ANDROID APP FOR V2V COMMUNICATION
USER DOCUMENT

WINDOWS:
SOURCE CODE:
- Download and install Git Bash
- Open Command prompt.

PUTTY
- Download and install latest version of Putty

ANDROID STUDIO:
Download and install Android studio from https://developer.android.com/studio
- Open/import "My Application" project.

UBUNTU:
Download and install Android Studio.
- Open the folder and extract the files.
- Open bin folder and open in terminal.
- Terminal command: ./studio.sh.
- Open/import the cloned project.

Open minicom through terminal.

TO CHANGE THE MAC ADDRESS AND UUIDS:
Open MainActivity.kt file:

MyApplication>app>src>main>java>com>example>myapplication>MainActivity

```
35      private val POLLING_INTERVAL = 10 //Reading time interval
36
37      val targetMacAddress = "00:1E:C0:3E:1B:3C"  //For scanning using macAddress
38      private val SUUID = "6e400001-b5a3-f393-e0a9-e50e24dccA9e" // Replace with the OBU service UUID
39      private val CUUID = "6e400002-b5a3-f393-e0a9-e50e24dccA9e" // Replace with the OBU characteristic UUID
```

➤ **To alter the time interval(millisecond) in which the data is read from the OBU,**
Change the value assigned to polling interval variable.

➤ **To connect it to some other OBU,**
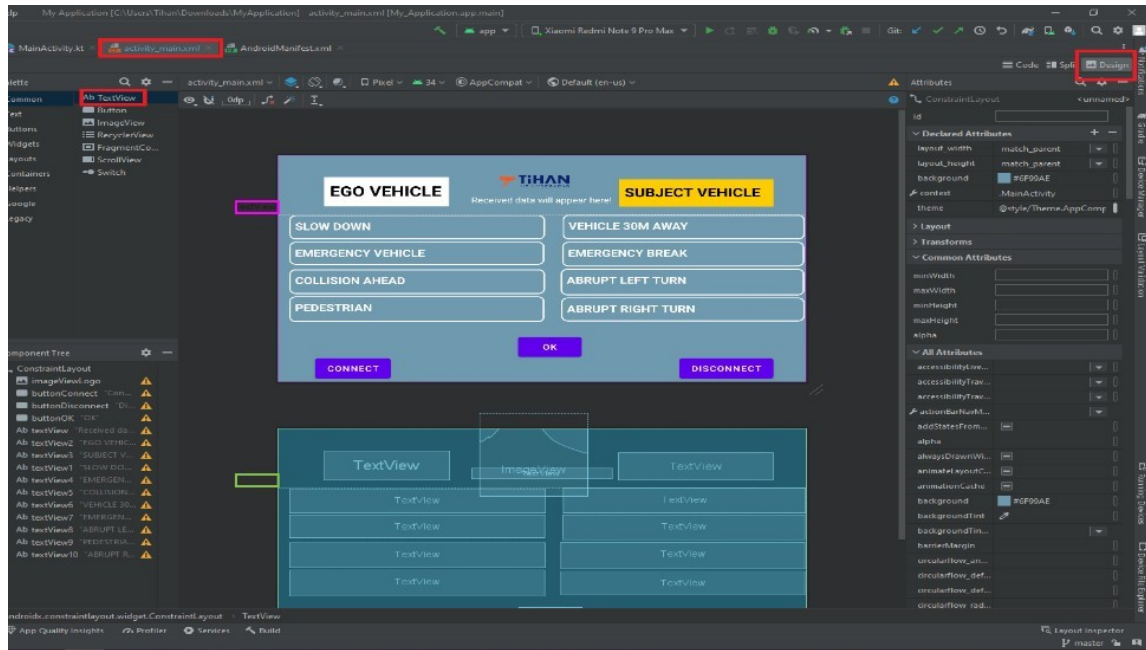Change the MAC address, service UUID and characteristic UUID
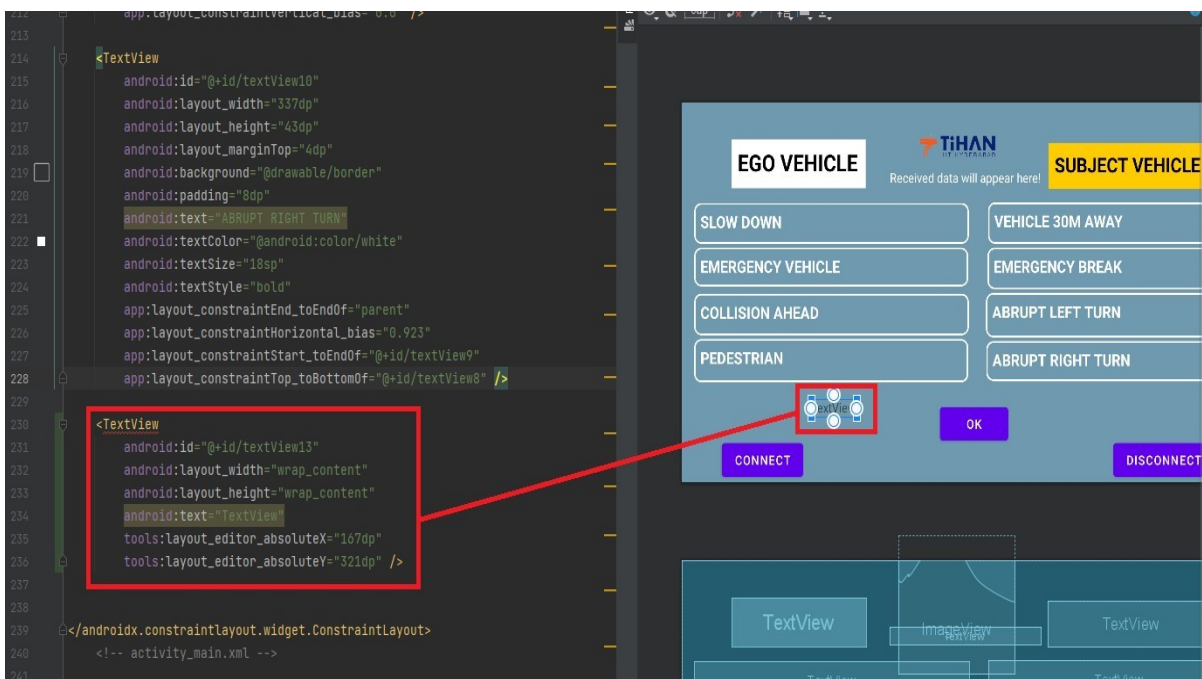
TO ADD TEXTVIEW:

