH_TEST);
		gl.glDepthFunc(GL10.GL_LEQUAL);
		gl.glHint(GL10.GL_PERSPECTIVE_CORRECTION_HINT,
GL10.GL_NICEST);

		cube.init(gl);
	}

	public void onDrawFrame(GL10 gl) {
		gl.glClear(GL10.GL_COLOR_BUFFER_BIT |
GL10.GL_DEPTH_BUFFER_BIT);
		gl.glLoadIdentity();
		gl.glTranslatef(0, 0, -4);

		cube.onDrawFrame(gl);
	}

	public void onSurfaceChanged(GL10 gl, int width, int height) {
		gl.glViewport(0, 0, width, height);
		gl.glMatrixMode(GL10.GL_PROJECTION);
		gl.glLoadIdentity();
		GLU.gluPerspective(gl, 45.0f, (float) width / (float)
height, 0.1f,
				100.0f);
		gl.glMatrixMode(GL10.GL_MODELVIEW);
		gl.glLoadIdentity();
	}
}
```

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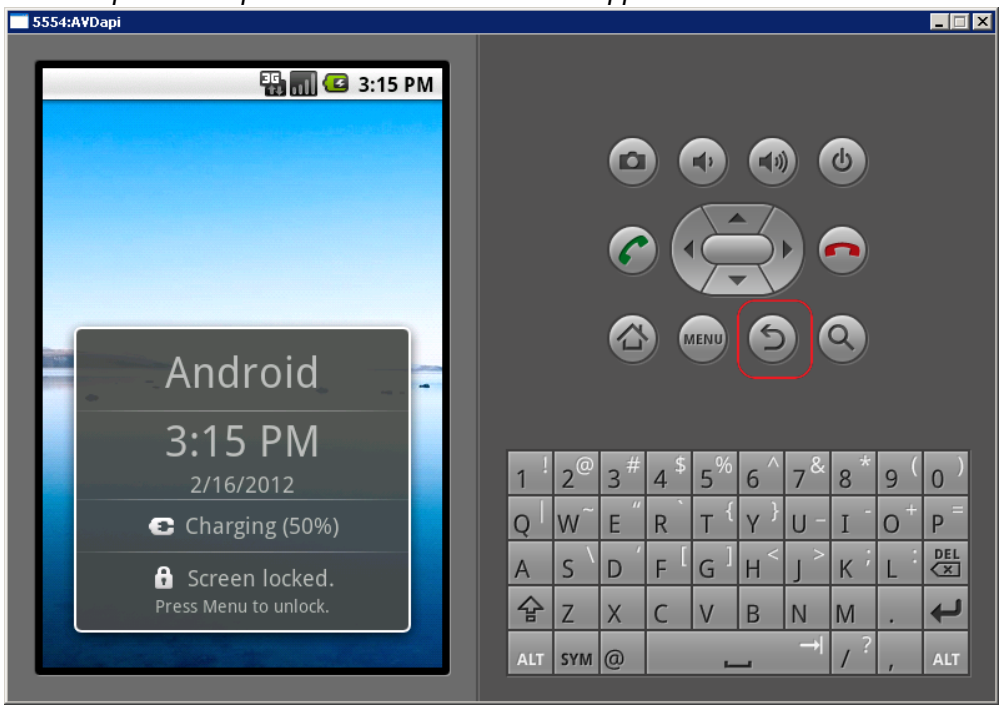
13. Buka class Main, dan ubah menjadi seperti berikut ini:

```
package com.javaclopedia.openglalpha;

import android.app.Activity;
import android.opengl.GLSurfaceView;
import android.os.Bundle;
import android.view.WindowManager;

public class Main extends Activity {
    /** Called when the activity is first created. */
    @Override
    public void onCreate(Bundle savedInstanceState) {
        super.onCreate(savedInstanceState);


getWindow().setFlags(WindowManager.LayoutParams.FLAG_FULLSCREEN
                    ,WindowManager.LayoutParams.FLAG_FULLSCREEN);

            GLSurfaceView view = new GLSurfaceView(this);
            view.setRenderer(new TaruRenderer(this));
            setContentView(view);

