Mobile_Lesson6: Speech to Text and Text to Speech

ICP GROUP: 38

ICP 13

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ICP13 Repository: https://github.com/UMKC-APL-WebMobileProgramming/ICP13-AnilkumarreddyNandikonda

ICP13 source code link: https://github.com/UMKC-APL-WebMobileProgramming/ICP13-AnilkumarreddyNandikonda/tree/main/Source/Speech%20to%20text

ICP13 Video: https://umsystem.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=ccd982eb-a9ff-4efd-8dd6-adf60071152d

My Partner

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Partner Repository: https://github.com/UMKC-APL-WebMobileProgramming/ICP13-YAbhinay

Source Code Link: https://github.com/UMKC-APL-WebMobileProgramming/ICP13-YAbhinay/tree/main/Source/Speech%20to%20text/app/src

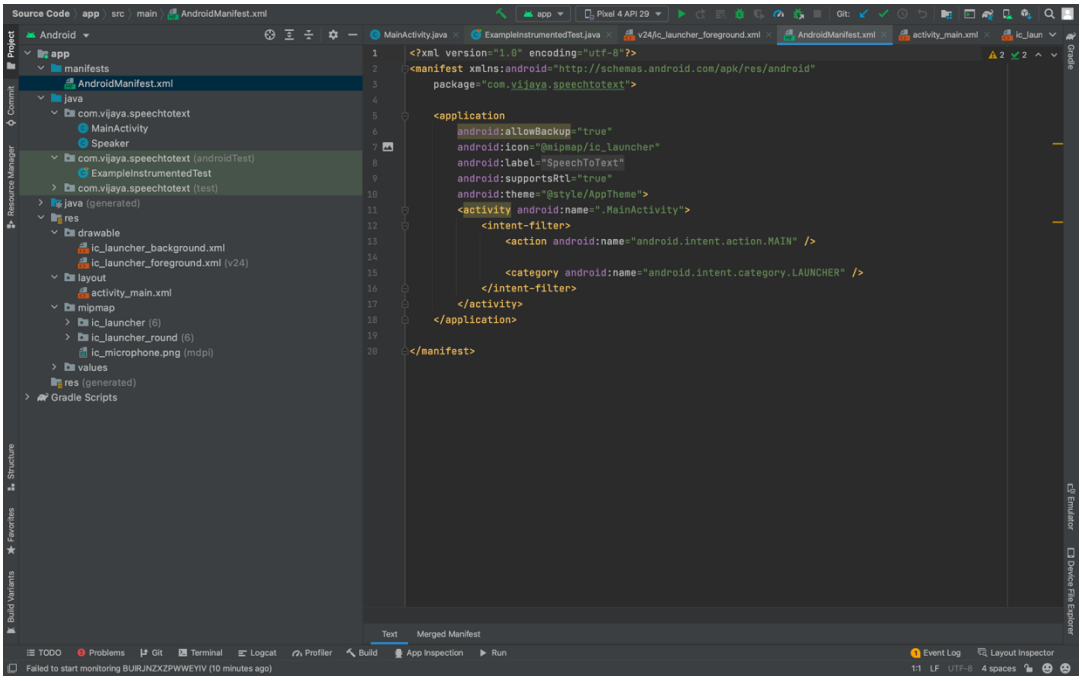
ICP13 video: https://umsystem.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=ccd982eb-a9ff-4efd-8dd6-adf60071152d

Lesson Overview: In this lesson, we are going to discussspeech to text and text to speech applications

