Android Speech-to-text

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Team 2, App 6.1
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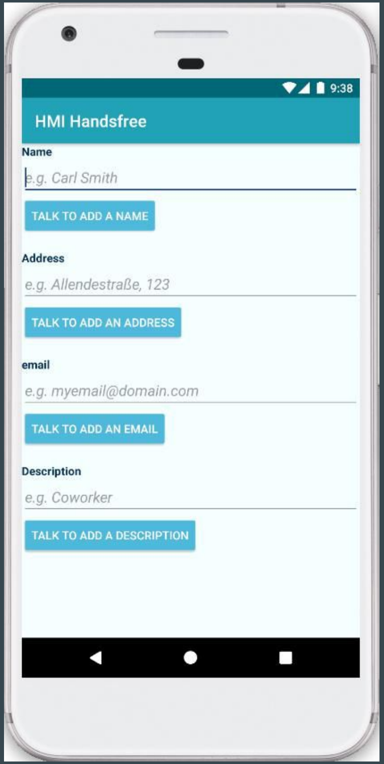
- 27/06/2019

4 textViews, 4 buttons



HMI Handsfree

Name

e.g. Carl Smith

Address

e.g. Allendestraße, 123

email

e.g. myemail@domain.com

Description

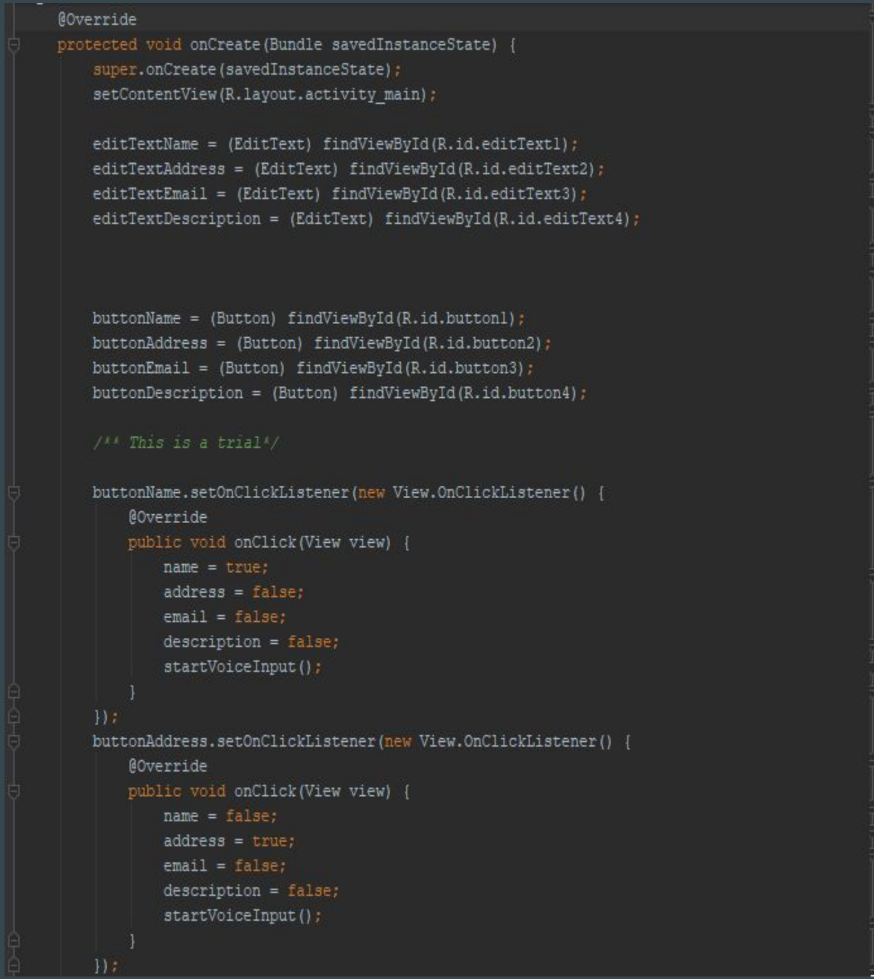
e.g. Coworker

Estimated date of presentation:

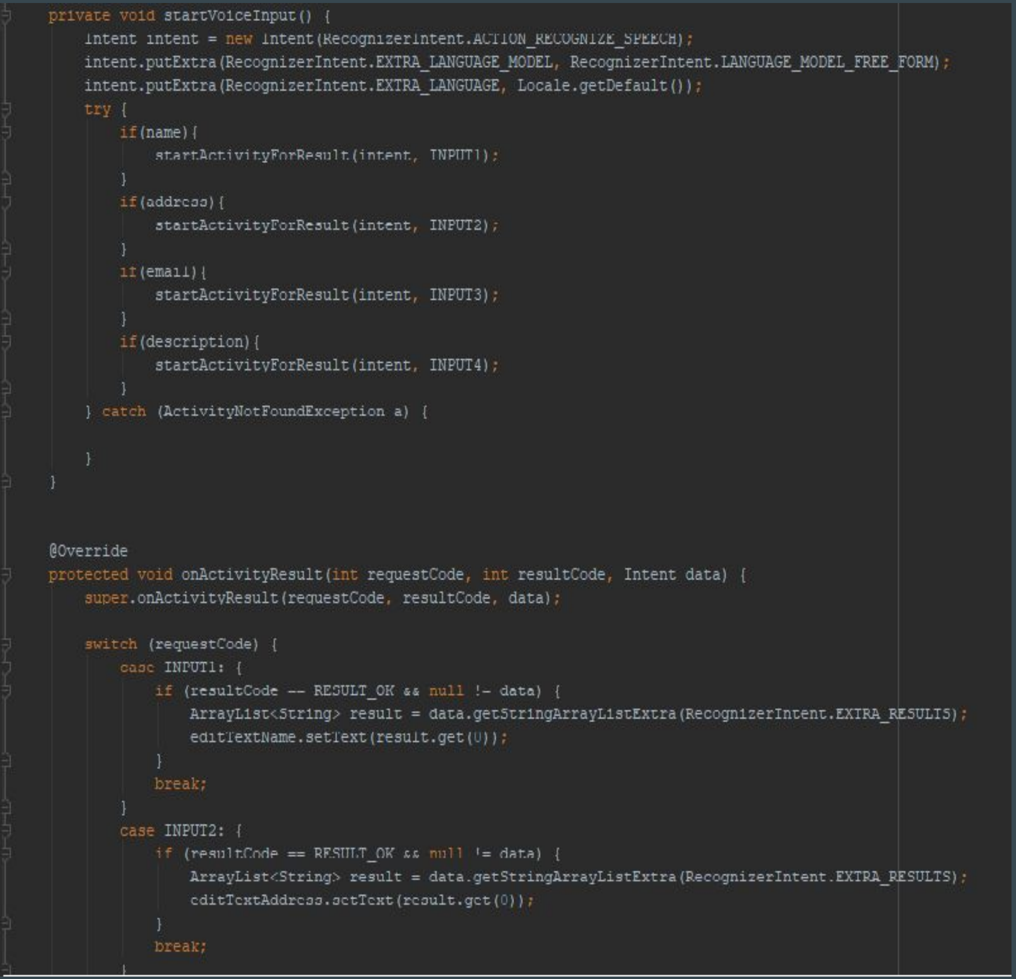
20/05/2019 - 24/05/2019

Achievements:

- 4 textviews
- 1 button per textview

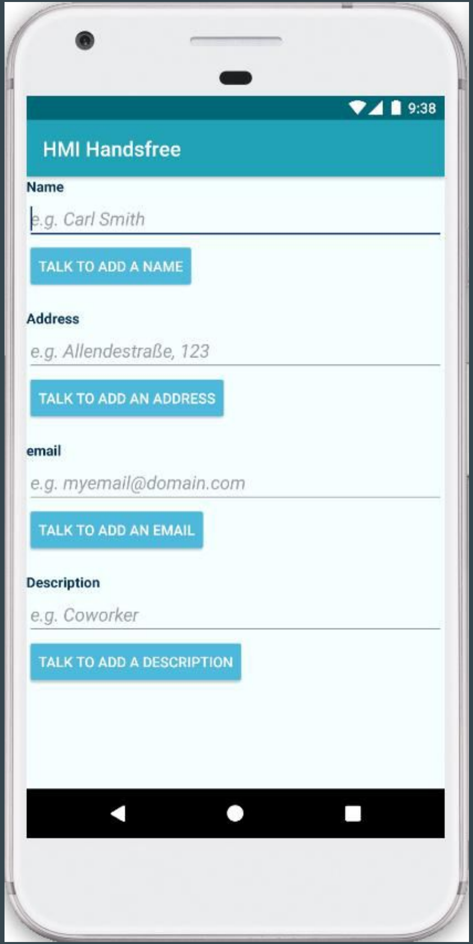


```java
@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);

    editTextName = (EditText) findViewById(R.id.editText1);
    editTextAddress = (EditText) findViewById(R.id.editText2);
    editTextEmail = (EditText) findViewById(R.id.editText3);
    editTextDescription = (EditText) findViewById(R.id.editText4);



    buttonName = (Button) findViewById(R.id.button1);
    buttonAddress = (Button) findViewById(R.id.button2);
    buttonEmail = (Button) findViewById(R.id.button3);
    buttonDescription = (Button) findViewById(R.id.button4);

    /** This is a trial*/

    buttonName.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View view) {
            name = true;
            address = false;
            email = false;
            description = false;
            startVoiceInput();
        }
    });
    buttonAddress.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View view) {
            name = false;
            address = true;
            email = false;
            description = false;
            startVoiceInput();
        }
    });
```



```java
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());
    try {
        if(name){
            startActivityForResult(intent, INPUT1);
        }
        if(address){
            startActivityForResult(intent, INPUT2);
        }
        if(email){
            startActivityForResult(intent, INPUT3);
        }
        if(description){
            startActivityForResult(intent, INPUT4);
        }
    } catch (ActivityNotFoundException a) {

    }
}


@Override
protected void onActivityResult(int requestCode, int resultCode, Intent data) {
    super.onActivityResult(requestCode, resultCode, data);

    switch (requestCode) {
        case INPUT1: {
            if (resultCode == RESULT_OK && null != data) {
                ArrayList<String> result = data.getStringArrayListExtra(RecognizerIntent.EXTRA_RESULTS);
                editTextName.setText(result.get(0));
            }
            break;
        }
        case INPUT2: {
            if (resultCode == RESULT_OK && null != data) {
                ArrayList<String> result = data.getStringArrayListExtra(RecognizerIntent.EXTRA_RESULTS);
                editTextAddress.setText(result.get(0));
            }
            break;
        }
```