Open activity_main.xml:

MyApplication>app>src>main>res>layout>activity_main

Click on the top right corner to open Design.

Click on TextView from the palette, drag it to the screen and place it in the required position.

The textview with its ID will be automatically added to the activity_main.xml code.

To apply it in the MainActivity.kt

```kotlin
nActivity  onCreate                                                         app ▼    □. Xiaomi Redmi Note 9 Pro Ma

  MainActivity.kt ×    activity_main.xml ×    AndroidManifest.xml ×

38        private val SUUID = "6e400001-b5a3-f393-e0a9-e50e24dccA9e" // Replace with the OBU service
39        private val CUUID = "6e400002-b5a3-f393-e0a9-e50e24dccA9e" // Replace with the OBU characte
40
41        //initialise UI
42        private lateinit var bluetoothAdapter: BluetoothAdapter
43        private lateinit var bluetoothGatt: BluetoothGatt
44        private lateinit var textView: TextView
45        private lateinit var textView1: TextView
46        private lateinit var textView2: TextView
47        private lateinit var textView3: TextView
48        private lateinit var textView4: TextView
49        private lateinit var textView5: TextView
50        private lateinit var textView6: TextView
51        private lateinit var textView7: TextView
52        private lateinit var textView8: TextView
53        private lateinit var textView9: TextView
54        private lateinit var textView10: TextView       ──> Initialise textview like this
55        private lateinit var buttonConnect: Button            eg: private lateinit var textView11: TextView
56        private lateinit var buttonDisconnect: Button
57        private var lastHighlightedTextView: TextView? = null
58
59        @SuppressLint("MissingPermission")
60        override fun onCreate(savedInstanceState: Bundle?) {
61            setTheme(R.style.Theme_AppCompat)
62            super.onCreate(savedInstanceState)
63            setContentView(R.layout.activity_main)
64            textView = findViewById(R.id.textView)
65            textView1 = findViewById(R.id.textView1)
66            textView2 = findViewById(R.id.textView2)
67            textView3 = findViewById(R.id.textView3)
68            textView4 = findViewById(R.id.textView4)
69            textView5 = findViewById(R.id.textView5)
70            textView6 = findViewById(R.id.textView6)
71            textView7 = findViewById(R.id.textView7)
72            textView8 = findViewById(R.id.textView8)
73            textView9 = findViewById(R.id.textView9)
74            textView10 = findViewById(R.id.textView10)   ──> Add this line for the corresponding textview
75            val buttonOK: Button = findViewById(R.id.buttonOK)  eg: textview11 = findViewById(R.id.textView11
76
```

```kotlin
ctivity  onCreate                                                           app ▼    □. Xiaomi Redmi Note 9 Pro Max ▼

  MainActivity.kt ×    activity_main.xml ×    AndroidManifest.xml ×

343                            Log.d(TAG, msg: "received data: $receiveddata )
344                            highlightTextView(receivedData)
345                        }
346
347                    }
348                }
349            } else {
350                Log.e(TAG, msg: "Characteristic read failed with status: $status")
351            }
352        }
353    }
354    //highlight text
355    private fun highlightTextView(receivedData: String) {
356        // Reset the previous highlighted TextView, if any
357        lastHighlightedTextView?.setBackgroundResource(R.drawable.border)
358        // lastHighlightedTextView?.setBackgroundResource(0)
359        lastHighlightedTextView?.setTextColor(Color.WHITE)
360
361        // Get the corresponding TextView based on the received data
362        val textView = when (receivedData.toIntOrNull()) {
363            1 -> findViewById<TextView>(R.id.textView1)
364            // 2 -> findViewById<TextView>(R.id.textView2)
365            //3 -> findViewById<TextView>(R.id.textView3)
366            2 -> findViewById<TextView>(R.id.textView4)
367            3 -> findViewById<TextView>(R.id.textView5)
368            5 -> findViewById<TextView>(R.id.textView6)
369            6 -> findViewById<TextView>(R.id.textView7)
370            7 -> findViewById<TextView>(R.id.textView8)
371            4 -> findViewById<TextView>(R.id.textView9)
372            8 -> findViewById<TextView>(R.id.textView10)   ──> Assign another received value to highlight text
373            else -> null                                        eg: 9 -> findViewById<TextView>(r.id.textView11)
374        }
375
```

TO BUILD AN APK FILE:

Click on Build in the navigation bar.
Build>Build Bundle(s)/APK(s)>Build APK(s)
Locate it and copy the file to install it in our devices.
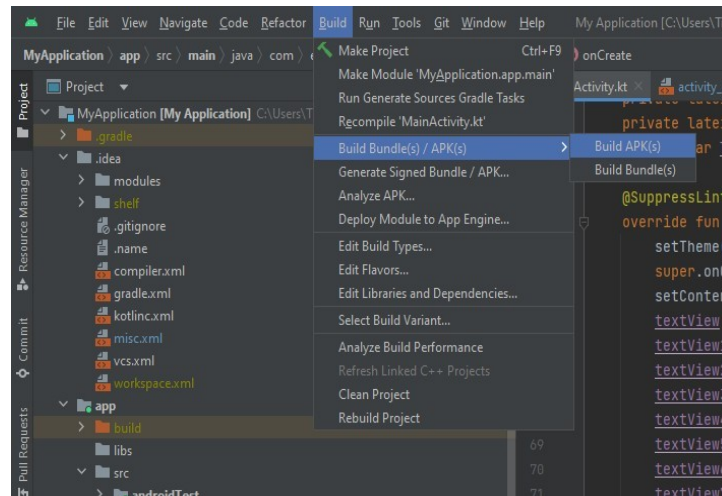
To run the app instantly on the device,
- Enable developer options(settings>about phone>versions/build number-tap multiple times) in your mobile phone and turn on USB debugging and Install via USB options.
- Connect the mobile phone and the PC using USB cable.
- Android studio will automatically find the device. Click on Run.
- Install the app in your mobile.
- Check logcat in the Android studio for updates.

To set up the connection between the OBU in DSRC,

Setup the putty configuration as given below and also verify the Port.

Commands for DSRC OBU:

- ☐ + - Echo on/off
- ➤ a – advertise
- ➤ y – stop advertising
- ➤ k – end connection
- ➤ When it is connected, it displays,
- ➤ Write data – shw,001c,31

COM3 - PuTTY

```
Welcome to minicom 2.7

OPTIONS: I18n
Compiled on May 12 2022, 04:29:45.
Port /dev/ttymxc3, 12:12:05

Press CTRL-A Z for help on special keys

Echo On
AOK
Connected
ConnParam: 0006,0000,01F4
ConnParam: 0024,0000,01F4
AOK,001c,31
AOK,001c,32
AOK,001c,37
AOK,001c,30
Connection End
```

Commands for C-v2x OBU:

- ☐ +UUBTACLC:<connection_handle>,0,<bd_address> - Connected
- ➤ AT+UBTGSER- to set service uuid
- ➤ AT+UBTGCHA - to set characteristic uuid
- ☐ +UUBTGRR:0,32 – Read request(response)
- ➤ AT+UBTGRR=0,34 – Write command
- ☐ +UUBTACLD:0 - Disconnected

```
+UUBTACLC:0,0,7616DED2E303r

+UUBTGRR:0,32

AT+UBTGRR=0,34

OK

+UUBTACLD:0
```