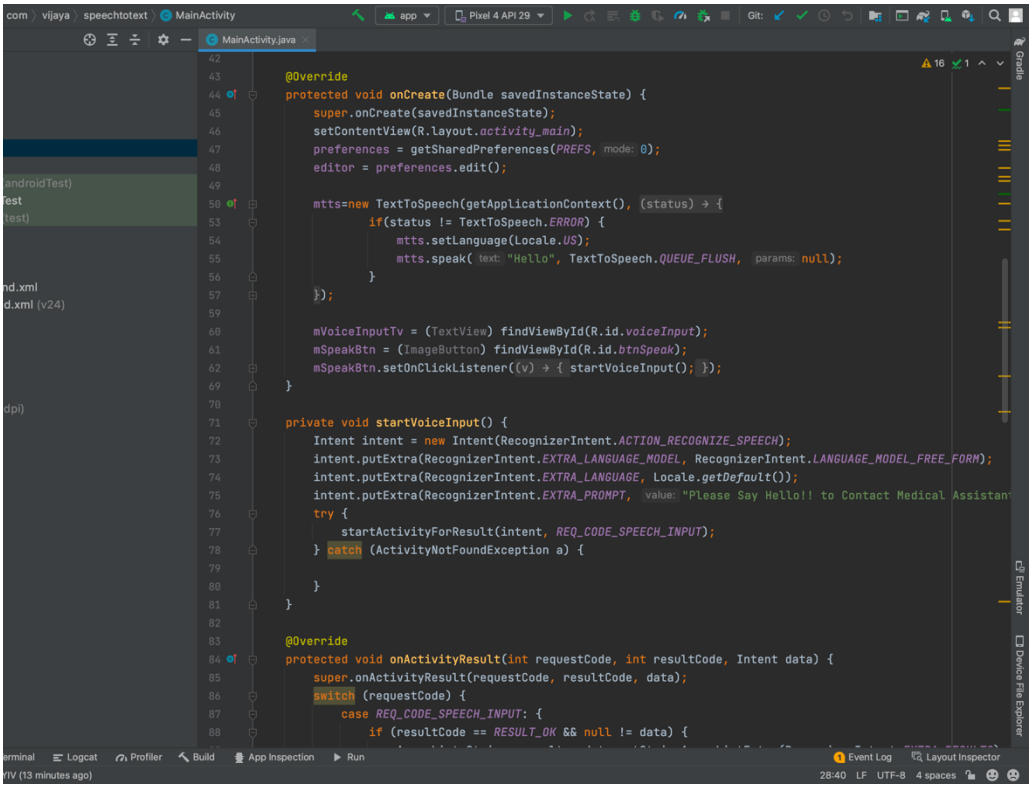
Programming elements:Speech to Text and Text to Speech

In Class Programming (ICP):Create a Medical AssistantApplication in the following steps.
1.Use the layout given in the second use case speech to text.
2.As soon as the app opens,it should say hello
3.Then the user clicks on the mic button to say hello
4.Once the user said hello,the app should speak,"what is your name?"
5.Then the user clicks on the mic button to say, "My name is"+<your name>
6.Extract the name of the user and then save it as editor level.Code snippet: private SharedPreferences preferences;private SharedPreferences.Editor editor;preferences = getSharedPreferences(PREFS,0);editor = preferences.edit();editor.putString(NAME,<extracted name>).apply();//private static final String NAME = "name";
7.Also,show the name on the screen
8.When the user asks the following questions, appropriate answers should be given:

- This androidmanifest.xml tells the main theme of the application.