4 textViews, 1 button:
field id recognition



HMI Handsfree

Name

e.g. Carl Smith

Address

e.g. Allendestraße, 123

email

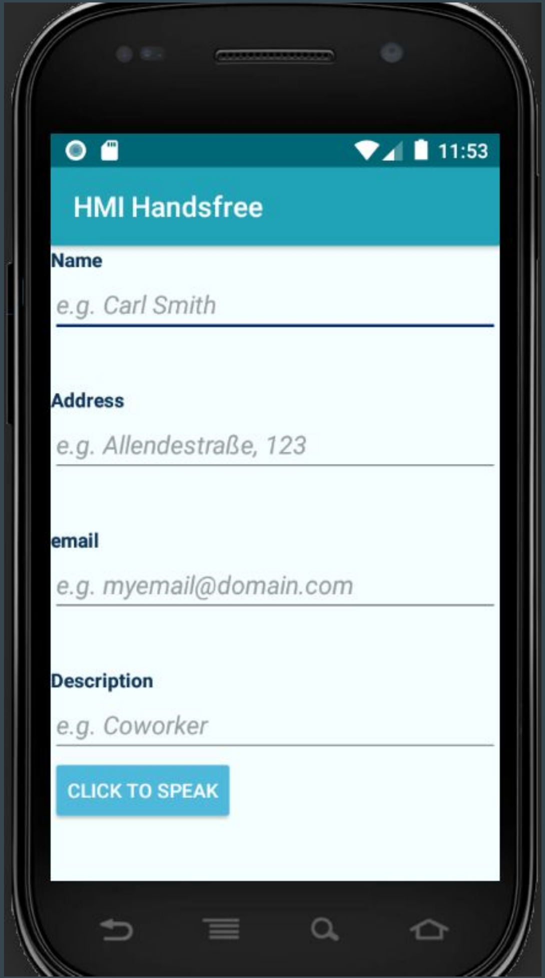
e.g. myemail@domain.com

Description

e.g. Coworker

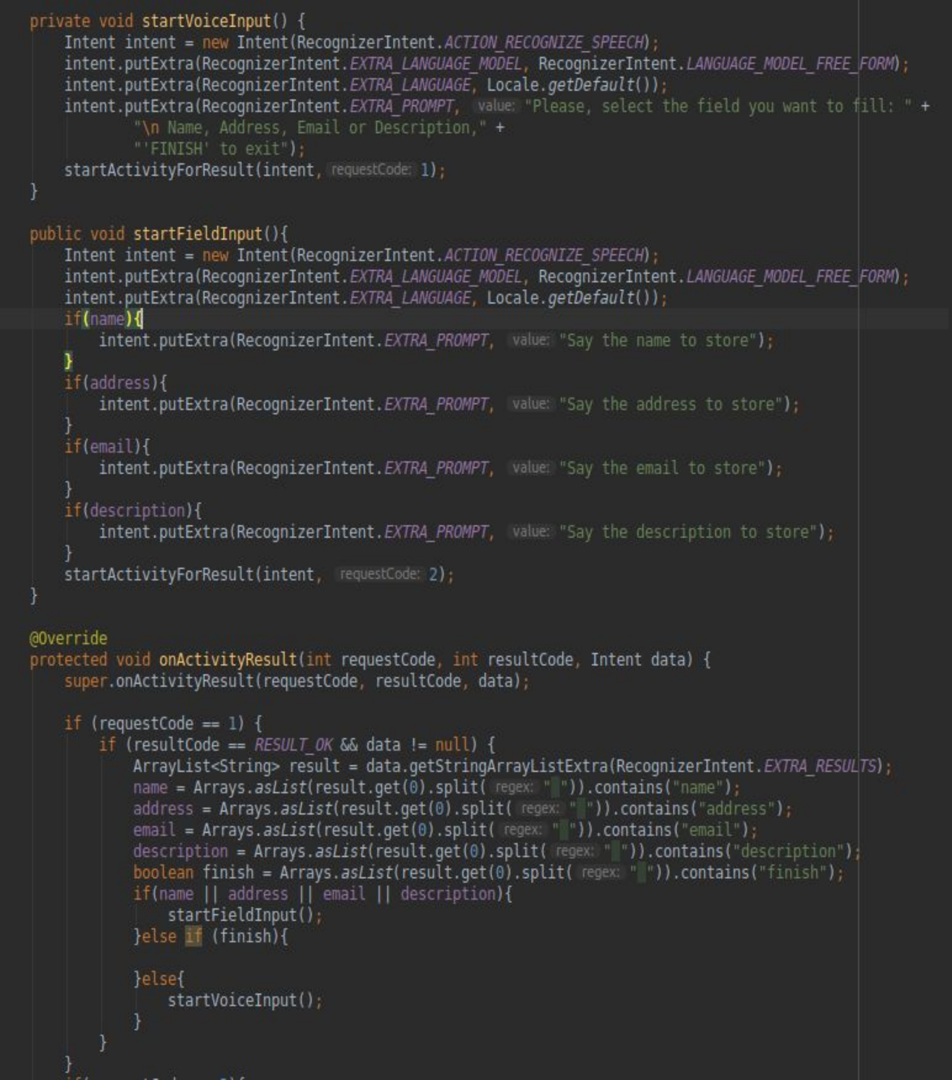
Before my change:

- 4 textviews
- 4 button per textview

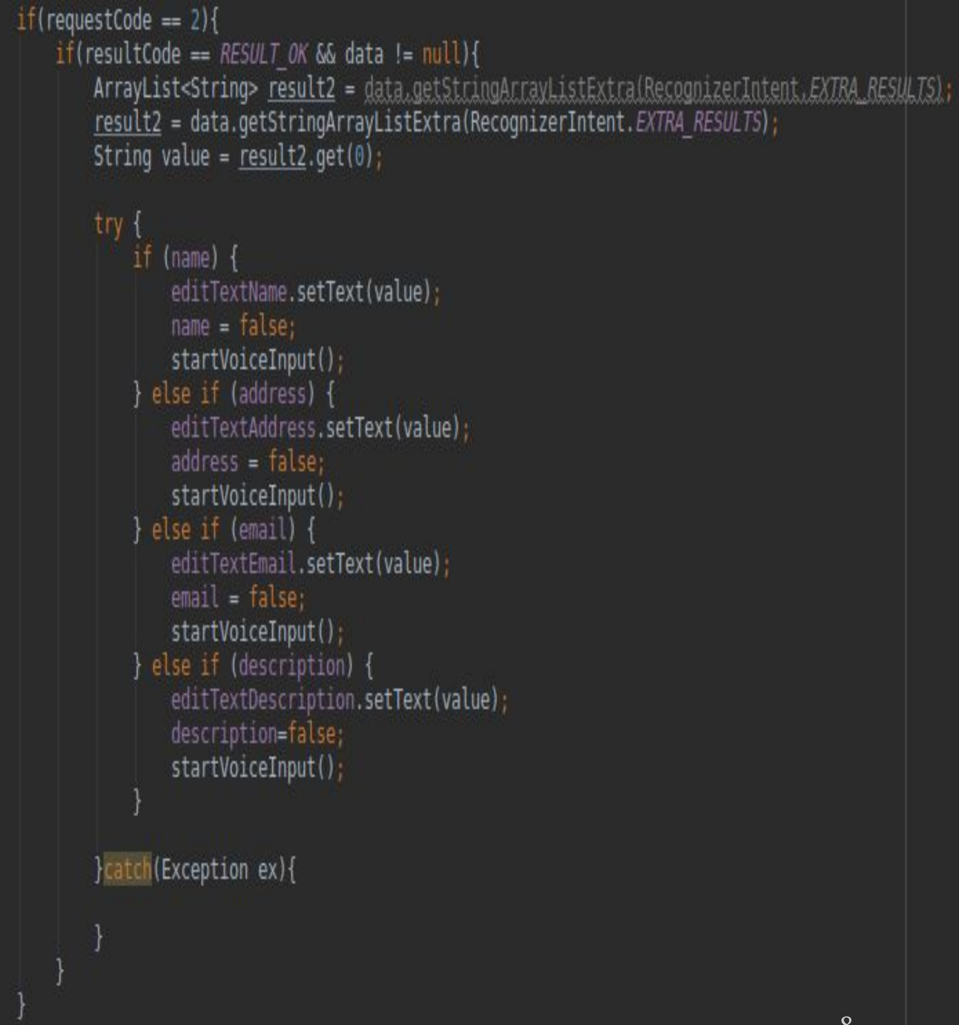


Achievements:

- 4 textviews and 1 button
    - Difference the different fields by “.equals” function within received speech.
    - Once to click the rest is done by voice