    }
}
```

14. Setelah itu, kita jalankan aplikasi kita dengan cara, *Klik Kanan Project AndroidOpenGL08AlphaBlend > Run As > Android Application*.



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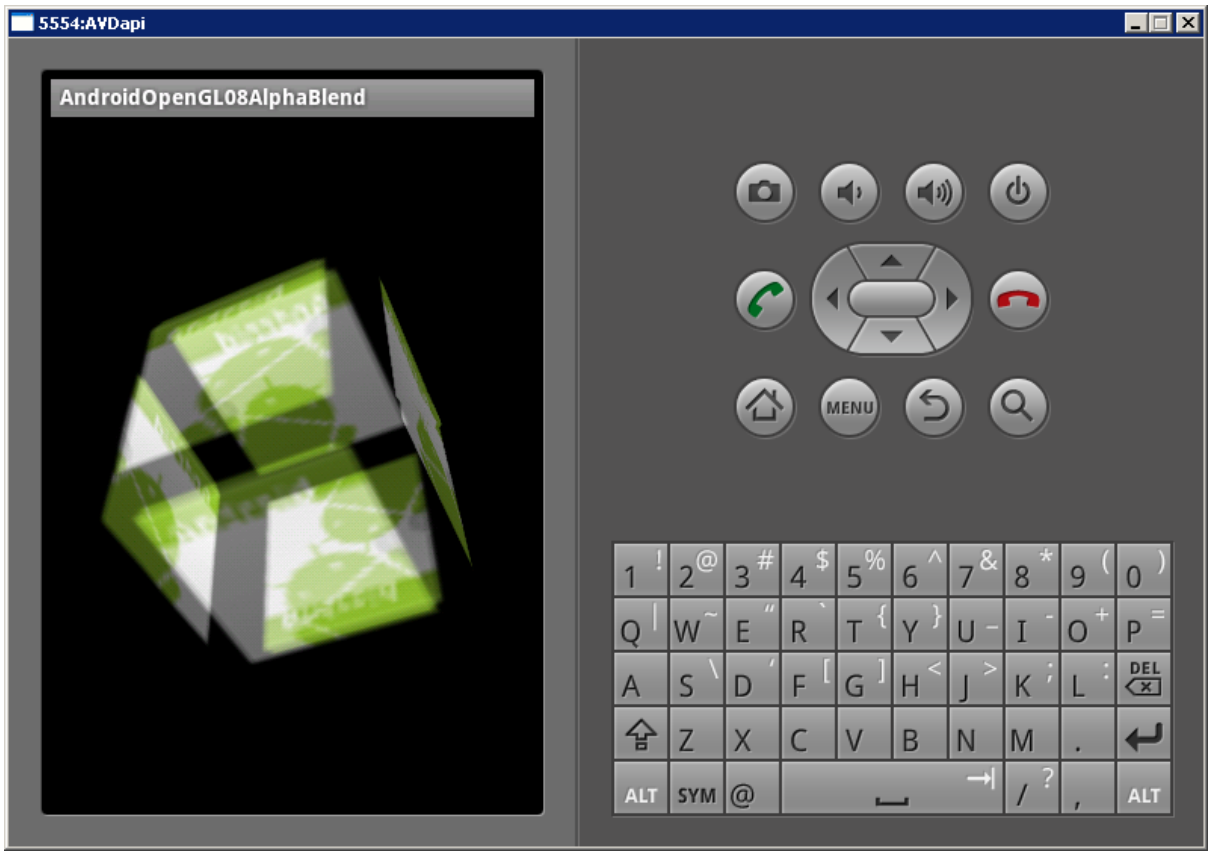
15. Jika Emulator sudah menunjukkan seperti Gambar di atas, maka tekan tombol MENU pada emulator.



16. Jika sudah muncul seperti tampilan di atas, berarti Pembaca telah berhasil membuat aplikasi Alpha Blending OpenGL di Android. **SELAMAT!!!**

Kesimpulan

1. Alpha blending digunakan untuk membuat efek gelas / kaca pada suatu objek
2. Alpha blending dapat diaktifkan dengan cara meng-enable kan GL_BLEND

Biografi Penulis

Andi Taru Nugroho Nur Wismono, Lahir di Tuntang, 01 April 1987. Menyelesaikan S1 Fakultas TI-TI pada tahun 2009 dan menyelesaikan S2 Fakultas TI-SI pada tahun 2011. Penulis merupakan founder dari **JavaClopedia.com** juga Founder dan CEO perusahaan IT **EducaStudio** (educastudio.com). Fokus penulis ada pada pemrograman Java baik itu pemrograman **game**, pemrograman **desktop**, pemrograman **mobile** dan pemrograman **enterprise**. Pengalaman belajar Java penulis, dimulai sejak tahun 2005. Ingin konsultasi pemrograman Java dan Android? request tutorial? Kritik dan Saran? Kirimkan email ke andi.taru@gmail.com

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