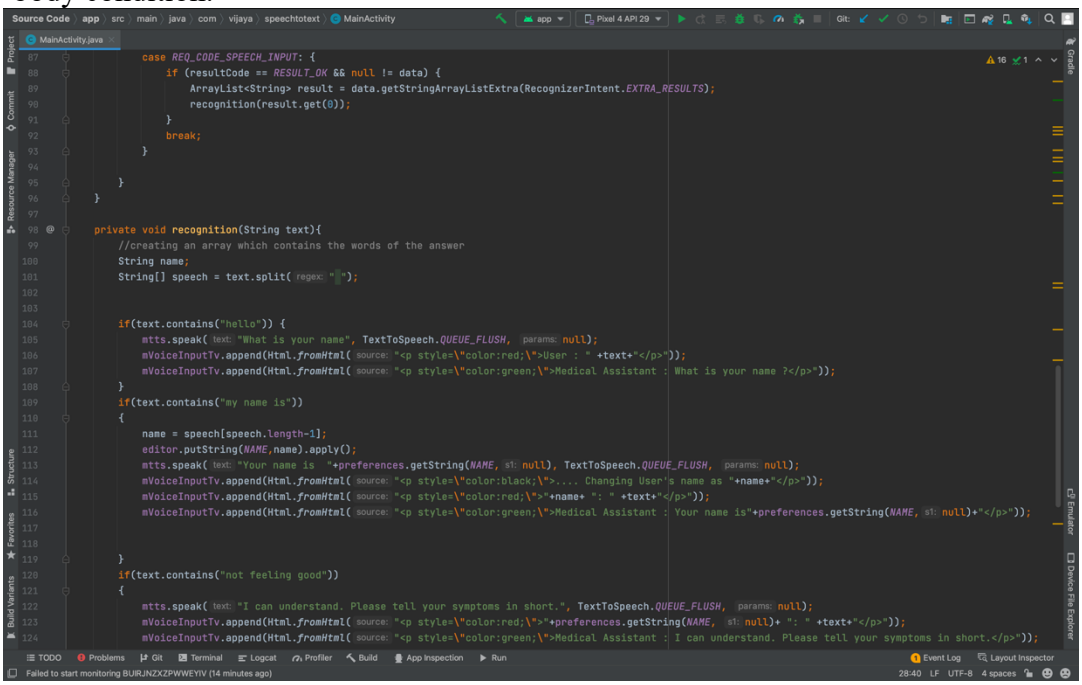


- Firstly, new text-to-speech is created if it detects you then it will greets back.



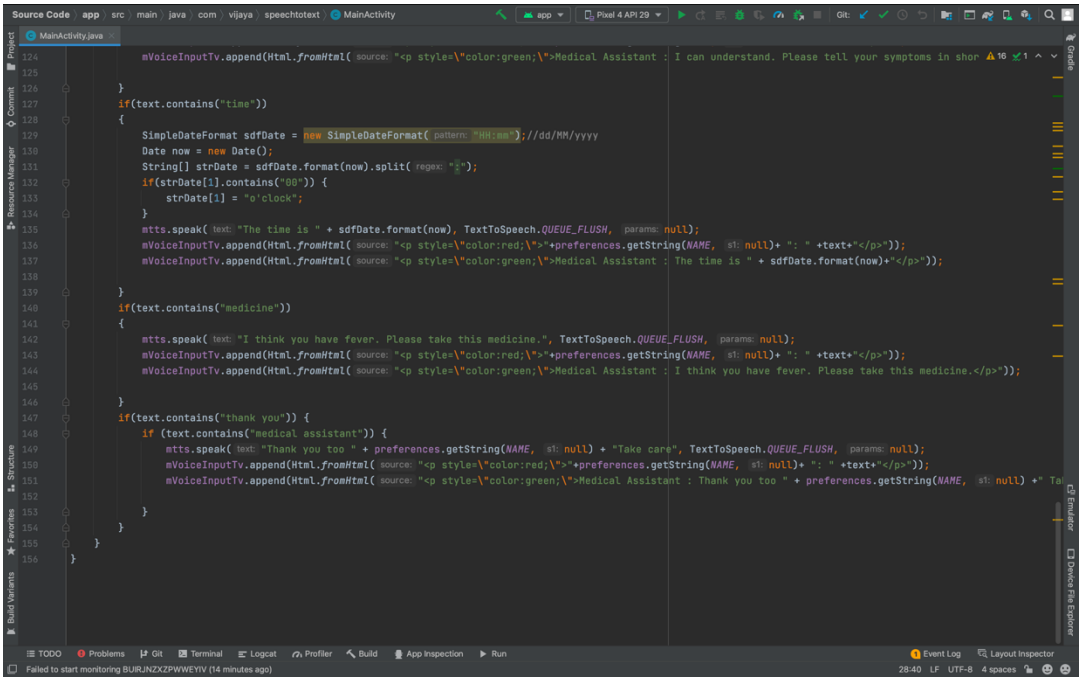
```
@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);
    preferences = getSharedPreferences(PREFS, mode: 0);
    editor = preferences.edit();

    mtts=new TextToSpeech(getApplicationContext(), (status) -> {
            if(status != TextToSpeech.ERROR) {
                mtts.setLanguage(Locale.US);
                mtts.speak( text: "Hello", TextToSpeech.QUEUE_FLUSH,  params: null);
            }
    });

    mVoiceInputTv = (TextView) findViewById(R.id.voiceInput);
    mSpeakBtn = (ImageButton) findViewById(R.id.btnSpeak);
    mSpeakBtn.setOnClickListener((v) -> { startVoiceInput(); });
}

private void startVoiceInput() {
    Intent intent = new Intent(RecognizerIntent.ACTION_RECOGNIZE_SPEECH);
    intent.putExtra(RecognizerIntent.EXTRA_LANGUAGE_MODEL, RecognizerIntent.LANGUAGE_MODEL_FREE_FORM);
    intent.putExtra(RecognizerIntent.EXTRA_LANGUAGE, Locale.getDefault());
    intent.putExtra(RecognizerIntent.EXTRA_PROMPT,  value: "Please Say Hello!! to Contact Medical Assistan
    try {
        startActivityForResult(intent, REQ_CODE_SPEECH_INPUT);
    } catch (ActivityNotFoundException a) {

    }
}

@Override
protected void onActivityResult(int requestCode, int resultCode, Intent data) {
    super.onActivityResult(requestCode, resultCode, data);
    switch (requestCode) {
        case REQ_CODE_SPEECH_INPUT: {
            if (resultCode == RESULT_OK && null != data) {
```