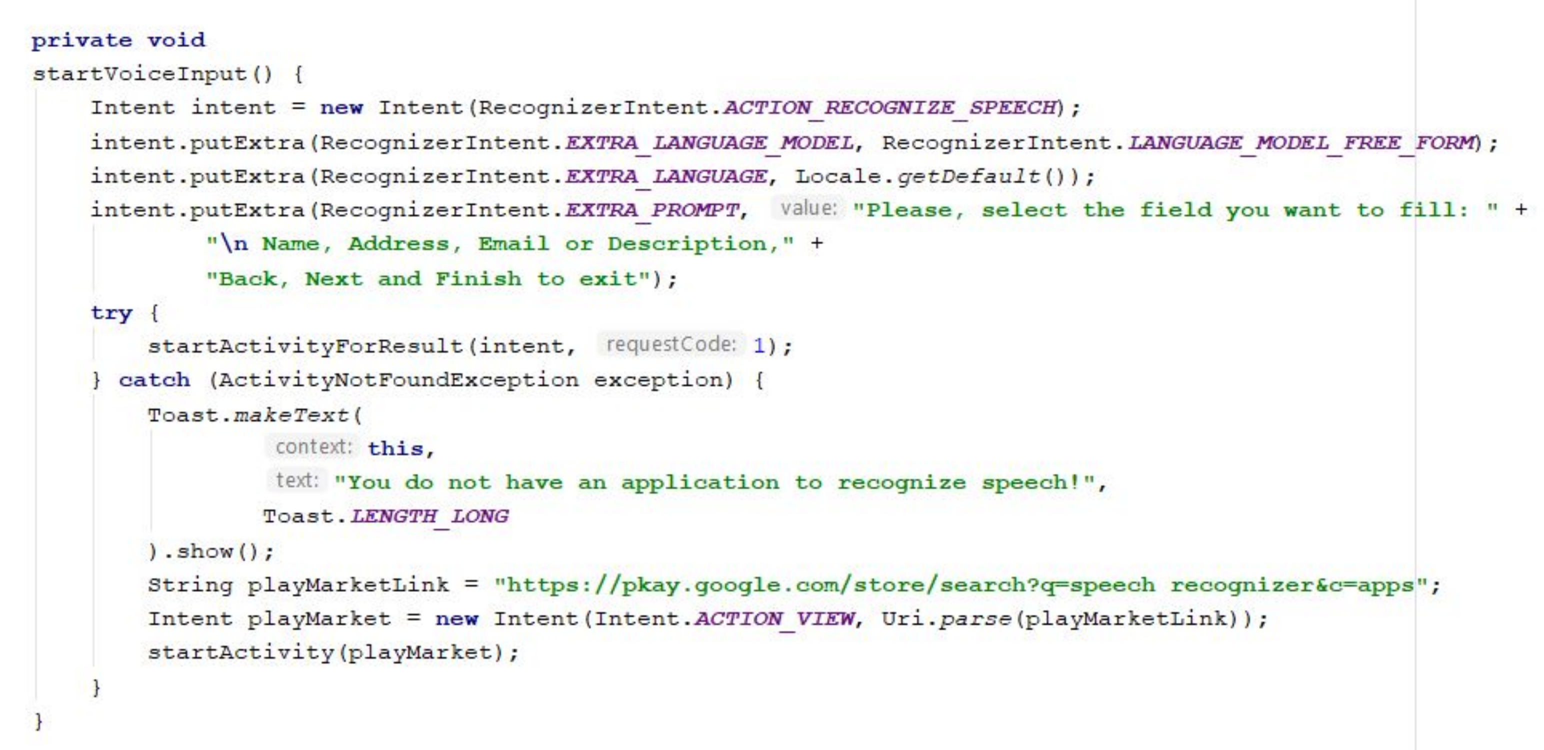


```
private void startVoiceInput() {
    Intent intent = new Intent(RecognizerIntent.ACTION_RECOGNIZE_SPEECH);
    intent.putExtra(RecognizerIntent.EXTRA_LANGUAGE_MODEL, RecognizerIntent.LANGUAGE_MODEL_FREE_FORM);
    intent.putExtra(RecognizerIntent.EXTRA_LANGUAGE, Locale.getDefault());
    intent.putExtra(RecognizerIntent.EXTRA_PROMPT,  value: "Please, select the field you want to fill: " +
            "\n Name, Address, Email or Description," +
            "'FINISH' to exit");
    startActivityForResult(intent,  requestCode: 1);
}

public void startFieldInput(){
    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());
    if(name){
        intent.putExtra(RecognizerIntent.EXTRA_PROMPT,  value: "Say the name to store");
    }
    if(address){
        intent.putExtra(RecognizerIntent.EXTRA_PROMPT,  value: "Say the address to store");
    }
    if(email){
        intent.putExtra(RecognizerIntent.EXTRA_PROMPT,  value: "Say the email to store");
    }
    if(description){
        intent.putExtra(RecognizerIntent.EXTRA_PROMPT,  value: "Say the description to store");
    }
    startActivityForResult(intent,  requestCode: 2);
}

@Override
protected void onActivityResult(int requestCode, int resultCode, Intent data) {
    super.onActivityResult(requestCode, resultCode, data);

    if (requestCode == 1) {
        if (resultCode == RESULT_OK && data != null) {
            ArrayList<String> result = data.getStringArrayListExtra(RecognizerIntent.EXTRA_RESULTS);
            name = Arrays.asList(result.get(0).split( regex: " ")).contains("name");
            address = Arrays.asList(result.get(0).split( regex: " ")).contains("address");
            email = Arrays.asList(result.get(0).split( regex: " ")).contains("email");
            description = Arrays.asList(result.get(0).split( regex: " ")).contains("description");
            boolean finish = Arrays.asList(result.get(0).split( regex: " ")).contains("finish");
            if(name || address || email || description){
                startFieldInput();
            }else if (finish){

            }else{
                startVoiceInput();
            }
        }
    }
    if(requestCode == 2){
```

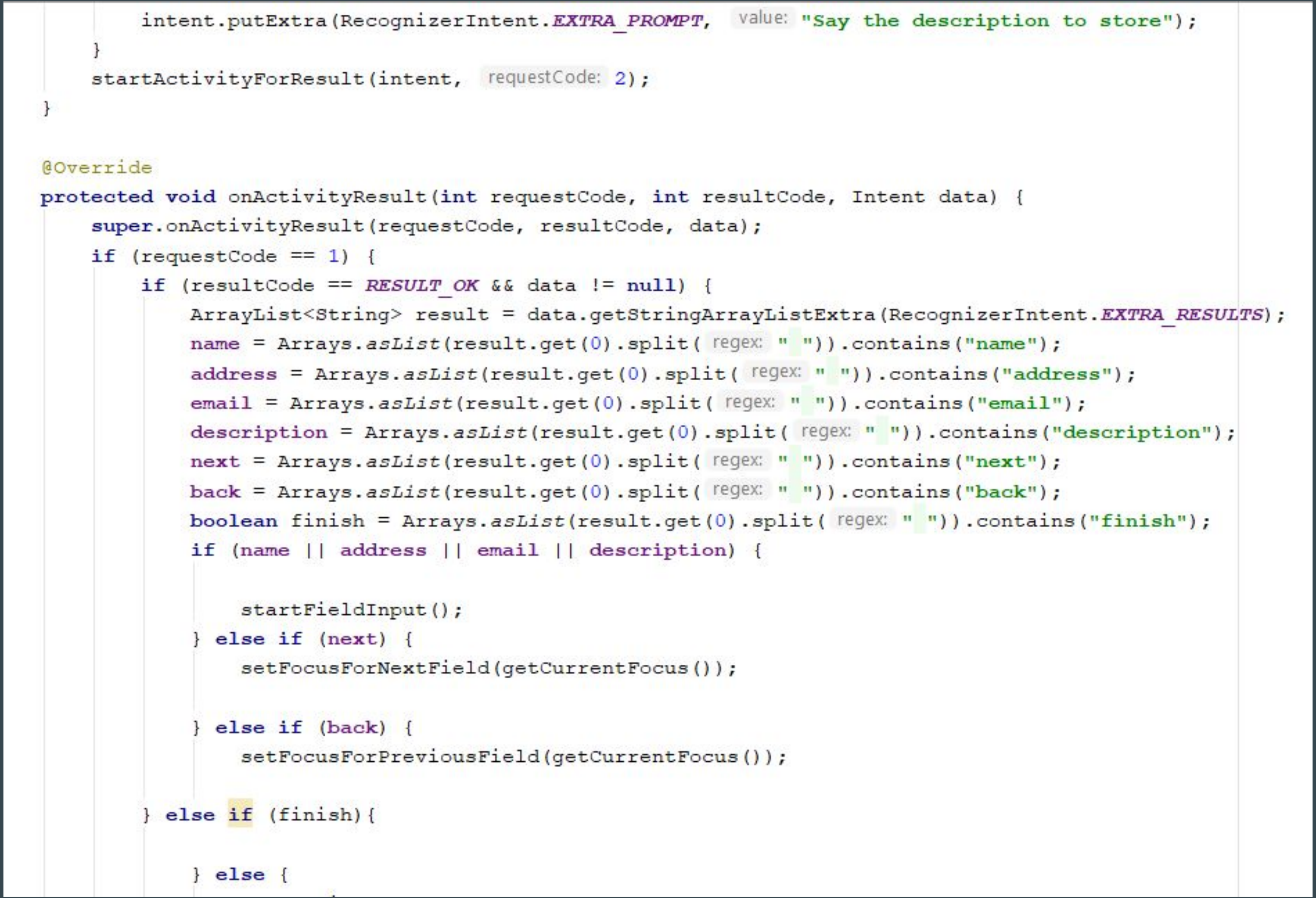


```
if(requestCode == 2){
    if(resultCode == RESULT_OK && data != null){
        ArrayList<String> result2 = data.getStringArrayListExtra(RecognizerIntent.EXTRA_RESULTS);
        result2 = data.getStringArrayListExtra(RecognizerIntent.EXTRA_RESULTS);
        String value = result2.get(0);

        try {
            if (name) {
                editTextName.setText(value);
                name = false;
                startVoiceInput();
            } else if (address) {
                editTextAddress.setText(value);
                address = false;
                startVoiceInput();
            } else if (email) {
                editTextEmail.setText(value);
                email = false;
                startVoiceInput();
            } else if (description) {
                editTextDescription.setText(value);
                description=false;
                startVoiceInput();
            }

        }catch(Exception ex){

        }
    }
}
```

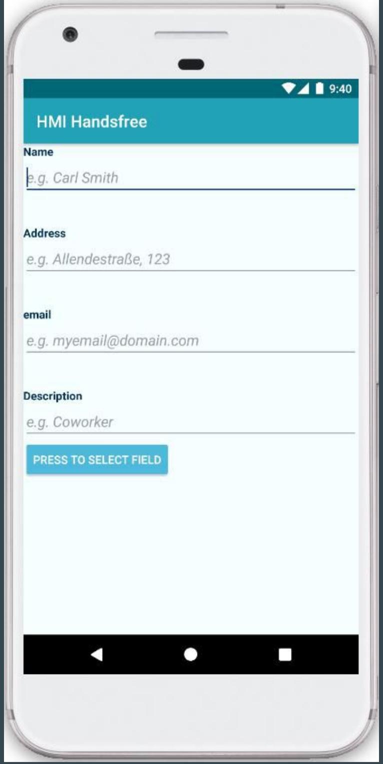
4 textViews, 1 button:
back and next navigation



```
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, select the field you want to fill: " +
            "\n Name, Address, Email or Description," +
            "Back, Next and Finish to exit");
    try {
        startActivityForResult(intent,  requestCode: 1);
    } catch (ActivityNotFoundException exception) {
        Toast.makeText(
                context: this,
                text: "You do not have an application to recognize speech!",
                Toast.LENGTH_LONG
        ).show();
        String playMarketLink = "https://pkay.google.com/store/search?q=speech recognizer&c=apps";
        Intent playMarket = new Intent(Intent.ACTION_VIEW, Uri.parse(playMarketLink));
        startActivity(playMarket);
    }
}
```



```
            intent.putExtra(RecognizerIntent.EXTRA_PROMPT,  value: "Say the description to store");
        }
        startActivityForResult(intent,  requestCode: 2);
    }

    @Override
    protected void onActivityResult(int requestCode, int resultCode, Intent data) {
        super.onActivityResult(requestCode, resultCode, data);
        if (requestCode == 1) {
            if (resultCode == RESULT_OK && data != null) {
                ArrayList<String> result = data.getStringArrayListExtra(RecognizerIntent.EXTRA_RESULTS);
                name = Arrays.asList(result.get(0).split( regex: " ")).contains("name");
                address = Arrays.asList(result.get(0).split( regex: " ")).contains("address");
                email = Arrays.asList(result.get(0).split( regex: " ")).contains("email");
                description = Arrays.asList(result.get(0).split( regex: " ")).contains("description");
                next = Arrays.asList(result.get(0).split( regex: " ")).contains("next");
                back = Arrays.asList(result.get(0).split( regex: " ")).contains("back");
                boolean finish = Arrays.asList(result.get(0).split( regex: " ")).contains("finish");
                if (name || address || email || description) {

                    startFieldInput();
                } else if (next) {
                    setFocusForNextField(getCurrentFocus());

                } else if (back) {
                    setFocusForPreviousField(getCurrentFocus());

            } else if (finish){

                } else {
```



Name

e.g. Carl Smith

Address

e.g. Allendestraße, 123

email

e.g. myemail@domain.com

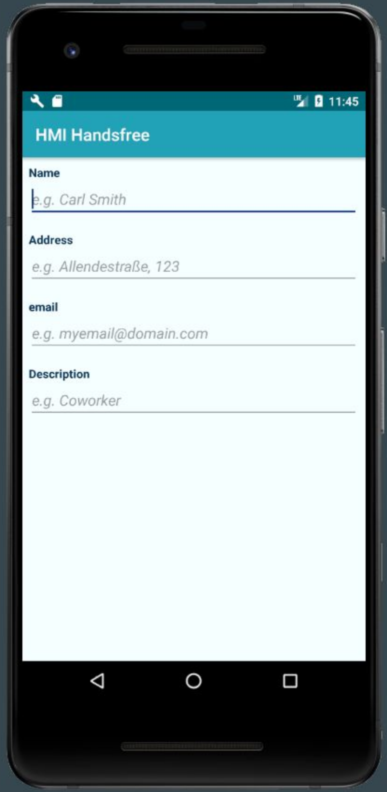
Description

e.g. Coworker

Achievements:

- 4 textviews
- 1 button
  - Implementation of "equals("next") → Following textView
    or
  - Is it correct?
    - Yes → next textView
    - No → edit same textView

No buttons



HMI Handsfree

Name

e.g. Carl Smith

Address

e.g. Allendestraße, 123

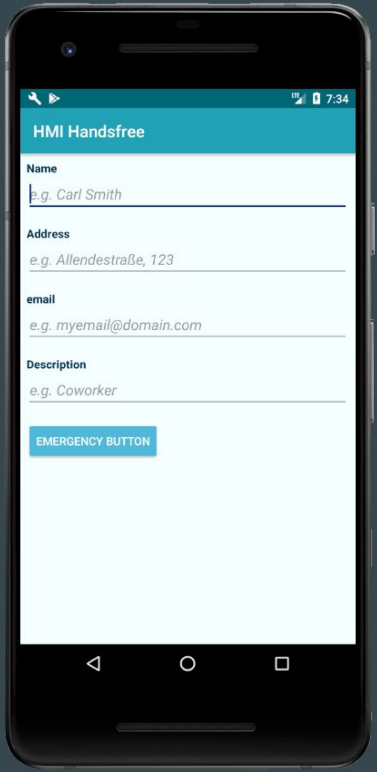
email

e.g. myemail@domain.com

Description

e.g. Coworker

- Fixed “at” → “@”
  - Problem: words with “at”. Solved taking spaces in both sides.
- No-buttons needed:
  - Reacts to “**hey okay**” command.
  - External module: **pocketsphinx-android.**
  - Problems:
    - External module.
    - Hard to use and understand.
    - Problems with RecognizerIntent
- Icon changed →



HMI Handsfree

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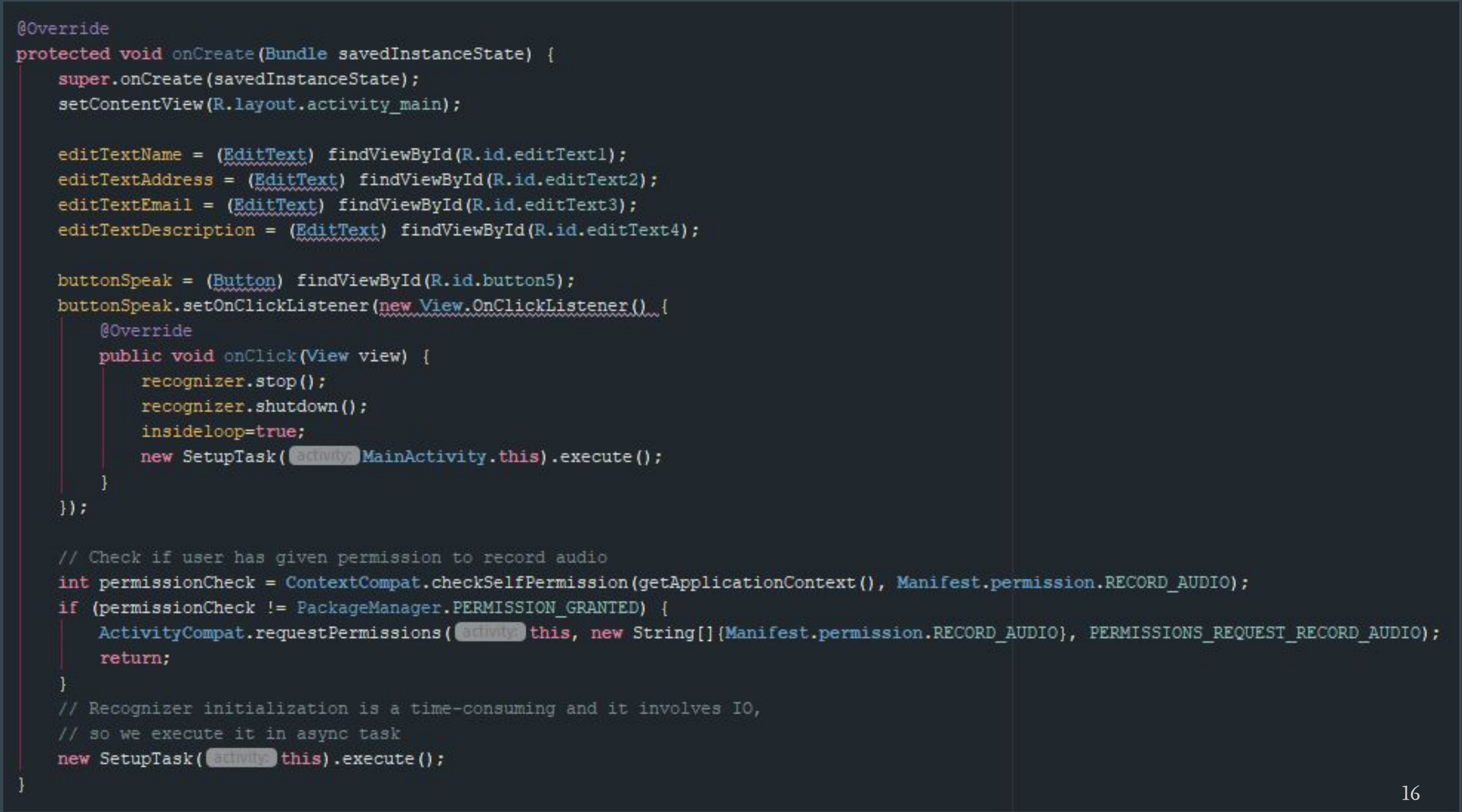
Description

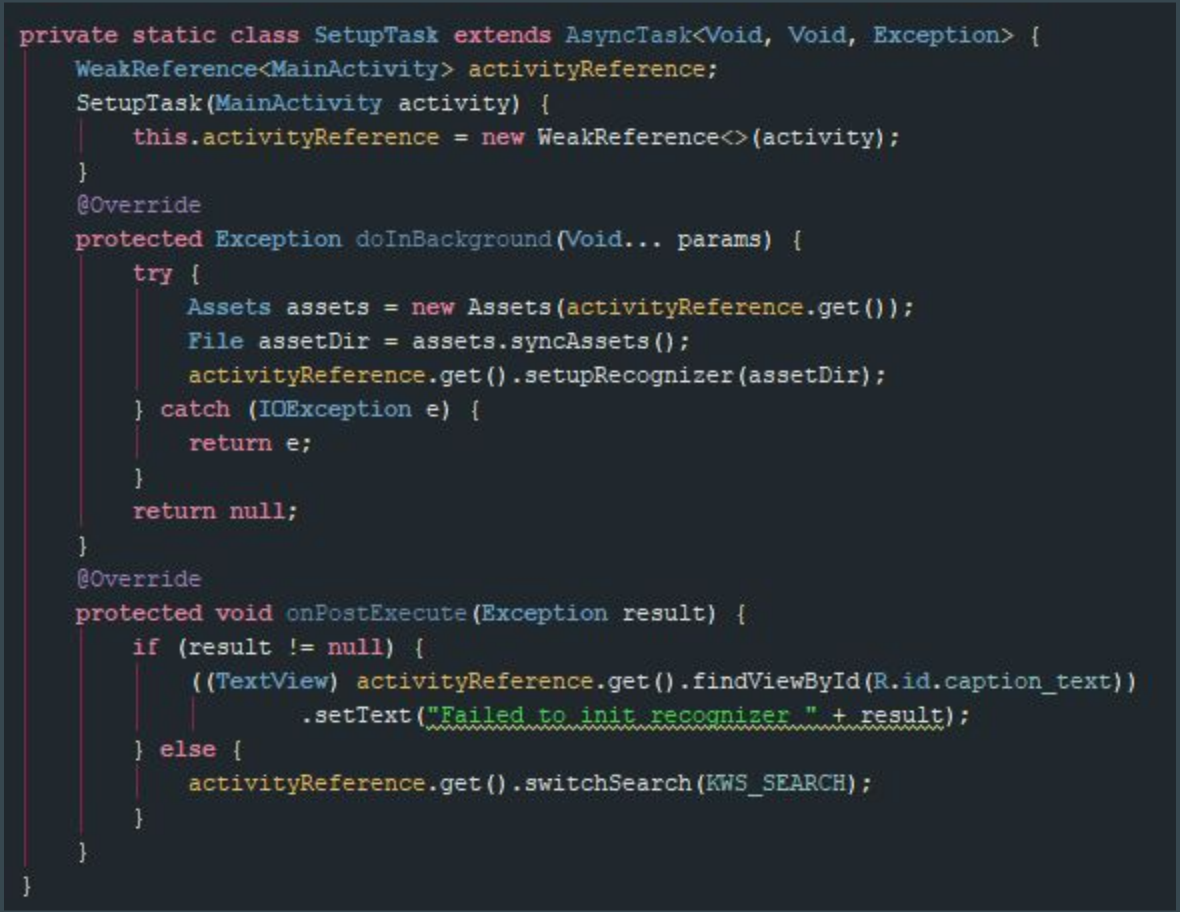
e.g. Coworker

EMERGENCY BUTTON

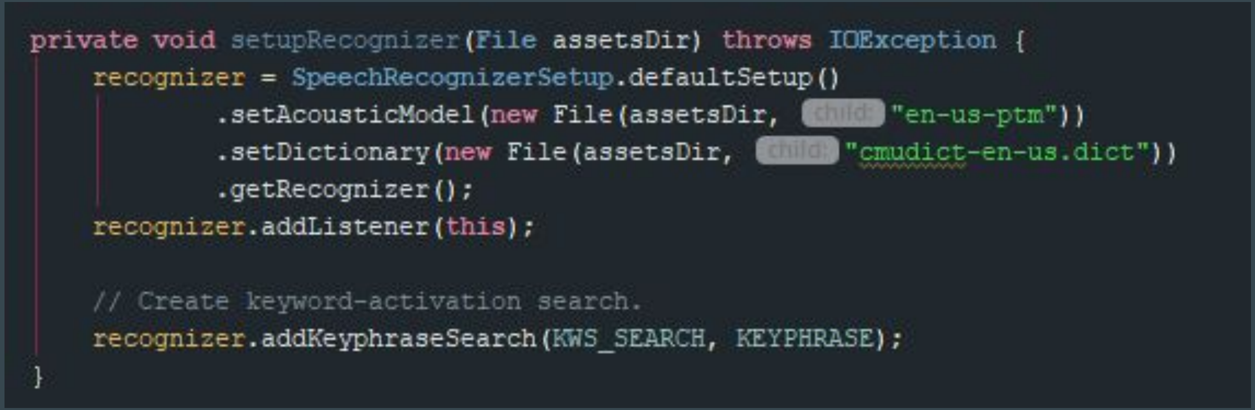
- Problems with RecognizerIntent:
  - Impossible to handle: problem from API.
  - Keyword had to be disabled after used due to incompatibilities with RecognizerIntent.
  - Added “emergency button”, which allows to start listening for the keyword again.



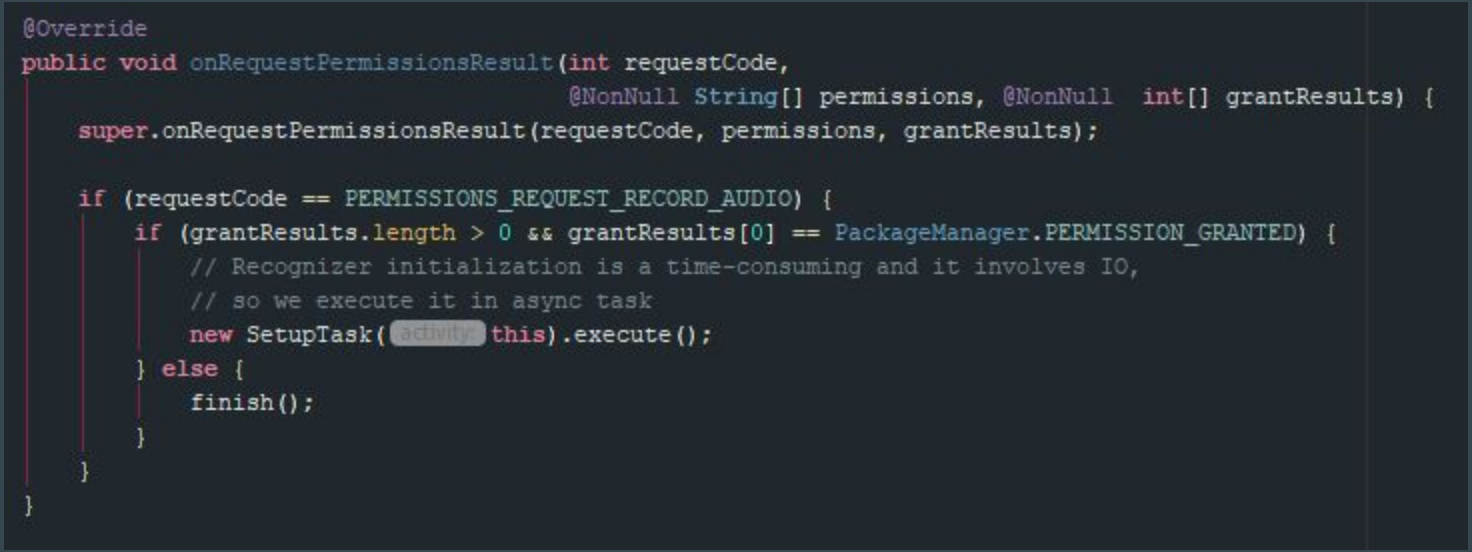
```
@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);

    editTextName = (EditText) findViewById(R.id.editText1);
    editTextAddress = (EditText) findViewById(R.id.editText2);
    editTextEmail = (EditText) findViewById(R.id.editText3);
    editTextDescription = (EditText) findViewById(R.id.editText4);

    buttonSpeak = (Button) findViewById(R.id.button5);
    buttonSpeak.setOnClickListener(new View.OnClickListener() {
        @Override
        public void onClick(View view) {
            recognizer.stop();
            recognizer.shutdown();
            insideloop=true;
            new SetupTask( activity: MainActivity.this).execute();
        }
    });

    // Check if user has given permission to record audio
    int permissionCheck = ContextCompat.checkSelfPermission(getApplicationContext(), Manifest.permission.RECORD_AUDIO);
    if (permissionCheck != PackageManager.PERMISSION_GRANTED) {
        ActivityCompat.requestPermissions( activity: this, new String[]{Manifest.permission.RECORD_AUDIO}, PERMISSIONS_REQUEST_RECORD_AUDIO);
        return;
    }
    // Recognizer initialization is a time-consuming and it involves IO,
    // so we execute it in async task
    new SetupTask( activity: this).execute();
}
```



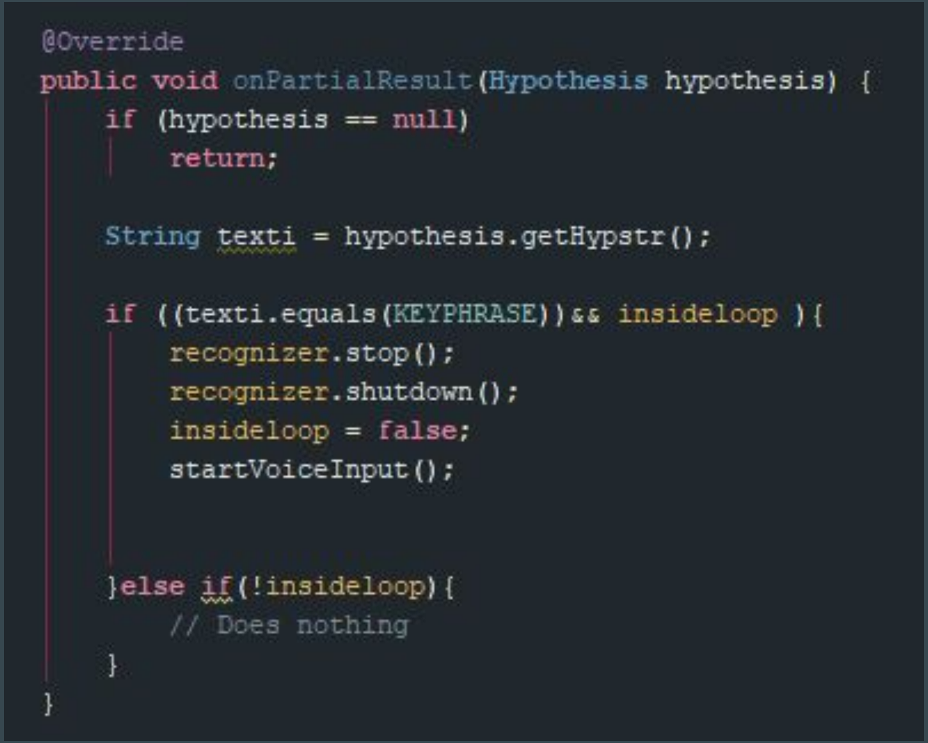
```java
private static class SetupTask extends AsyncTask<Void, Void, Exception> {
    WeakReference<MainActivity> activityReference;
    SetupTask(MainActivity activity) {
        this.activityReference = new WeakReference<>(activity);
    }
    @Override
    protected Exception doInBackground(Void... params) {
        try {
            Assets assets = new Assets(activityReference.get());
            File assetDir = assets.syncAssets();
            activityReference.get().setupRecognizer(assetDir);
        } catch (IOException e) {
            return e;
        }
        return null;
    }
    @Override
    protected void onPostExecute(Exception result) {
        if (result != null) {
            ((TextView) activityReference.get().findViewById(R.id.caption_text))
                    .setText("Failed to init recognizer " + result);
        } else {
            activityReference.get().switchSearch(KWS_SEARCH);
        }
    }
}
```



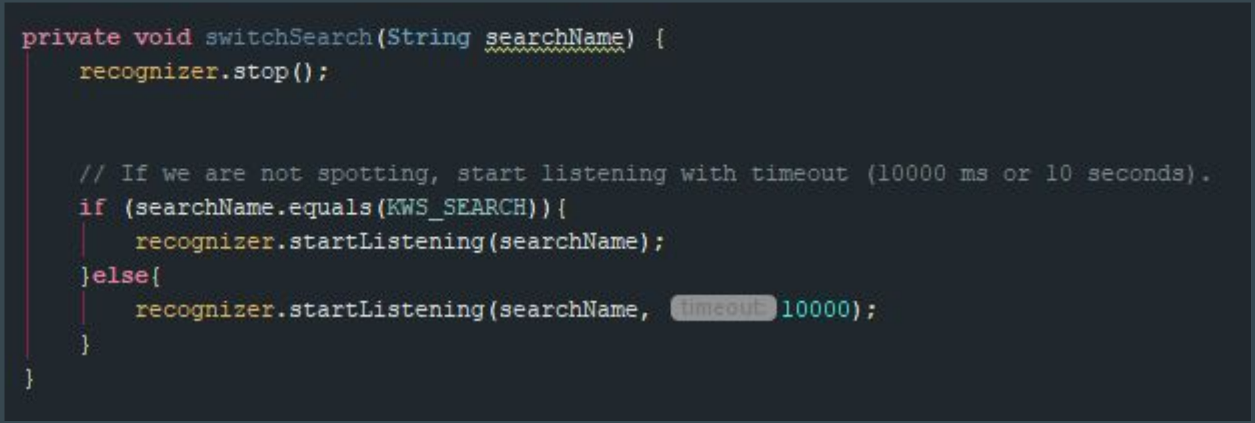
```
private void setupRecognizer(File assetsDir) throws IOException {
    recognizer = SpeechRecognizerSetup.defaultSetup()
            .setAcousticModel(new File(assetsDir, child: "en-us-ptm"))
            .setDictionary(new File(assetsDir, child: "cmudict-en-us.dict"))
            .getRecognizer();
    recognizer.addListener(this);

    // Create keyword-activation search.
    recognizer.addKeyphraseSearch(KWS_SEARCH, KEYPHRASE);
}
```



```
@Override
public void onRequestPermissionsResult(int requestCode,
                                       @NonNull String[] permissions, @NonNull  int[] grantResults) {
    super.onRequestPermissionsResult(requestCode, permissions, grantResults);

    if (requestCode == PERMISSIONS_REQUEST_RECORD_AUDIO) {
        if (grantResults.length > 0 && grantResults[0] == PackageManager.PERMISSION_GRANTED) {
            // Recognizer initialization is a time-consuming and it involves IO,
            // so we execute it in async task
            new SetupTask( activity: this).execute();
        } else {
            finish();
        }
    }
}
```



```
@Override
public void onPartialResult(Hypothesis hypothesis) {
    if (hypothesis == null)
        return;

    String texti = hypothesis.getHypstr();

    if ((texti.equals(KEYPHRASE))&& insideloop ){
        recognizer.stop();
        recognizer.shutdown();
        insideloop = false;
        startVoiceInput();


    }else if(!insideloop){
        // Does nothing
    }
}
```



```
private void switchSearch(String searchName) {
    recognizer.stop();


    // If we are not spotting, start listening with timeout (10000 ms or 10 seconds).
    if (searchName.equals(KWS_SEARCH)){
        recognizer.startListening(searchName);
    }else{
        recognizer.startListening(searchName, timeout: 10000);
    }
}
```

Planning

Planning

- 20/05/2019 - 24/05/2019 → 4 textviews & 1 button per textview.
- 03/06/2019 - 07/06/2019 → 4 textviews & 1 button. Distinction only of name of fields.
- 10/06/2019 - 14/06/2019 → Navigation between back and next fields.
- 7/06/2019 - 21/06/2019 → No button. Whole functionality achieved by voice commands.

Problems:

- Decision and declaration of tasks to implement. Solved by meetings and consensus.
- Study and comprehension of Android coding.

Thank you

Human Machine Interaction