Assignment 3 – Android Application
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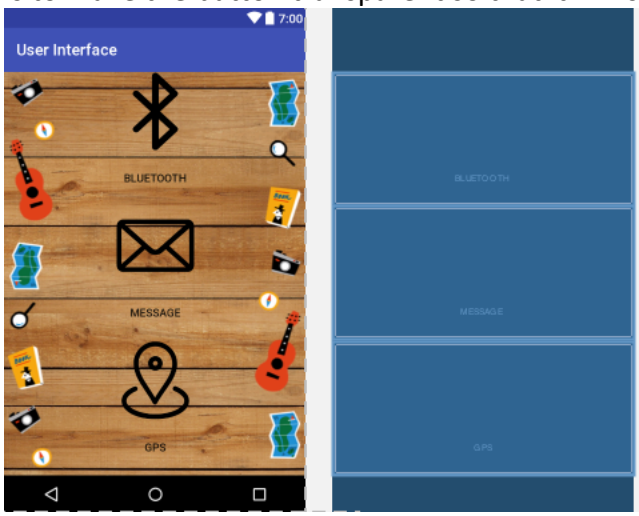
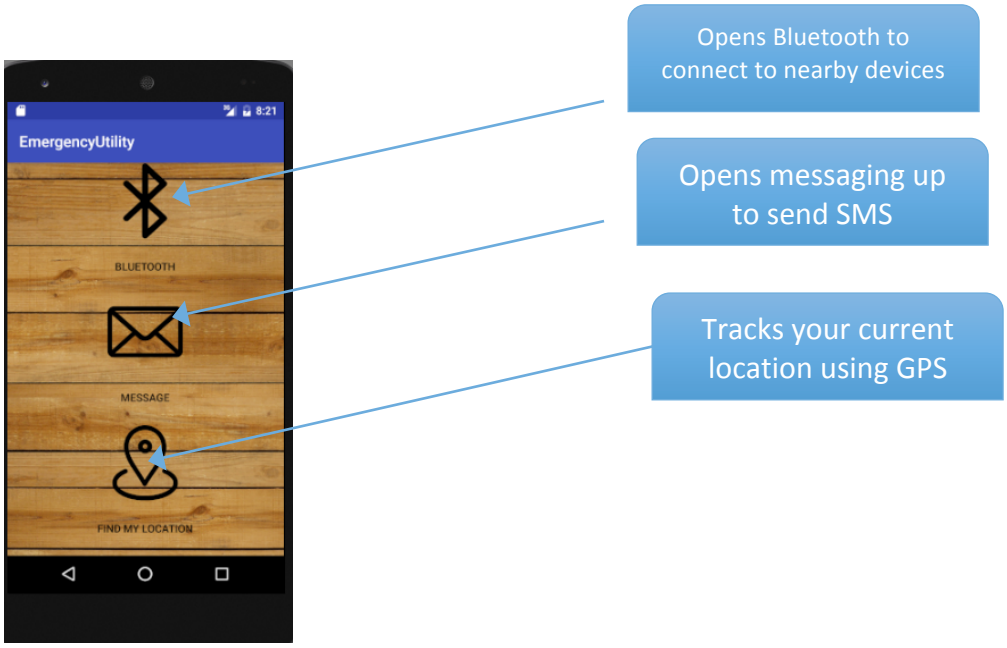
In this project, we choose Bluetooth, messaging and location-based services to develop a useful Android mobile application, which acts as an emergency mobile utility when you get lost. It has location services to track your current position and the ability to send and receive SMS to people, and find and connect with near by Bluetooth devices in range and sends a message via Bluetooth.

User Interface

User interface need to be well designed and contains 3 elements (Bluetooth, Message, GPS). And I choose icons as buttons to control those 3 features. And a background pictures as well to make the interface looks better. 3 icons should be '. SVG' file and convert to '.xml' so that we can put those icons on the buttons, and the most important aspect we need to modified is to make the button transparent so that it will show the icons only.