- It is method for recognition, it recognize the voice and ask for the name later asks for body condition.



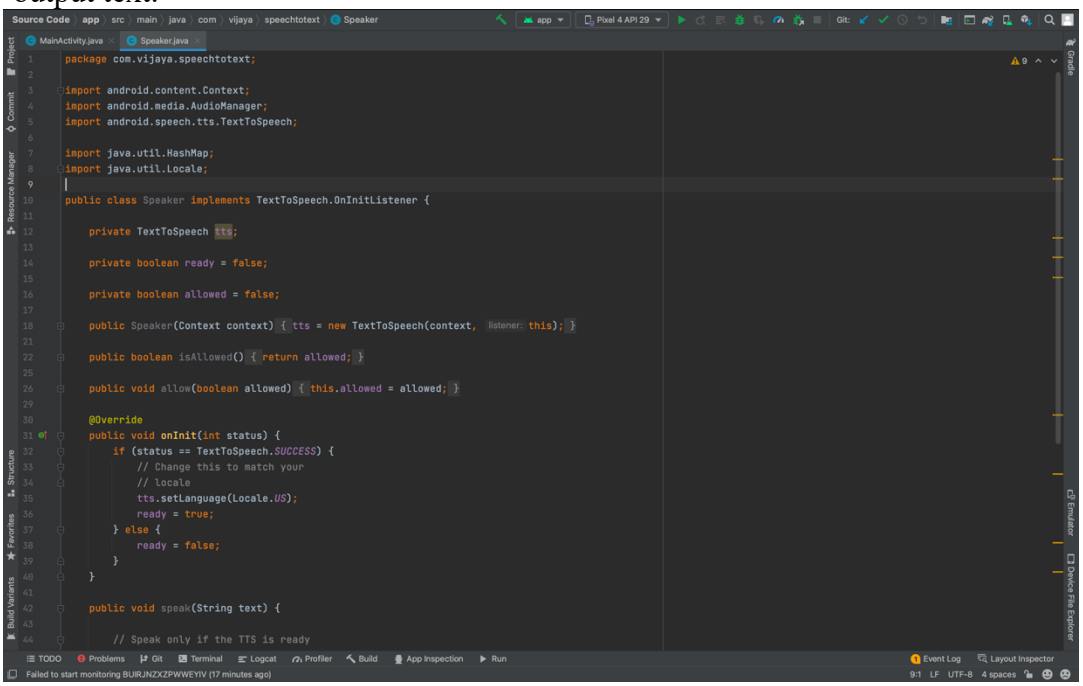
```
            case REQ_CODE_SPEECH_INPUT: {
                if (resultCode == RESULT_OK && null != data) {
                    ArrayList<String> result = data.getStringArrayListExtra(RecognizerIntent.EXTRA_RESULTS);
                    recognition(result.get(0));
                }
                break;
            }

        }
    }

    private void recognition(String text){
        //creating an array which contains the words of the answer
        String name;
        String[] speech = text.split( regex: " ");


        if(text.contains("hello")) {
            mtts.speak( text: "What is your name", TextToSpeech.QUEUE_FLUSH,  params: null);
            mVoiceInputTv.append(Html.fromHtml( source: "<p style=\"color:red;\">User : " +text+"</p>"));
            mVoiceInputTv.append(Html.fromHtml( source: "<p style=\"color:green;\">Medical Assistant : What is your name ?</p>"));
        }
        if(text.contains("my name is"))
        {
            name = speech[speech.length-1];
            editor.putString(NAME,name).apply();
            mtts.speak( text: "Your name is  "+preferences.getString(NAME, s1: null), TextToSpeech.QUEUE_FLUSH,  params: null);
            mVoiceInputTv.append(Html.fromHtml( source: "<p style=\"color:black;\">... Changing User's name as "+name+"</p>"));
            mVoiceInputTv.append(Html.fromHtml( source: "<p style=\"color:red;\">"+name+ ": " +text+"</p>"));
            mVoiceInputTv.append(Html.fromHtml( source: "<p style=\"color:green;\">Medical Assistant : Your name is"+preferences.getString(NAME, s1: null)+"</p>"));


        }
        if(text.contains("not feeling good"))
        {
            mtts.speak( text: "I can understand. Please tell your symptoms in short.", TextToSpeech.QUEUE_FLUSH,  params: null);
            mVoiceInputTv.append(Html.fromHtml( source: "<p style=\"color:red;\">"+preferences.getString(NAME,  s1: null)+ ": " +text+"</p>"));
            mVoiceInputTv.append(Html.fromHtml( source: "<p style=\"color:green;\">Medical Assistant : I can understand. Please tell your symptoms in short.</p>"));
```

- If we ask for time it will take the word “time” and gives the system time.
- Then detects the word “medicine” from the sentence we say, it will tell us that we have fever and take medicine
- If we want to end the conversation then it will ends with “thank you”.

