Universidad Autónoma del Estado de México

Centro Universitario UAEM Atlacomulco

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Licenciatura en Ingeniería en Computación

Tercer semestre

Unidad de aprendizaje: Bases de datos

Evaluación Extraordinaria

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Sistema de control de inventarios en Abarrotes usando Firebase

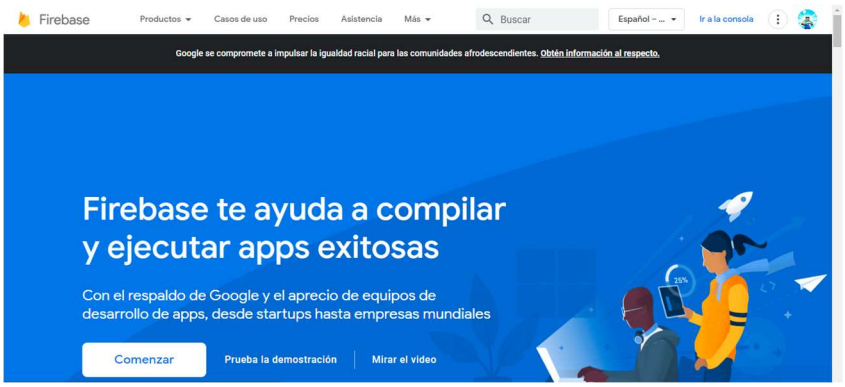
Para empezar, debemos de tener una cuenta de Google para poder usar su servicio de BD.

Navegaremos al siguiente sitio:

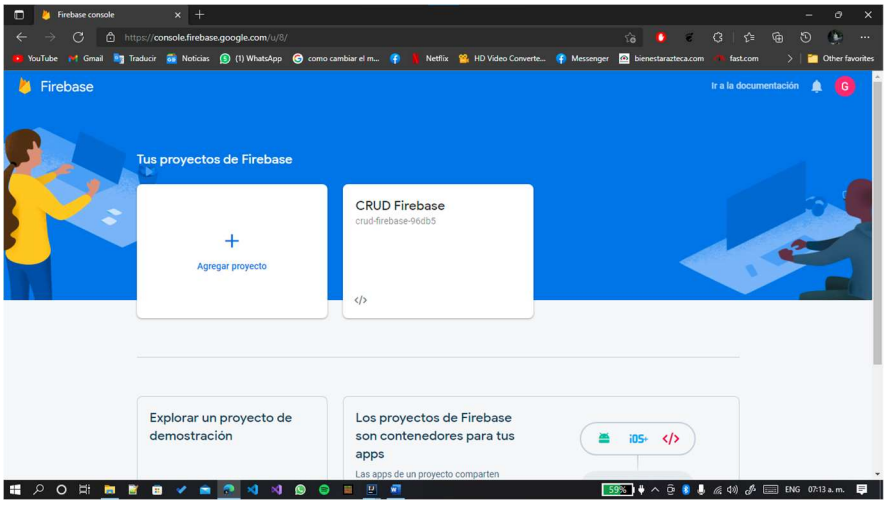
https://firebase.google.com

Nos mostrara la siguiente pantalla:

Daremos click en Empezar:

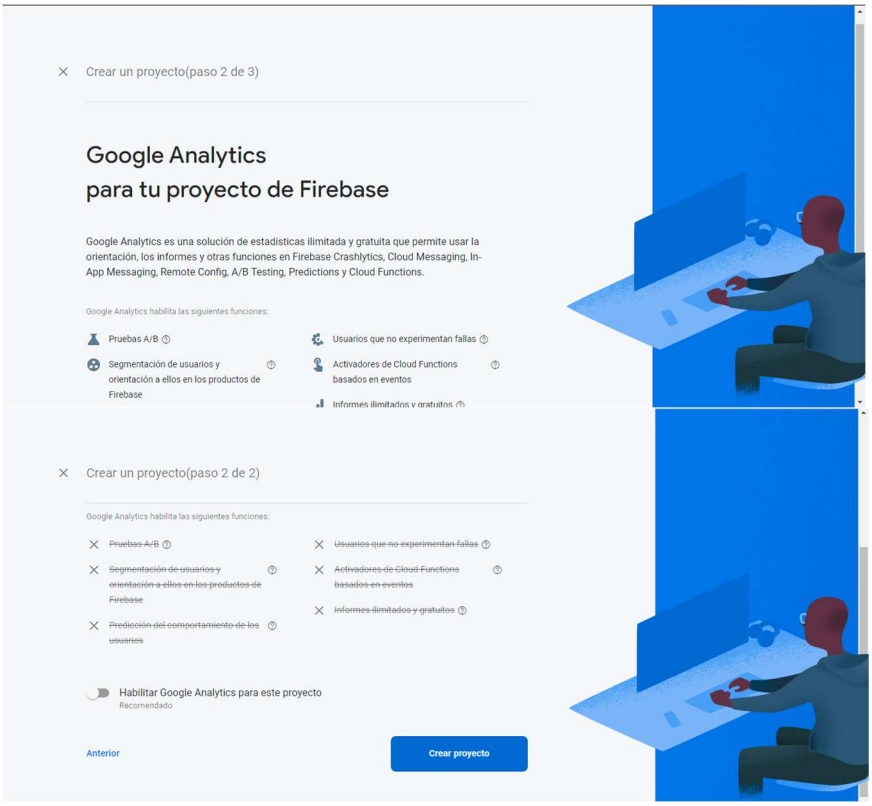


Hacemos click en “Agregar proyecto”

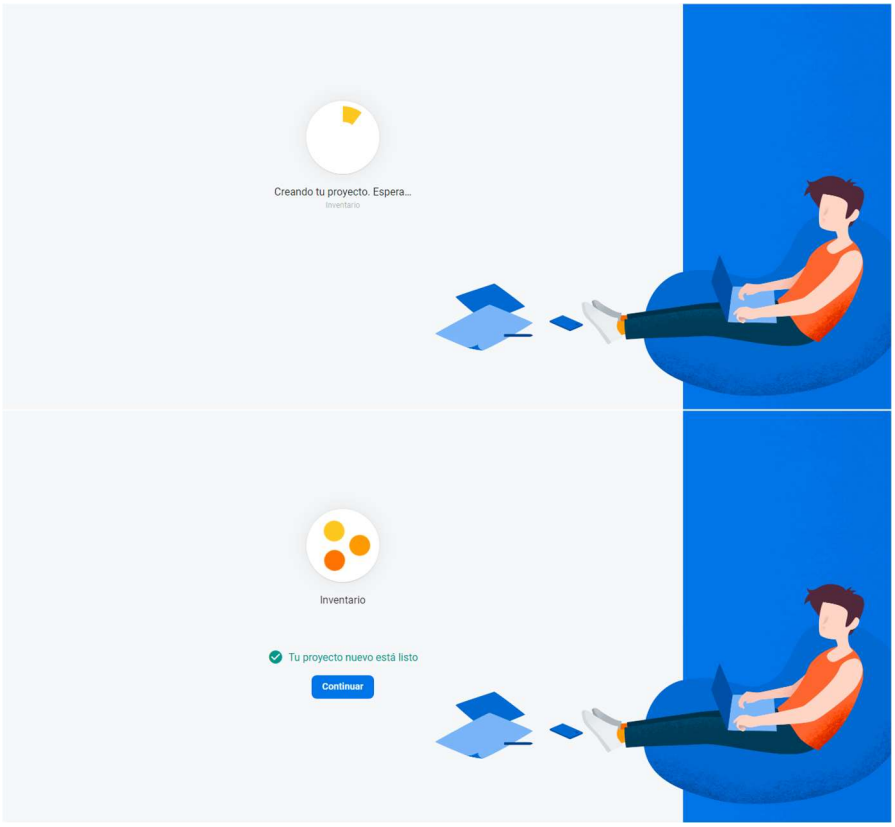


Y le damos un nombre:

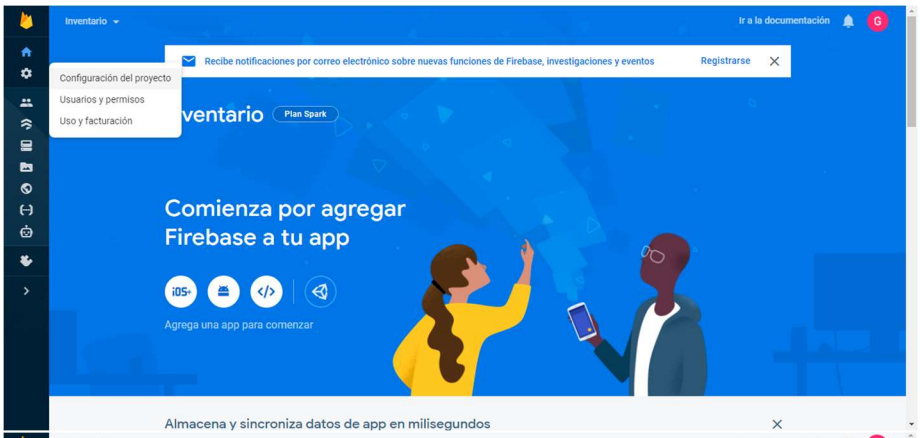
Desactivamos los Google analiticys ya que no necesitamos las métricas:

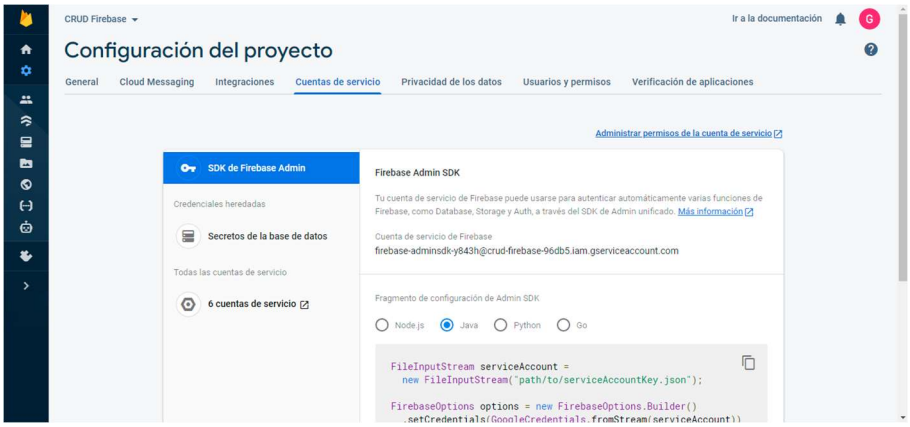


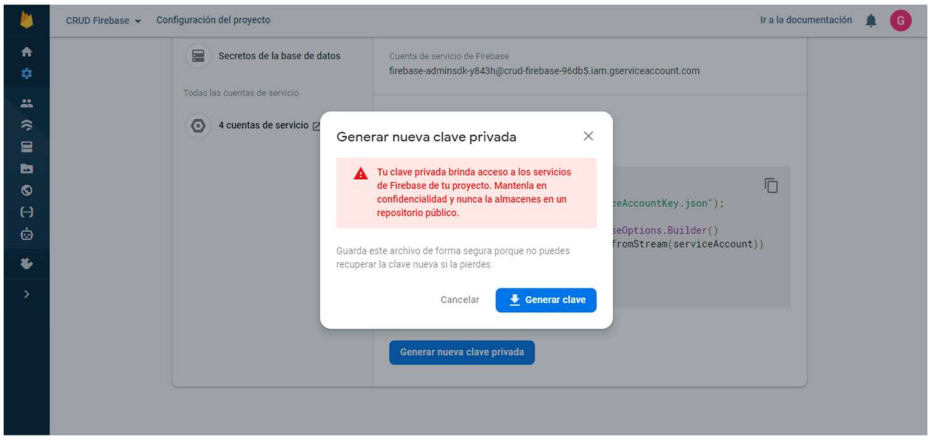
Una vez hecho esto empezara a crear el proyecto:



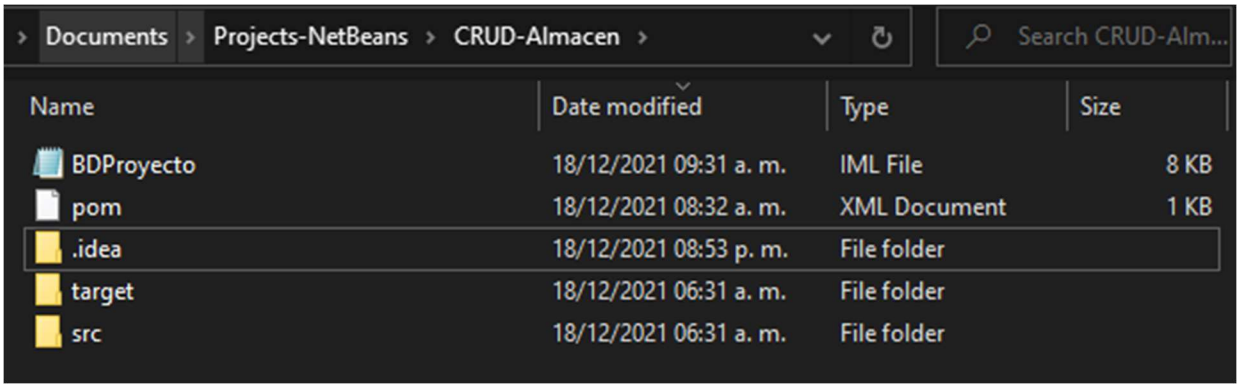
Nos dirigimos a la pestaña de configuración de proyecto y una vez dentro de esta exportaremos nuestra clave privada para poder conectar el proyecto de JAVA a Firebase:

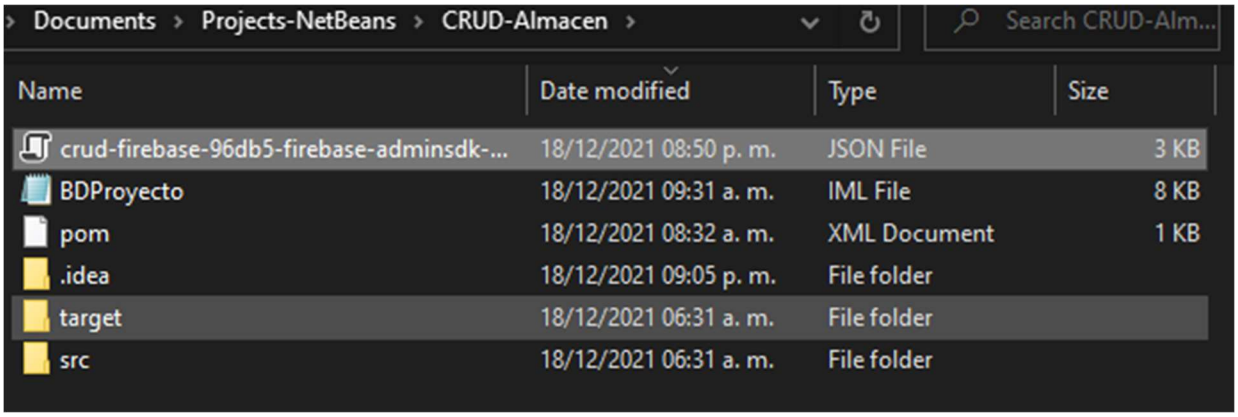




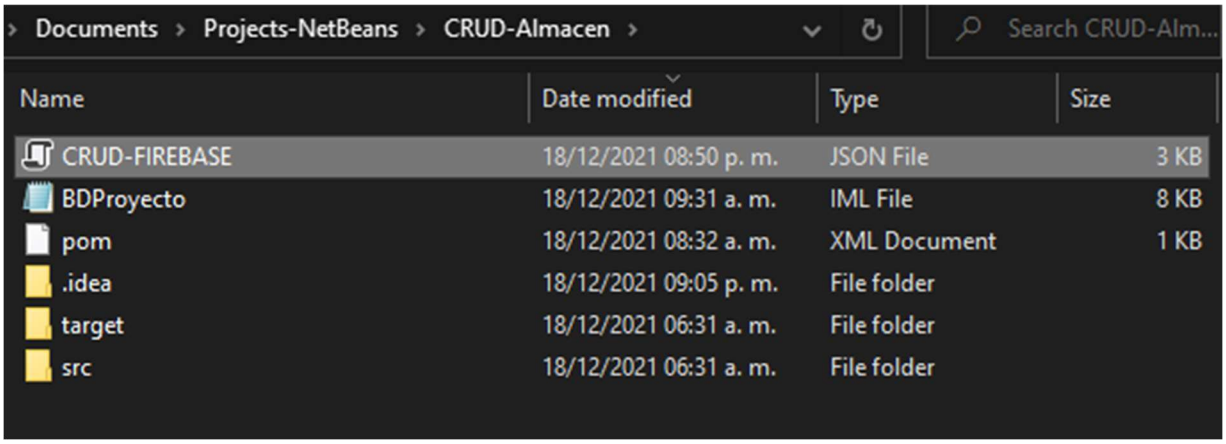


Una vez descargada la pegamos en el directorio raíz de nuestro proyecto de Java:

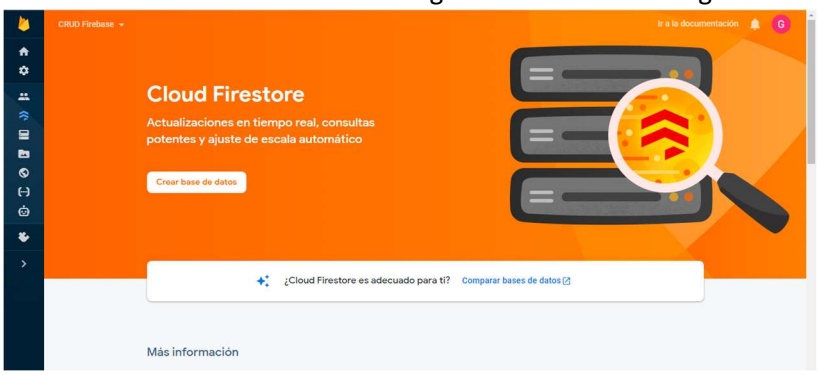




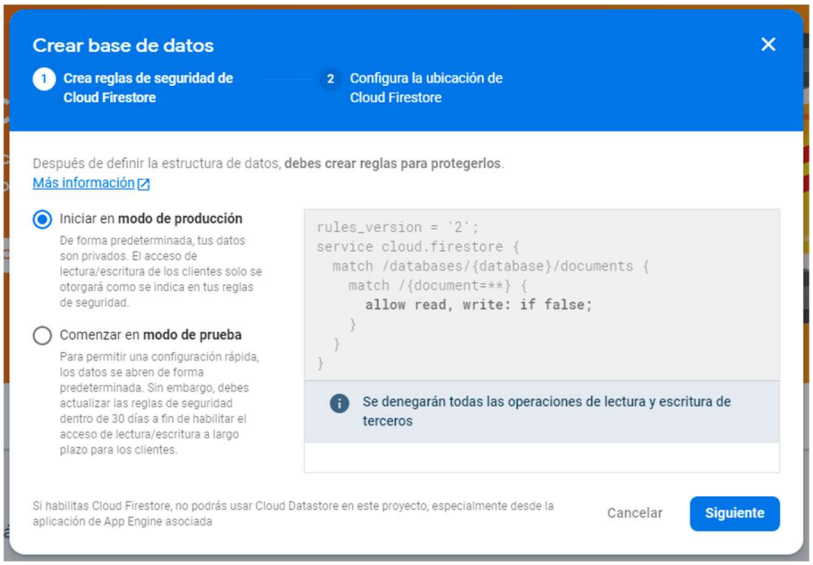
La renombramos a un nombre más corto:

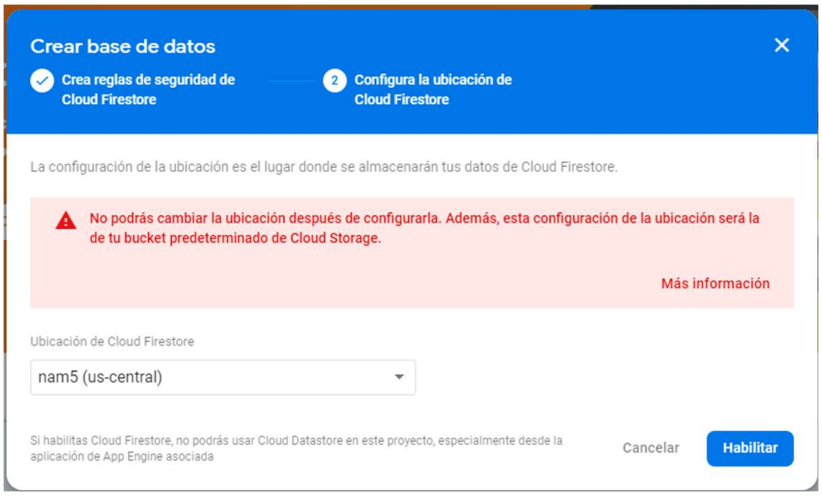


Creamos la base de datos donde se guardaran todos los registros:

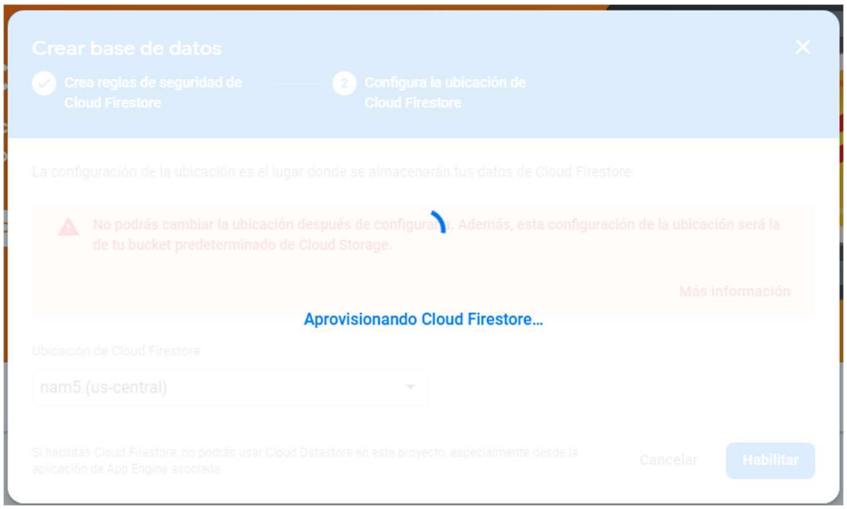


La creamos en modo de producción:

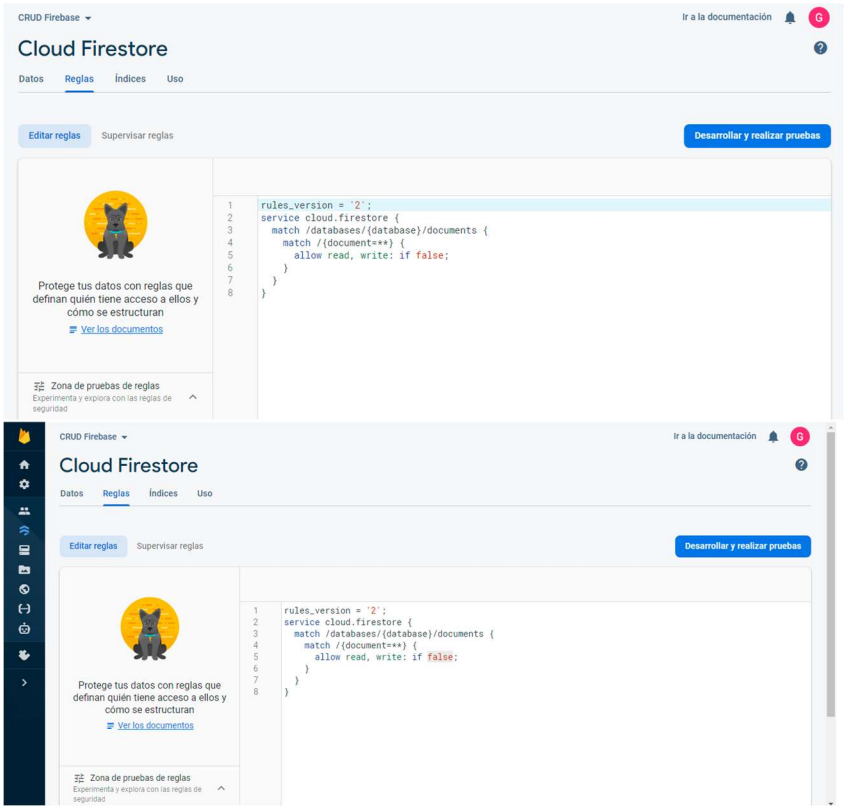




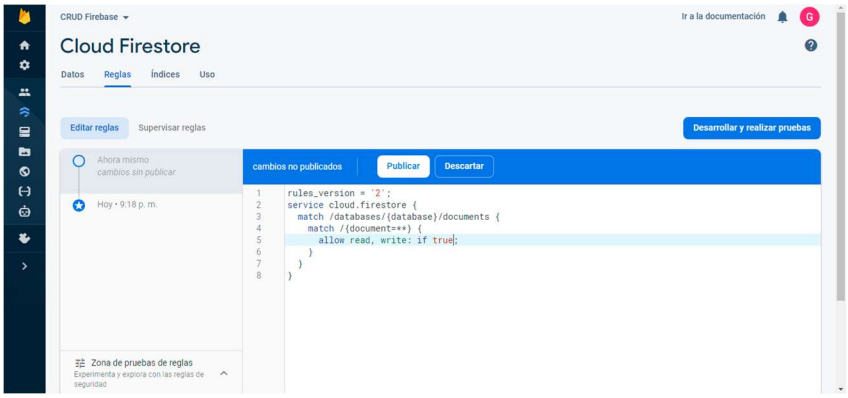
Una vez especificado el modo comienza a crear la BD:



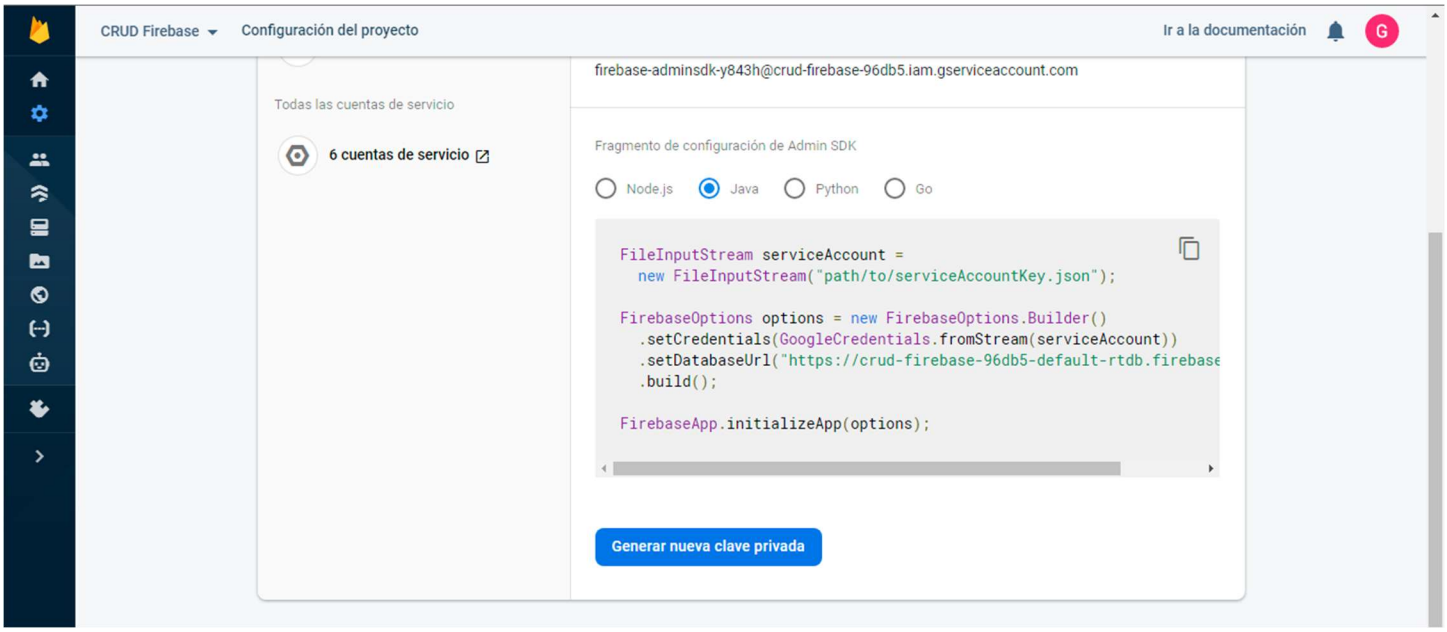
Ahora nos dirigimos a la pestaña de “Reglas” donde modificaremos el permiso de escritura:



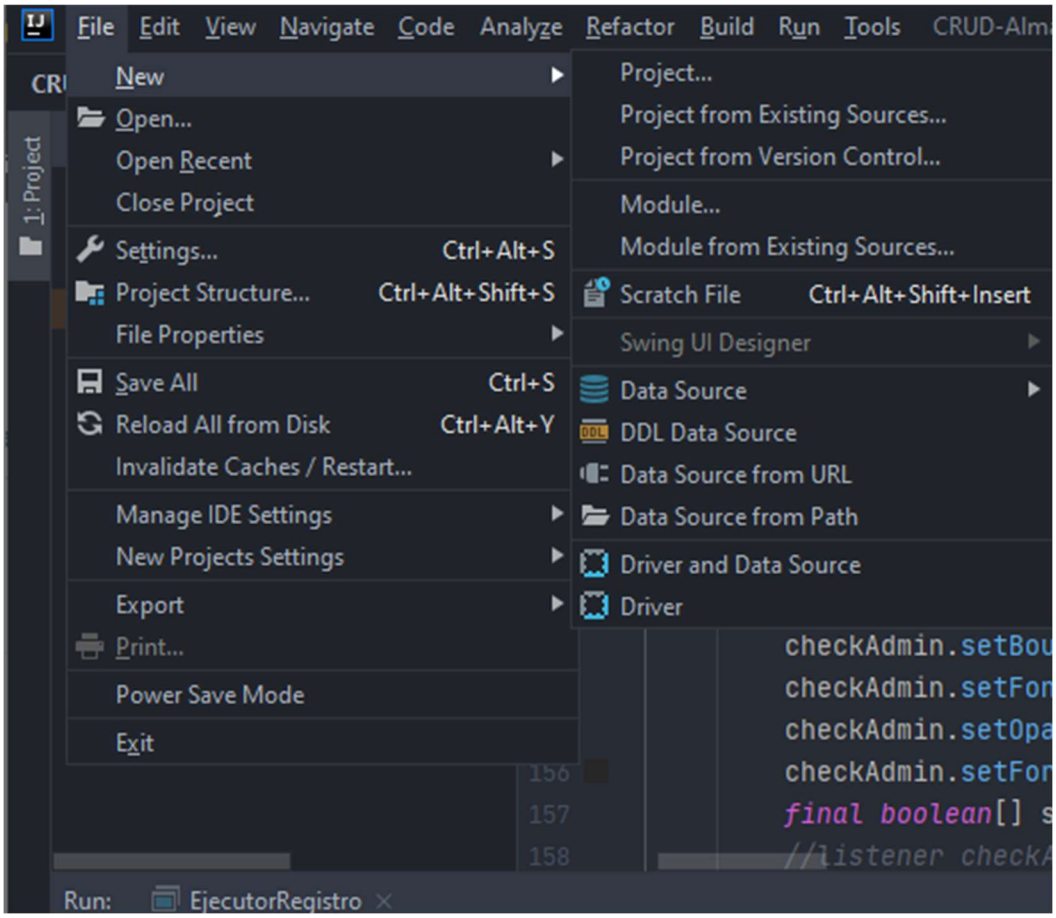
Modificamos la regla a “True “ para que nos permita los cambios:

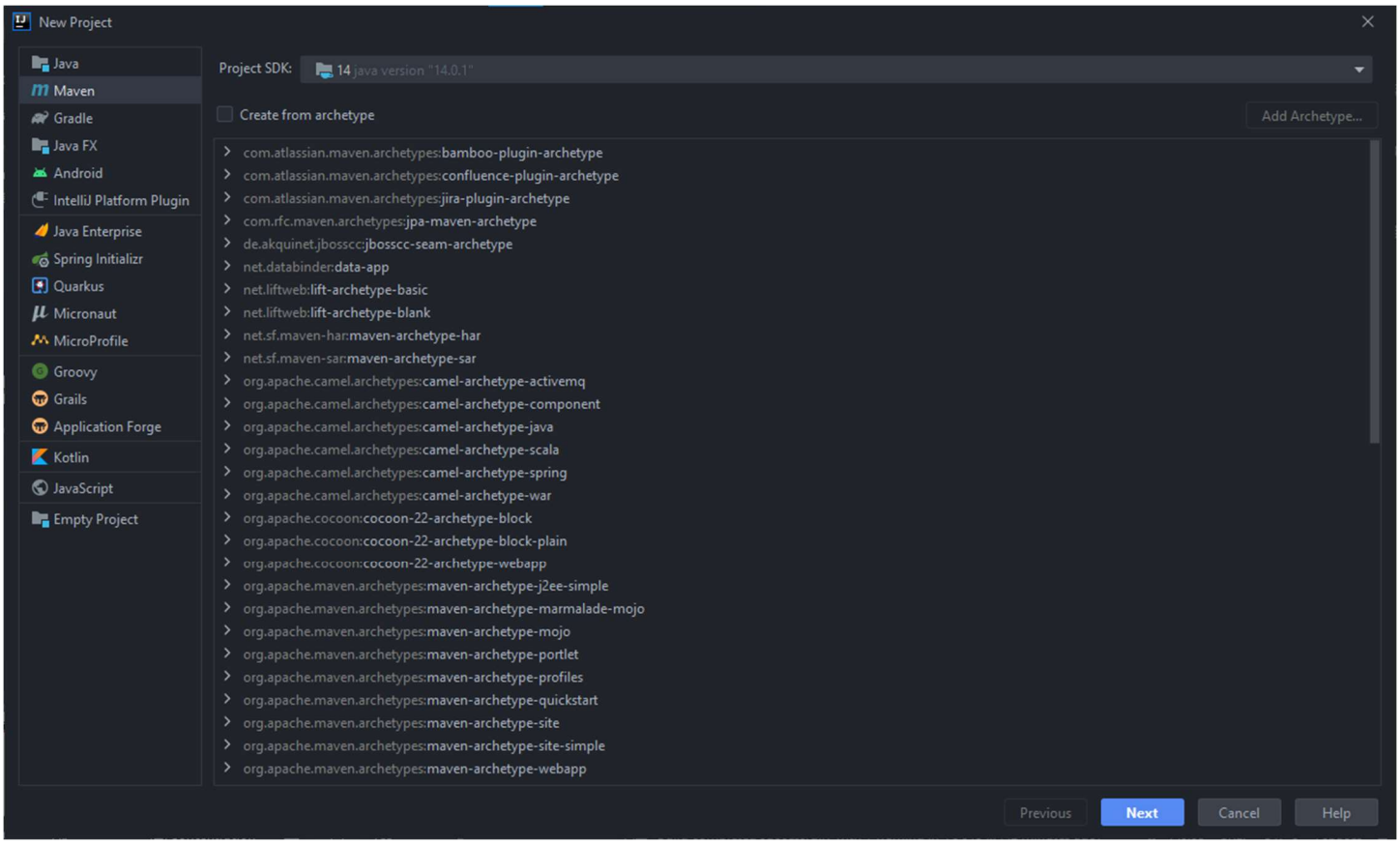


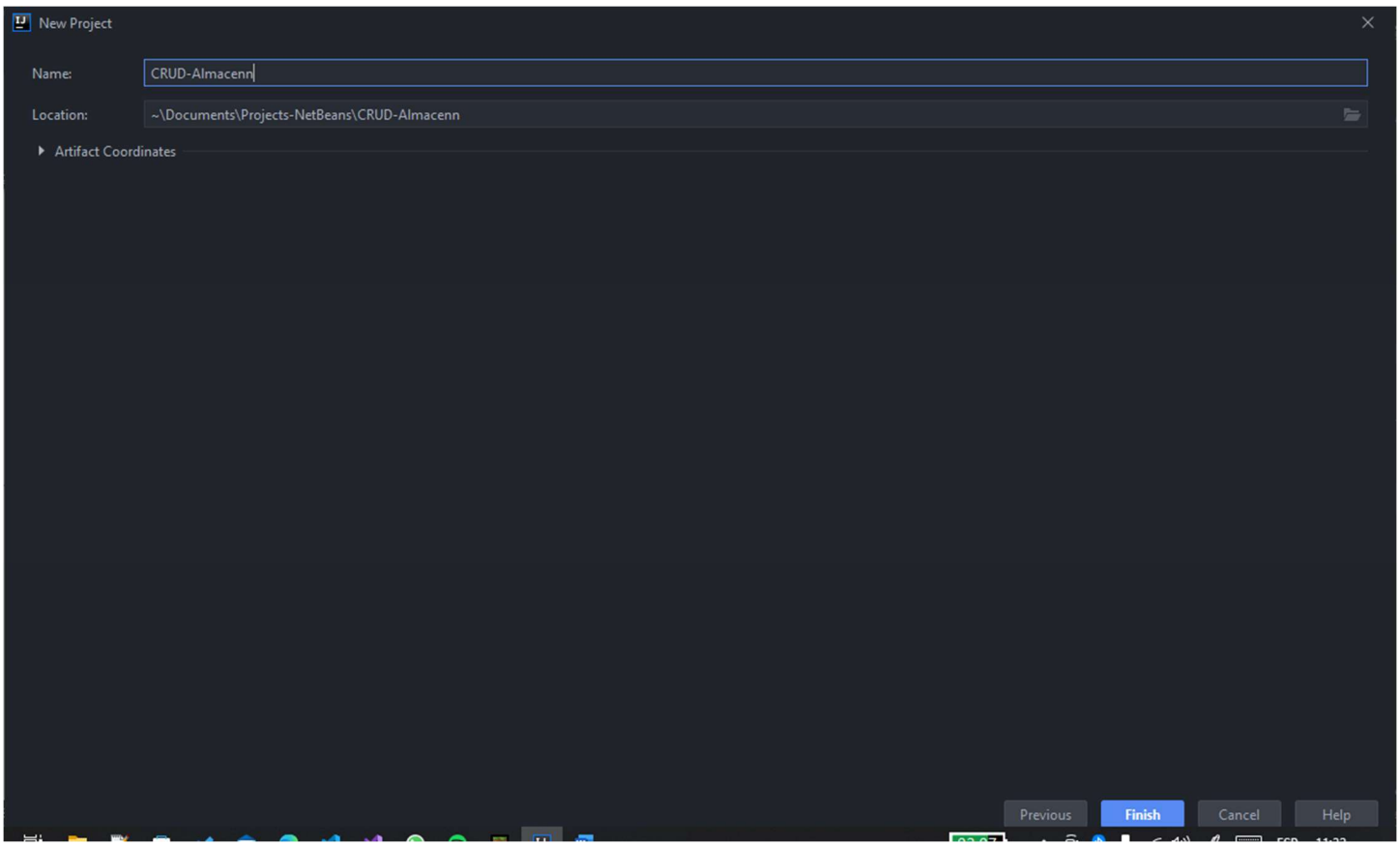
Después nos dirigimos a la sección de configuración del proyecto y en la pestaña de “Cuentas de servicio” elegiremos el SDK a usar en el proyecto, en este caso seleccionamos java y copiamos el código para realizar la conexión.



Ahora creamos un nuevo proyecto en intellij IDEA pero esta será un proyecto con Maven:







Finalizamos y empezamos la importación de dependencias mediante el archivo “pom.xml”

pom.xml (BDProyecto)

```xml
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLoca
    <modelVersion>4.0.0</modelVersion>
    <groupId>com.mycompany</groupId>
    <artifactId>BDProyecto</artifactId>
    <version>1.0-SNAPSHOT</version>
    <packaging>jar</packaging>
    <dependencies>
        <dependency>
            <groupId>com.google.firebase</groupId>
            <artifactId>firebase-admin</artifactId>
            <version>8.1.0</version>
        </dependency>
    </dependencies>
    <properties>
        <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
        <maven.compiler.source>14</maven.compiler.source>
        <maven.compiler.target>14</maven.compiler.target>
    </properties>
</project>
```

Una vez instaladas empezamos con la creación de interfaces graficas usando Java

Codigo del proyecto:

BorderLineRound.java

```java
import java.awt.Color;
import java.awt.Component;
import java.awt.Graphics;
import java.awt.Graphics2D;
import java.awt.RenderingHints;
import java.awt.Shape;
import java.awt.geom.Path2D;
import java.awt.geom.RoundRectangle2D;
import javax.swing.border.AbstractBorder;


public class BorderLineRound extends AbstractBorder{

    public BorderLineRound(Color lineColor,boolean roundedCorners){

        this.lineColor = lineColor;
        this.roundedCorners = roundedCorners;

    }

    public void paintBorder(Component c,Graphics g,int x,int y,int width,int height){

        Graphics2D g2d = (Graphics2D) g;
        Shape outer;
        Shape inner;

        //lineaaaas

        if(roundedCorners){
```

```
            int offs = 1;
            int size = offs + offs;

            float arc = .2f * offs;

            g2d.setColor(lineColor);
            outer = new RoundRectangle2D.Float(x + 1, y + 1, width - 2 , height -2 ,offs
* 30, offs * height);
            inner = new RoundRectangle2D.Float(x + offs - 2, y + offs -2, width - size +
4, height - size + 4, arc, arc);
            Path2D path = new Path2D.Float(Path2D.WIND_EVEN_ODD);
            g2d.addRenderingHints(antiliasing);
            path.append(outer,false);
            path.append(inner,false);
            g2d.fill(path);

        }

        Color oldColor = c.getParent().getBackground();
        g2d.setColor(oldColor);

        int offs = 1;
        int size = offs + offs;
        float arc = .2f * offs;
        outer = new  RoundRectangle2D.Float(x,y,width,height,offs * 30, offs * height);
        inner = new RoundRectangle2D.Float(x + offs -2, y + offs - 2, width - size + 4,
height - size + 4 , arc, arc );
        Path2D path = new Path2D.Float(Path2D.WIND_EVEN_ODD);
        g2d.addRenderingHints(antiliasing);
        path.append(outer, false);
        path.append(inner, true);
        g2d.fill(path);
    }
    Color lineColor = null;
    boolean roundedCorners = false;

    RenderingHints antiliasing = new
RenderingHints(RenderingHints.KEY_ANTIALIASING,RenderingHints.VALUE_ANTIALIAS_ON);
}
```

JTextFieldRounded.java

```
import java.awt.Color;
import java.awt.Dimension;
import java.awt.Font;
import java.awt.event.FocusEvent;
import java.awt.event.FocusListener;
import javax.swing.JTextField;


public class JTextFieldRounded extends JTextField {
    private final Dimension d = new Dimension(250, 28);
    private final BorderLineRound border = new BorderLineRound((Color.lightGray), true);


    public JTextFieldRounded() {
        setOpaque(true);
        setBorder(border);
        setSize(d);
        setPreferredSize(d);
        setHorizontalAlignment(CENTER);
        setFont(new Font("Century Gothic", 0, 12));
```

```
        addFocusListener(new FocusListener() {

            public void focusGained(FocusEvent e) {
                txtFocusGained(e);
            }

            public void focusLost(FocusEvent e) {
                txtFocusLost(e);
            }

        });
    }


    private void txtFocusGained(FocusEvent evt) {

        setBorder(new BorderLineRound(Color.lightGray, true));
    }

    private void txtFocusLost(FocusEvent evt) {

        setBorder(border);
    }


}
```

RoundedBorder.java

```
import java.awt.Component;
import java.awt.Graphics;
import java.awt.Insets;
import javax.swing.border.Border;

class RoundedBorder implements Border {

    private int radius;

    RoundedBorder(int radius) {
        this.radius = radius;
    }

    public Insets getBorderInsets(Component c) {
        return new Insets(this.radius+1, this.radius+1, this.radius+2, this.radius);
    }

    public boolean isBorderOpaque() {
        return true;
    }

    public void paintBorder(Component c, Graphics g, int x, int y, int width, int height)
{
        g.drawRoundRect(x, y, width-1, height-1, radius, radius);
    }
}
```

Principal.java

```
import com.google.api.core.ApiFuture;
import com.google.auth.oauth2.GoogleCredentials;
import com.google.cloud.firestore.CollectionReference;
```

```
import com.google.cloud.firestore.DocumentSnapshot;
import com.google.cloud.firestore.Firestore;
import com.google.cloud.firestore.QuerySnapshot;
import com.google.firebase.FirebaseApp;
import com.google.firebase.FirebaseOptions;
import com.google.firebase.cloud.FirestoreClient;
import javax.imageio.ImageIO;
import javax.swing.*;
import java.awt.*;
import java.awt.image.BufferedImage;
import java.io.File;
import java.io.FileInputStream;
import java.io.IOException;
import java.util.ArrayList;
import java.util.List;
import java.util.concurrent.ExecutionException;

public class Principal extends JFrame {
    static Firestore bd;
    static String[] datosAcceso;

    public Principal() throws HeadlessException {
        this.setTitle("Inicio de Sesion");
        this.setSize(510, 470);
        this.setLocationRelativeTo(null);
        try {
            conectar();
            BDatos BDregistros = new BDatos();
            try {
                BDregistros.buscarUsuario();
            } catch (InterruptedException | ExecutionException interruptedException) {
                interruptedException.printStackTrace();
            }
        } catch (Exception e) {
            JOptionPane.showMessageDialog(null, "Error en la conexión");
        }
        inicializarComponentes();
        this.setDefaultCloseOperation(EXIT_ON_CLOSE);
    }

    private void inicializarComponentes() {
        //Panel de Login
        JPanel panel = new JPanel();
        getContentPane().add(panel);
        panel.setLayout(null);

        //Letra para formulario
        Font letraGeneral = new Font("Century Gothic", Font.PLAIN, 28);
        //Etiqueta Nombre Formulario
        JLabel etiquetaSuperior = new JLabel("Bienvenido");
        etiquetaSuperior.setFont(letraGeneral);
        etiquetaSuperior.setHorizontalAlignment(JLabel.CENTER);
        etiquetaSuperior.setForeground(new Color(38, 38, 38));
        etiquetaSuperior.setBounds(150, 20, 200, 32);
        panel.add(etiquetaSuperior);
        //Imagen superior
        BufferedImage img3 = null;
        try {
            img3 = ImageIO.read(new
File("C:\\Users\\jesus\\Downloads\\RecursosBD\\carrito.png"));
        } catch (IOException e) {
            e.printStackTrace();
        }
```

```
assert img3 != null;
Image dimensionarIMG3 = img3.getScaledInstance(170, 160, Image.SCALE_SMOOTH);
ImageIcon imageIcon3 = new ImageIcon(dimensionarIMG3);

JLabel imagenSup = new JLabel(imageIcon3);
imagenSup.setBounds(158, 70, 170, 160);
panel.add(imagenSup);


JLabel Usuario, Contrasena;
Font letra = new Font("Century Gothic", Font.PLAIN, 23);
Font letra2 = new Font("Century Gothic", Font.PLAIN, 15);
//Etiqueta Usuario
Usuario = new JLabel("Usuario:");
Usuario.setBounds(100, 250, 150, 30);
Usuario.setForeground(new Color(38, 38, 38));
Usuario.setOpaque(false);
Usuario.setFont(letra);
panel.add(Usuario);
//panel.add(round);
JTextField round3 = new JTextField("");
round3.setBounds(100, 281, 300, 38);
round3.setFont(letra2);
round3.setOpaque(false);
round3.setForeground(new Color(38, 38, 38));
round3.setBackground(new Color(0, 0, 0));
round3.setBorder(new RoundedBorder(10));
panel.add(round3);
//Etiqueta Contrasena
Contrasena = new JLabel("Contraseña:");
Contrasena.setBounds(100, 320, 150, 30);
Contrasena.setForeground(new Color(38, 38, 38));
Contrasena.setOpaque(false);
Contrasena.setFont(letra);
panel.add(Contrasena);
//panel.add(round);
Font know = new Font("Webdings", Font.PLAIN, 15);
JTextField round4 = new JTextField("");
round4.setBounds(100, 350, 300, 38);
round4.setFont(know);
round4.setOpaque(false);
round4.setForeground(new Color(38, 38, 38));
round4.setBackground(new Color(0, 0, 0));
round4.setBorder(new RoundedBorder(10));
panel.add(round4);
System.out.println(round4.getText());

//Boton registro
JButton entrar = new JButton("Entrar");
entrar.setBounds(180, 400, 150, 25);
entrar.setForeground(new Color(38, 38, 38));
entrar.setFont(letra2);
entrar.setOpaque(false);
entrar.setFocusable(false);
entrar.setBorder(new RoundedBorder(20));
entrar.setBackground(new Color(0, 5, 8));
entrar.addActionListener(e -> {
    String usuario = round3.getText();
    String pass = round4.getText();
    String total = usuario + "-" + pass;
    boolean existe = false;
    for (String s : datosAcceso) {
```

```
                if (s.equals(total)) {
                    existe = true;
                    break;
                } else
                    existe = false;
            }

            if (existe) {
                JOptionPane.showMessageDialog(null, "Inicio de sesion exitoso");
                System.exit(0);
            } else {
                JOptionPane.showMessageDialog(null, "Error en credenciales o
registrese");
                round3.setText(null);
                round4.setText(null);
            }

        });

        //Panel Secundario
        JPanel panel2 = new JPanel();
        panel.setLayout(null);


        panel.getRootPane().setDefaultButton(entrar);
        panel.add(entrar);

    }

    private void conectar() throws IOException {

        FileInputStream serviceAccount =
                new FileInputStream("CRUD-FIREBASE.json");

        FirebaseOptions options = new FirebaseOptions.Builder()
                .setCredentials(GoogleCredentials.fromStream(serviceAccount))
                .setDatabaseUrl("https://crud-firebase-96db5-default-
rtdb.firebaseio.com")
                .build();

        FirebaseApp.initializeApp(options);

        bd = FirestoreClient.getFirestore();

        System.out.println("Se realizo la conexion con exito");

    }

    static class Datos {
        private final String Name;
        private final String Usuario;
        private final String Password;
        private final String Admin;

        public Datos(String name, String usuario, String password, String admin) {
            Name = name;
            Usuario = usuario;
            Password = password;
            Admin = admin;
        }

        public String getName() {
            return Name;
```

```
        }

        public String getAdmin() {
            return Admin;
        }

        public String getUsuario() {
            return Usuario;
        }

        public String getPassword() {
            return Password;
        }
    }

    static class BDatos {
        List<Datos> listaRegistros = new ArrayList<>();

        public void buscarUsuario() throws InterruptedException, ExecutionException {
            CollectionReference Registros = bd.collection("Registro");
            ApiFuture<QuerySnapshot> querySnapshot = Registros.get();

            for (DocumentSnapshot document : querySnapshot.get().getDocuments()) {
                Datos registros = new Datos(document.getString("Nombre"),
document.getString("Usuario"),
                        document.getString("Password"), document.getString("Admin"));

                listaRegistros.add(registros);
            }
            mostrarRegistros();
        }

        public void mostrarRegistros() {
            Datos[] dat = new Datos[listaRegistros.size()];
            String[] datPrueba = new String[listaRegistros.size()];
            for (int i = 0; i < listaRegistros.size(); i++) {
                dat[i] = listaRegistros.get(i);
                //datPrueba[i] = dat[i].getUsuario() + "-" + dat[i].getPassword();
                datPrueba[i] = dat[i].getName() + " - " +dat[i].getUsuario() + " - " +
dat[i].getPassword()+ " - " +dat[i].getAdmin();
            }

            for (String s : datPrueba) {
                System.out.println(s);
            }
            datosAcceso = datPrueba;
        }
    }

}
```

Registro.java

```
import com.google.api.core.ApiFuture;

import javax.imageio.ImageIO;
import javax.swing.*;
import java.awt.*;
import java.awt.event.*;
import java.awt.image.BufferedImage;
import java.io.File;
```

```
import java.io.IOException;

import com.google.auth.oauth2.GoogleCredentials;
import com.google.cloud.firestore.DocumentReference;
import com.google.cloud.firestore.Firestore;
import com.google.cloud.firestore.WriteResult;
import com.google.firebase.cloud.FirestoreClient;
import com.google.firebase.FirebaseApp;
import com.google.firebase.FirebaseOptions;

import java.io.FileInputStream;
import java.util.HashMap;
import java.util.Map;

public class Registro extends JFrame {
    static Firestore bd;

    public Registro() throws HeadlessException {
        this.setTitle("Registro");
        this.setSize(500, 620);
        this.setLocationRelativeTo(null);
        //this.setUndecorated(true);
        //this.setBackground(new Color(0, 0, 0, 230));
        try {
            conectar();
        } catch (Exception e) {
            e.getStackTrace();
        }
        inicializarComponentes();
        this.setDefaultCloseOperation(EXIT_ON_CLOSE);
        //this.setShape(new RoundRectangle2D.Double(0, 0, getWidth(), getHeight(), 20,
20));
    }

    private void inicializarComponentes() {
        JPanel panel = new JPanel();
        getContentPane().add(panel);
        //panel.setOpaque(false);
        panel.setLayout(null);

        //Letra para formulario
        Font letraGeneral = new Font("Century Gothic", Font.PLAIN, 28);
        //Etiqueta Nombre Formulario
        JLabel etiquetaSuperior = new JLabel("Registro");
        etiquetaSuperior.setFont(letraGeneral);
        etiquetaSuperior.setHorizontalAlignment(JLabel.CENTER);
        etiquetaSuperior.setForeground(new Color(38, 38, 38));
        etiquetaSuperior.setBounds(170, 20, 145, 32);
        panel.add(etiquetaSuperior);
        //Imagen superior
        BufferedImage img3 = null;
        try {
            img3 = ImageIO.read(new
File("C:\\Users\\jesus\\Downloads\\RecursosBD\\carrito.png"));
        } catch (IOException e) {
            e.printStackTrace();
        }

        assert img3 != null;
        Image dimensionarIMG3 = img3.getScaledInstance(170, 160, Image.SCALE_SMOOTH);
        ImageIcon imageIcon3 = new ImageIcon(dimensionarIMG3);

        JLabel imagenSup = new JLabel(imageIcon3);
```

```
imagenSup.setBounds(158, 60, 170, 160);
panel.add(imagenSup);

//Etiqueta Nombre
JLabel Nombre, Correo, Usuario, Contrasena;
Nombre = new JLabel("Nombre:");
Font letra = new Font("Century Gothic", Font.PLAIN, 23);
Font letra2 = new Font("Century Gothic", Font.PLAIN, 15);

Nombre.setBounds(100, 250, 150, 30);
Nombre.setForeground(new Color(38, 38, 38));
Nombre.setOpaque(false);
Nombre.setFont(letra);
panel.add(Nombre);
//Cuadro de texto

//panel.add(round1);
JTextField round = new JTextField("");
round.setBounds(100, 281, 300, 38);
round.setFont(letra2);
round.setOpaque(false);
round.setHorizontalAlignment(JTextField.CENTER);
round.setForeground(new Color(38, 38, 38));
round.setBackground(new Color(0, 0, 0, 10));
round.setBorder(new RoundedBorder(10));
panel.add(round);

/*//Etiqueta Correo
Correo = new JLabel("Correo:");
Correo.setBounds(100, 320, 150, 30);
Correo.setForeground(new Color(38, 38, 38));
Correo.setOpaque(false);
Correo.setFont(letra);
panel.add(Correo);
//panel.add(round);
JTextField round2 = new JTextField("");
round2.setBounds(100, 350, 300, 38);
round2.setFont(letra2);
round2.setOpaque(false);
round2.setForeground(new Color(38, 38, 38));
round2.setBackground(new Color(0, 0, 0, 10));
round2.setBorder(new RoundedBorder(10));
panel.add(round2);
*/

//Etiqueta Usuario
Usuario = new JLabel("Usuario:");
Usuario.setBounds(100, 320, 150, 30);
Usuario.setForeground(new Color(38, 38, 38));
Usuario.setOpaque(false);
Usuario.setFont(letra);
panel.add(Usuario);
//panel.add(round);
JTextField round3 = new JTextField("");
round3.setBounds(100, 350, 300, 38);
round3.setFont(letra2);
round3.setHorizontalAlignment(JTextField.CENTER);
round3.setOpaque(false);
round3.setForeground(new Color(38, 38, 38));
round3.setBackground(new Color(0, 0, 0, 10));
round3.setBorder(new RoundedBorder(10));
panel.add(round3);
//Etiqueta Contrasena
```

```
        Contrasena = new JLabel("Contraseña:");
        Contrasena.setBounds(100, 390, 150, 30);
        Contrasena.setForeground(new Color(38, 38, 38));
        Contrasena.setOpaque(false);
        Contrasena.setFont(letra);
        panel.add(Contrasena);
        //panel.add(round);
        Font know = new Font("Webdings", Font.PLAIN, 15);
        JTextField round4 = new JTextField("");
        round4.setBounds(100, 420, 300, 38);
        round4.setFont(letra2);
        round4.setOpaque(false);
        round4.setForeground(new Color(38, 38, 38));
        round4.setBackground(new Color(0, 0, 0, 10));
        round4.setBorder(new RoundedBorder(10));
        panel.add(round4);
        System.out.println(round4.getText());
        //Division Admin
        JCheckBox checkAdmin = new JCheckBox("Administrador");
        checkAdmin.setBounds(100, 470, 300, 30);
        checkAdmin.setFont(letra2);
        checkAdmin.setOpaque(false);
        checkAdmin.setForeground(new Color(38, 38, 38));
        final boolean[] statAdmin = {false};
        //listener checkAdmin
        checkAdmin.addItemListener(new ItemListener() {
            @Override
            public void itemStateChanged(ItemEvent e) {
                System.out.println(e.getStateChange());
                if (e.getStateChange() == 1) {
                    System.out.println("check");
                    statAdmin[0] = true;
                } else {
                    System.out.println("Uncheck");
                    statAdmin[0] = false;
                }
                System.out.println(e.getStateChange() + " final");
                System.out.println(statAdmin[0]);
            }
        });
        panel.add(checkAdmin);

        //Imagen Hide
        BufferedImage hideimg = null;
        try {
            hideimg = ImageIO.read(new File("C:\\Users\\jesus\\Documents\\Projects-
NetBeans\\UniversidadParcial2\\src\\Imagenes\\hide.png"));
        } catch (IOException e) {
            e.printStackTrace();
        }

        assert hideimg != null;
        Image dimensionarHide = hideimg.getScaledInstance(35, 35, Image.SCALE_SMOOTH);
        ImageIcon imageIconHide = new ImageIcon(dimensionarHide);
        //Imagen Show
        BufferedImage showimg = null;
        try {
            showimg = ImageIO.read(new File("C:\\Users\\jesus\\Documents\\Projects-
NetBeans\\UniversidadParcial2\\src\\Imagenes\\show.png"));
        } catch (IOException e) {
            e.printStackTrace();
        }
```

```
        assert showimg != null;
        Image dimensionarShow = showimg.getScaledInstance(38, 38, Image.SCALE_SMOOTH);
        ImageIcon imageIconShow = new ImageIcon(dimensionarShow);

        //Boton Password
        JButton hideShow = new JButton();
        hideShow.setIcon(imageIconHide);
        hideShow.setBounds(400, 490, 38, 38);
        hideShow.setBorder(null);
        hideShow.setOpaque(false);
        hideShow.setBackground(new Color(0, 0, 1, 100));
        panel.add(hideShow);
        //Boton registro
        JButton registro = new JButton("Registrar");
        registro.setBounds(180, 540, 150, 25);
        registro.setForeground(new Color(38, 38, 38));
        registro.setFont(letra2);
        registro.setOpaque(false);
        registro.setFocusable(false);
        registro.setBorder(new RoundedBorder(20));
        registro.setBackground(new Color(0, 5, 8, 12));

        registro.addActionListener(e -> {
            String Nombre1 = round.getText();
            String Usuario1 = round3.getText();
            String Pass = round4.getText();
            String adminDude = String.valueOf(statAdmin[0]);
            Map<String, Object> datosRegistro = new HashMap<>();
            datosRegistro.put("Nombre", Nombre1);
            //datosRegistro.put("Correo", Correo1);
            datosRegistro.put("Usuario", Usuario1);
            datosRegistro.put("Password", Pass);
            datosRegistro.put("Admin",adminDude);
            String uuid = java.util.UUID.randomUUID().toString();
            insertarDatos("Registro", uuid, datosRegistro);

            round.setText(null);
            //round2.setText(null);
            round3.setText(null);
            round4.setText(null);


        });

        panel.add(registro);
        panel.getRootPane().setDefaultButton(registro);

    }

    private void conectar() throws IOException {


        FileInputStream serviceAccount =
                new FileInputStream("CRUD-FIREBASE.json");

        FirebaseOptions options = new FirebaseOptions.Builder()
                .setCredentials(GoogleCredentials.fromStream(serviceAccount))
                .setDatabaseUrl("https://crud-firebase-96db5-default-
rtdb.firebaseio.com")
                .build();

        FirebaseApp.initializeApp(options);
```

```
        /*FileInputStream serviceAccount
                = new FileInputStream("ordinarioBD.json");

        FirebaseOptions options = new FirebaseOptions.Builder()
                .setCredentials(GoogleCredentials.fromStream(serviceAccount))
                .setDatabaseUrl("https://ordinariobd-default-rtdb.firebaseio.com")
                .build();

        FirebaseApp.initializeApp(options);

         */

        bd = FirestoreClient.getFirestore();

        System.out.println("Se realizo la conexion con exito");

    }

    public static boolean insertarDatos(
            String coleccion,
            String documento,
            Map<String, Object> data) {
        try {
            DocumentReference docRef = bd.collection(coleccion).document(documento);
            ApiFuture<WriteResult> result = docRef.set(data);
            System.out.println("Hora de actualizacion: " + result.get().getUpdateTime());

            return true;
        } catch (Exception e) {
            e.getStackTrace();
        }
        return false;
    }
}
```

EjecutorPrincipal.java

```
public class EjecutorPrincipal {
    public static void main(String[] args) {
        Principal logon = new Principal();
        logon.setVisible(true);
    }
}
```

EjecutorRegistro.java

```
public class EjecutorRegistro {
    public static void main(String[] args) {
        Registro window = new Registro();
        window.setVisible(true);
    }
}
```

Salidas de pantalla:

Enlace a sitio GitHub del proyecto:

GaryElizalde224/Extraordinario-BaseDeDatos (github.com)