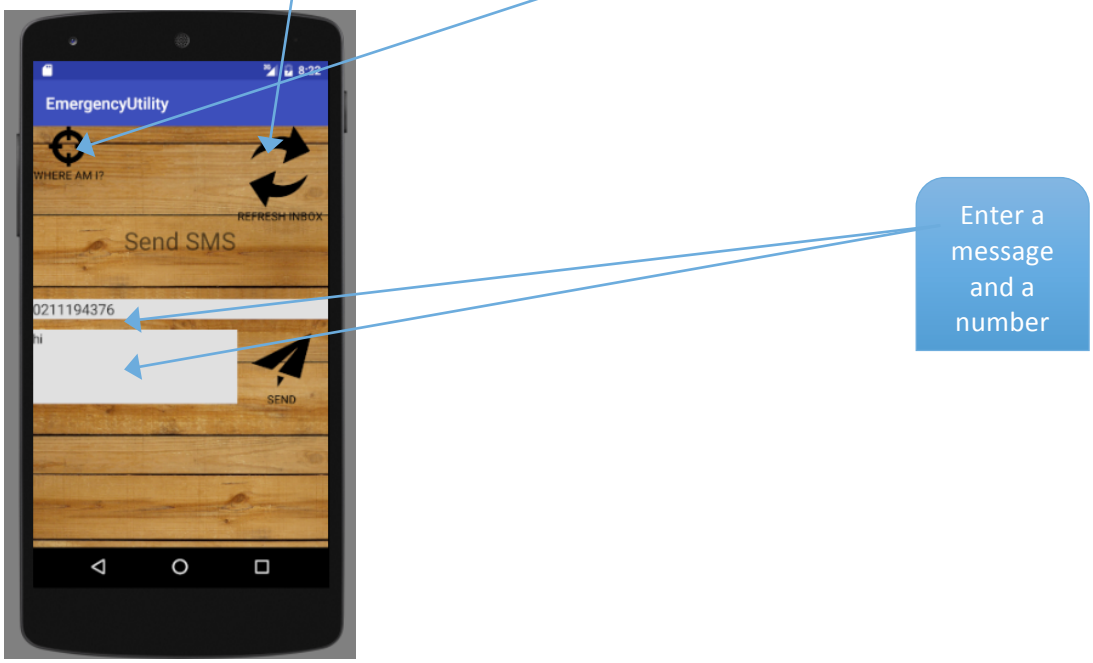


The user can tap each specific icon to connect to Bluetooth, send and receive messages and get your own location.
Set three buttons as linear layout and also set the orientation as vertical. Give each button a unique ID as well.
Because there are only three icons, so I use sketched pro to add some elements on both side of the screen, just make the interface looks better.



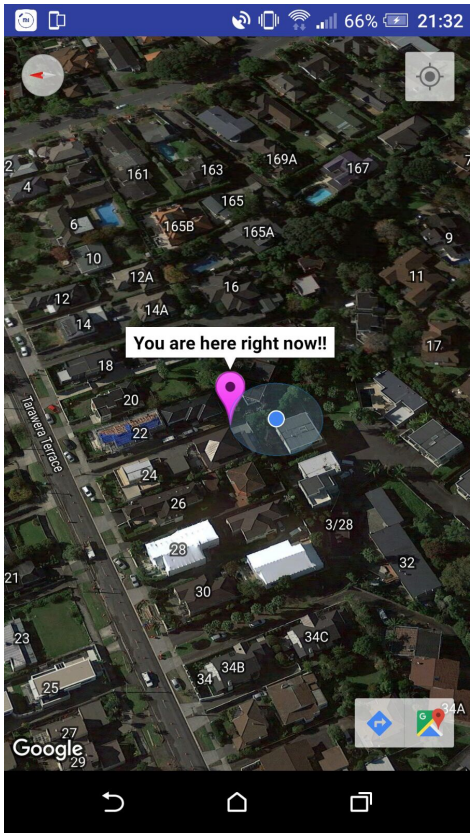
Message

The messaging app is a built in SMS messaging service feature. It lets you send messages by SMS and also receive your messages. It reads through all messages in the phones inbox and keeps them in an array list and presents it to the user as a list view. Once you click on the messaging app it will take you to this window below. Enter a text and a number and push send. Click on "Refresh inbox" to see received messages, or click on "where am I?" to get your current location. You must also allow SMS messaging permission when first time using the app.



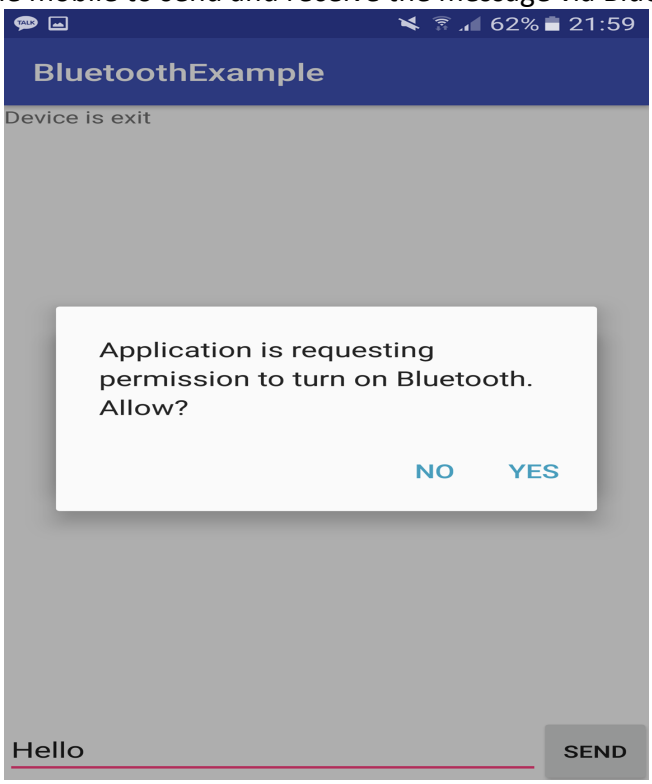
GPS

Two ways of finding your current location by going to the main screen and clicking on find my location or in Messaging at top there is another button called “where am I”. This is created for a user-friendlier interface, and more easily accessible functionality. You must turn on your GPS and be connected to WIFI for it to find your location. You must also allow location services permission when first using the app.



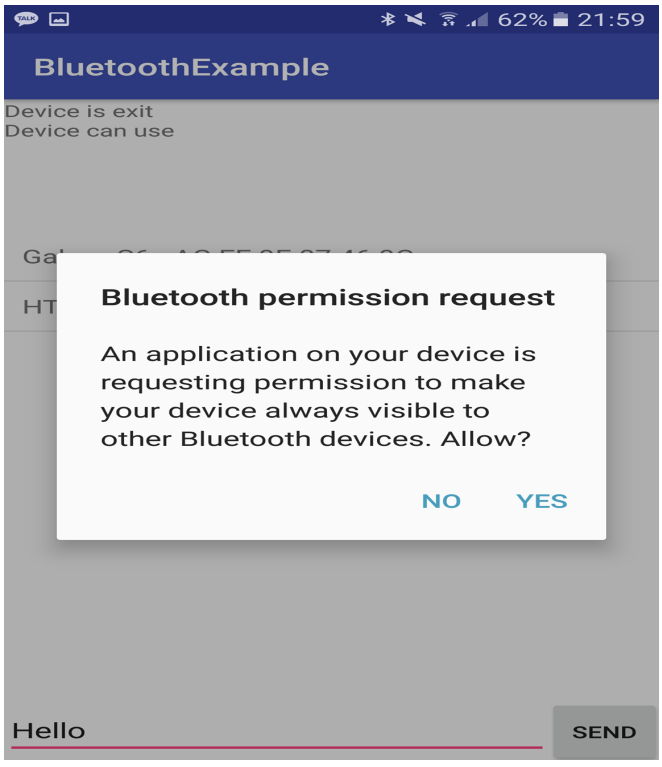
Bluetooth

This feature allows the mobile to send and receive the message via Bluetooth service.

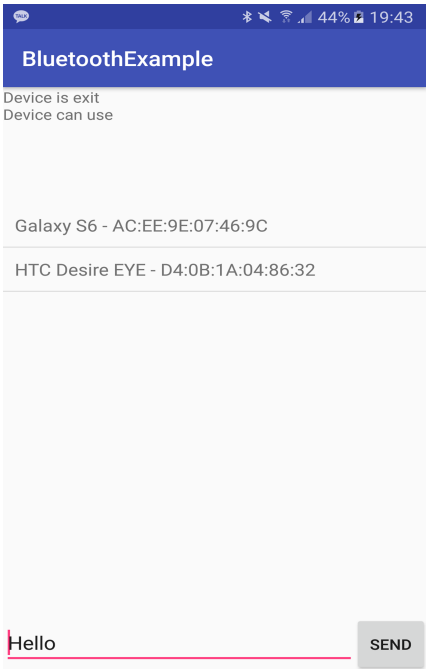


After clicking Bluetooth button, the app ask user to enable the Bluetooth unless the mobile turns on the Bluetooth.

The app then ask user to make user's mobile discoverable.

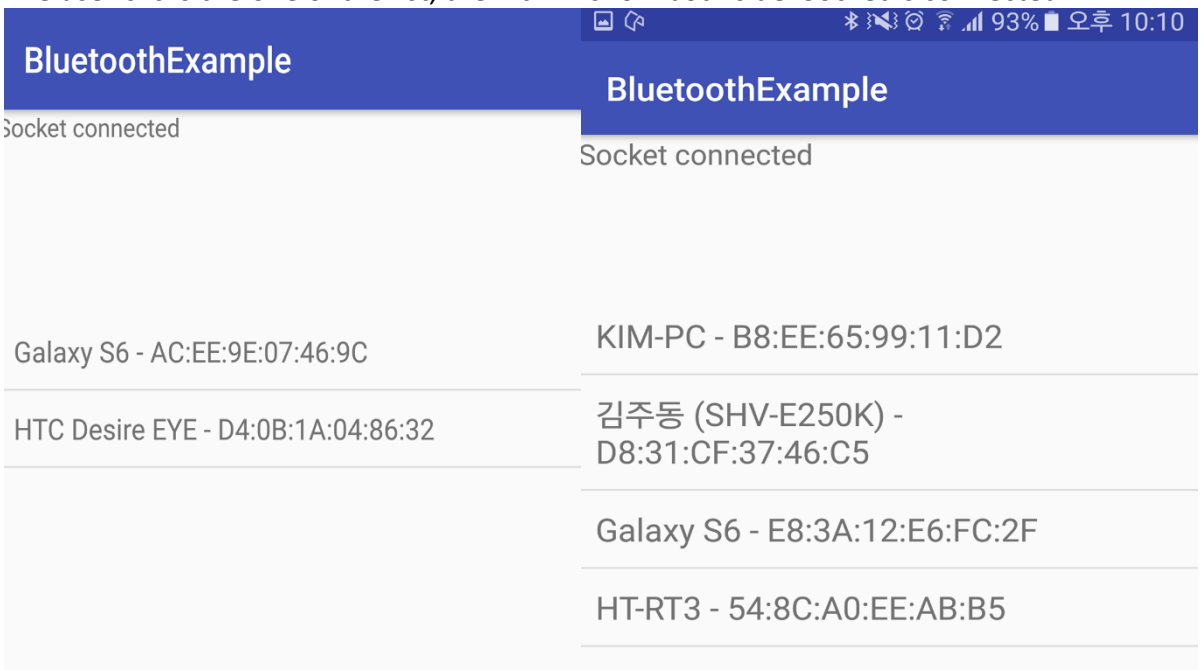


If user clicks ok, then it goes to the User interface.

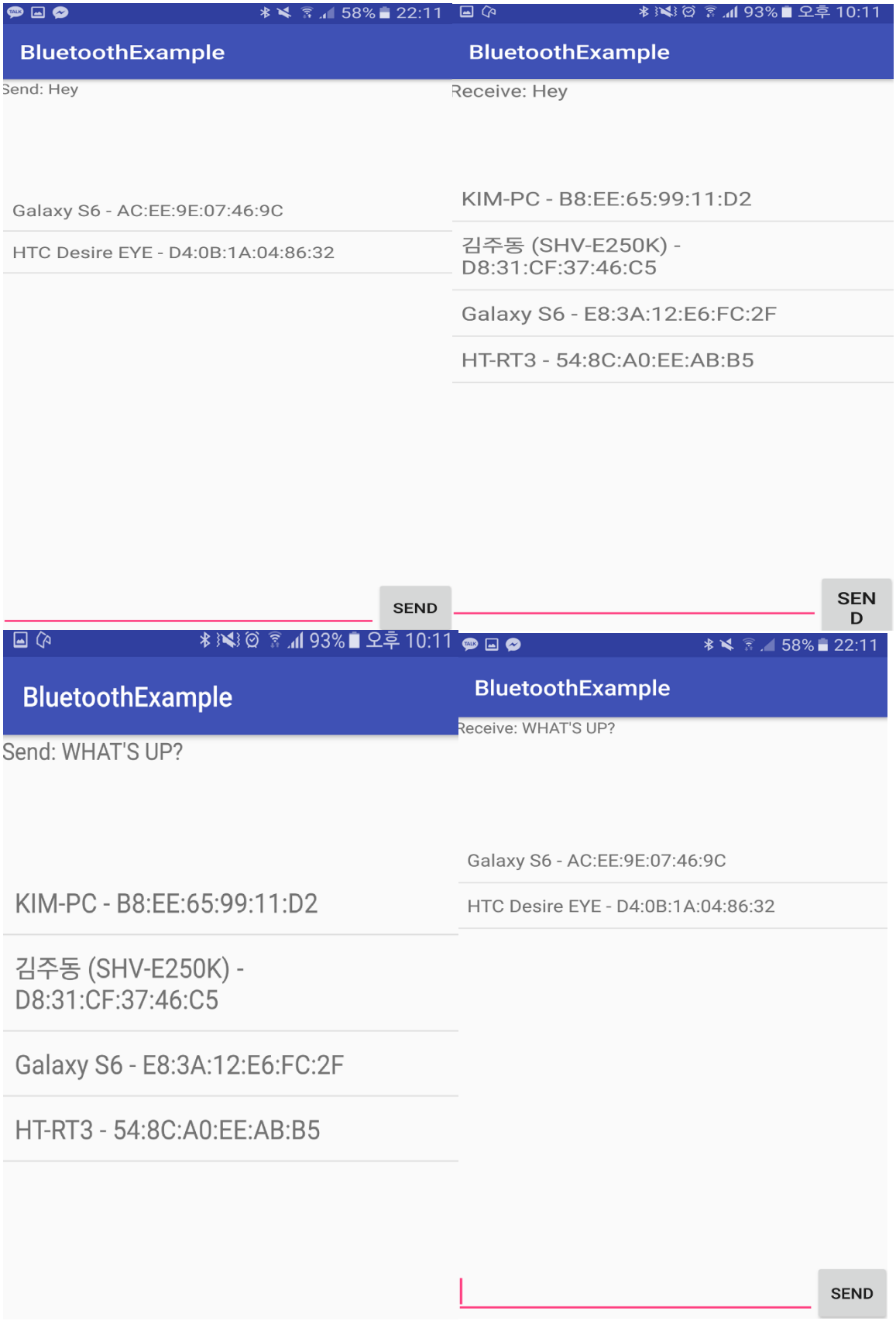


User interface is composed of 3 parts, TextView, ListView and EditText parts. On the top of the field, it shows a status of app and messenger story in TextView. On the middle of that, it shows the list of paired device and new discovered devices (but does not work yet) in the ListView. On the bottom, there is the EditText for typing the text.
If there is a device supporting Bluetooth device nearby your device and both devices turn on the Bluetooth, then the app allow the user to connect both devices.

The user clicks the one of the list, then it will show both side 'Socket is connected'



After that it allows users to use texting each other there are some pictures below….



There is a problem that we have not figured out. The app is unable to scan other devices.

1. The device does not scan other discovered devices which support Bluetooth Service.

```
public void startFindDevice(){

    stopFindDevice();

    mBTAdapter.startDiscovery();

    IntentFilter intent = new IntentFilter(BluetoothDevice.ACTION_FOUND);
    registerReceiver(mReceiver, intent);
}
```

In this part, mBTAdapter.startDiscovery() returns true and then implements registerReceiver(mReceiver, intent). However, I assume that mReceiver which is BroadcastReceiver does not work properly.

```
private final BroadcastReceiver mReceiver = new BroadcastReceiver() {
    @Override
    public void onReceive(Context context, Intent intent) {

        String action = intent.getAction();
        //if(intent.getAction() == BluetoothDevice.ACTION_FOUND){
        if(BluetoothDevice.ACTION_FOUND.equals(action) && mBTAdapter.isDiscovering()){
            Toast.makeText(getApplicationContext(), "Find the device", Toast.LENGTH_SHORT).show();

            BluetoothDevice device = intent.getParcelableExtra(BluetoothDevice.EXTRA_DEVICE);

            if(device.getBondState() != BluetoothDevice.BOND_BONDED){

                addDeviceToList(device.getName(), device.getAddress());
            }
        }
    }
};
```

Some reason(we don’t know yet), mReceiver is not invoked while the application is running.

UML Diagram for our useful application