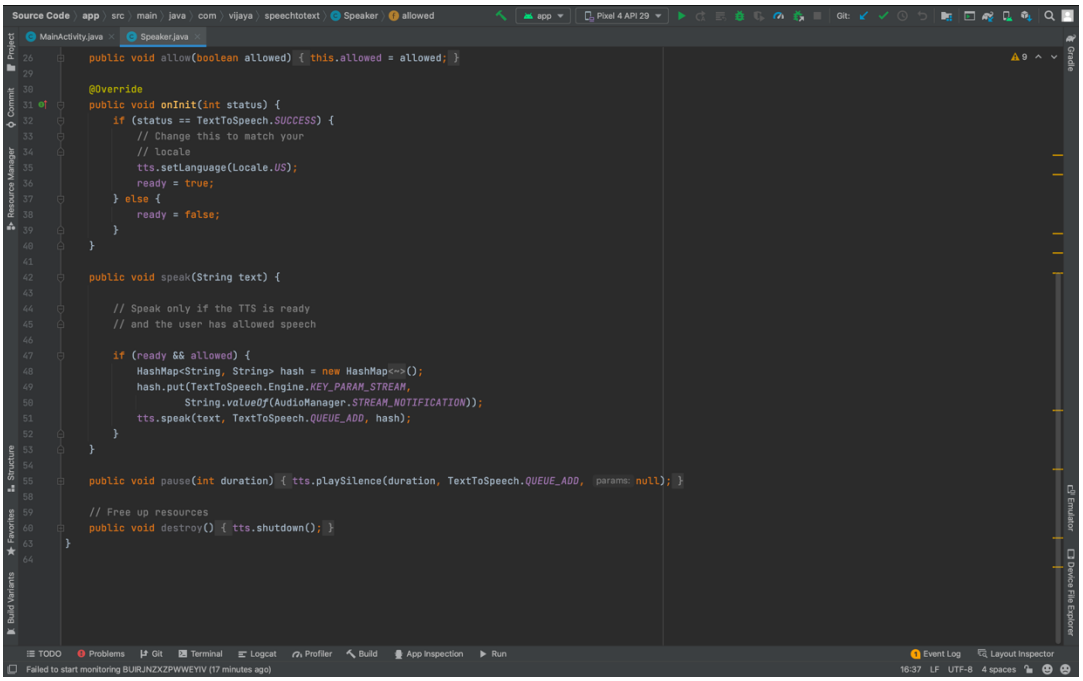


```
            mVoiceInputTv.append(Html.fromHtml( source: "<p style=\"color:green;\">Medical Assistant : I can understand. Please tell your symptoms in shor
        }
        if(text.contains("time"))
        {
            SimpleDateFormat sdfDate = new SimpleDateFormat( pattern: "HH:mm");//dd/MM/yyyy
            Date now = new Date();
            String[] strDate = sdfDate.format(now).split( regex: ":");
            if(strDate[1].contains("00")) {
                strDate[1] = "o'clock";
            }
            mtts.speak( text: "The time is " + sdfDate.format(now), TextToSpeech.QUEUE_FLUSH,  params: null);
            mVoiceInputTv.append(Html.fromHtml( source: "<p style=\"color:red;\">"+preferences.getString(NAME,  s1: null)+ ": " +text+"</p>"));
            mVoiceInputTv.append(Html.fromHtml( source: "<p style=\"color:green;\">Medical Assistant : The time is " + sdfDate.format(now)+"</p>"));

        }
        if(text.contains("medicine"))
        {
            mtts.speak( text: "I think you have fever. Please take this medicine.", TextToSpeech.QUEUE_FLUSH,  params: null);
            mVoiceInputTv.append(Html.fromHtml( source: "<p style=\"color:red;\">"+preferences.getString(NAME,  s1: null)+ ": " +text+"</p>"));
            mVoiceInputTv.append(Html.fromHtml( source: "<p style=\"color:green;\">Medical Assistant : I think you have fever. Please take this medicine.</p>"));

        }
        if(text.contains("thank you")) {
            if (text.contains("medical assistant")) {
                mtts.speak( text: "Thank you too " + preferences.getString(NAME,  s1: null) + "Take care", TextToSpeech.QUEUE_FLUSH,  params: null);
                mVoiceInputTv.append(Html.fromHtml( source: "<p style=\"color:red;\">"+preferences.getString(NAME,  s1: null)+ ": " +text+"</p>"));
                mVoiceInputTv.append(Html.fromHtml( source: "<p style=\"color:green;\">Medical Assistant : Thank you too " + preferences.getString(NAME,  s1: null) +" Ta

            }
        }
    }
}
```

- Speak to text uses the HASHMAP to store the data in hash table, so that we see the output text.

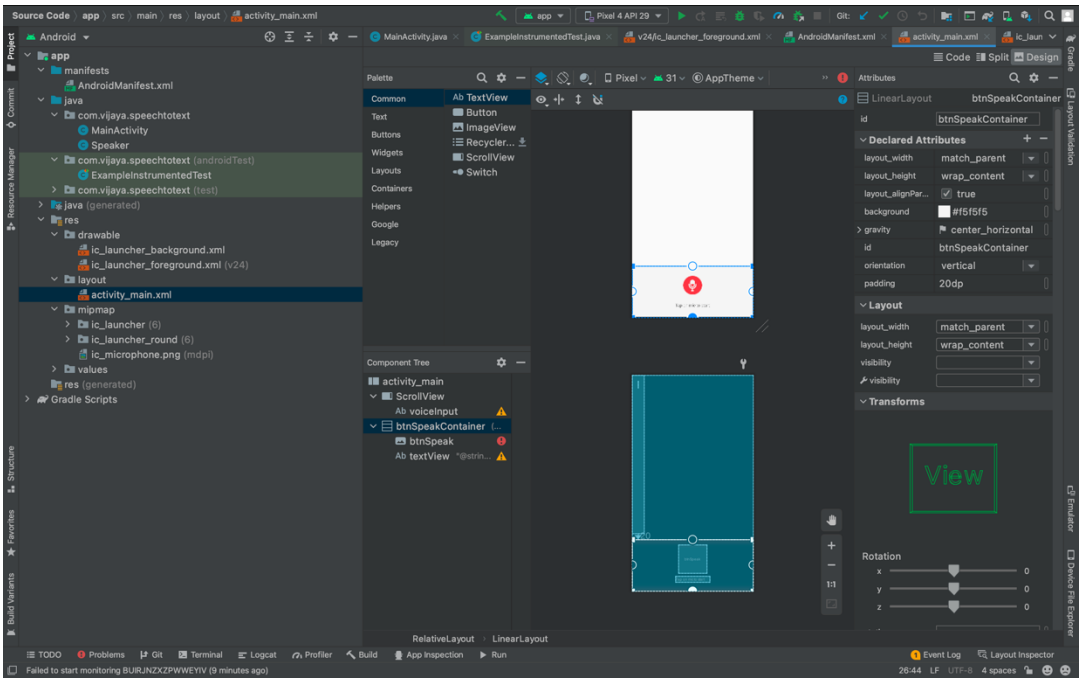


```
package com.vijaya.speechtotext;

import android.content.Context;
import android.media.AudioManager;
import android.speech.tts.TextToSpeech;

import java.util.HashMap;
import java.util.Locale;

public class Speaker implements TextToSpeech.OnInitListener {

    private TextToSpeech tts;

    private boolean ready = false;

    private boolean allowed = false;

    public Speaker(Context context) { tts = new TextToSpeech(context,  listener: this); }

    public boolean isAllowed() { return allowed; }

    public void allow(boolean allowed) { this.allowed = allowed; }

    @Override
    public void onInit(int status) {
        if (status == TextToSpeech.SUCCESS) {
            // Change this to match your
            // locale
            tts.setLanguage(Locale.US);
            ready = true;
        } else {
            ready = false;
        }
    }

    public void speak(String text) {

        // Speak only if the TTS is ready
```

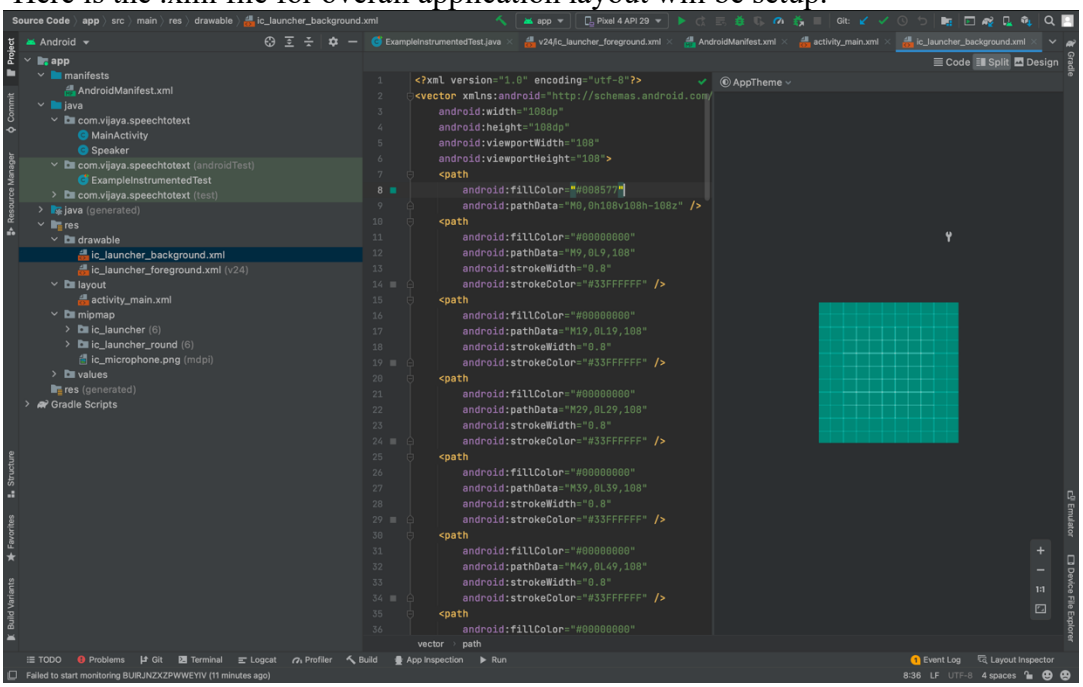


```
public void allow(boolean allowed) { this.allowed = allowed; }

@Override
public void onInit(int status) {
    if (status == TextToSpeech.SUCCESS) {
        // Change this to match your
        // locale
        tts.setLanguage(Locale.US);
        ready = true;
    } else {
        ready = false;
    }
}

public void speak(String text) {

    // Speak only if the TTS is ready
    // and the user has allowed speech

    if (ready && allowed) {
        HashMap<String, String> hash = new HashMap<>();
        hash.put(TextToSpeech.Engine.KEY_PARAM_STREAM,
                String.valueOf(AudioManager.STREAM_NOTIFICATION));
        tts.speak(text, TextToSpeech.QUEUE_ADD, hash);
    }
}

public void pause(int duration) { tts.playSilence(duration, TextToSpeech.QUEUE_ADD,  params: null); }

// Free up resources
public void destroy() { tts.shutdown(); }
}
```

LAYOUT:

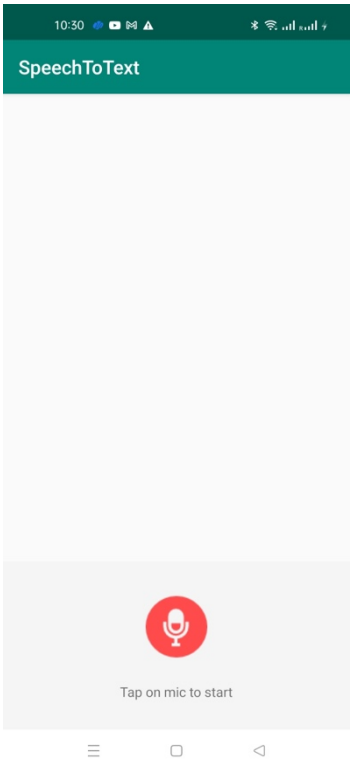


- Here is the .xml file for overall application layout will be setup.



OUTPUT:

The initial page when the app gets installed is as follows.



When we speak to the google assistant it will respectively replies as follows: