Ćwiczenia 17 – Android studio – GPS, Open Street Maps

Na koniec zajęć prześlij pliki źródłowe (.xml, .java)+ obrazek do zasobu w teams.

1. Utwórz projekt o nazwie GpsMaps na podstawie Empty Activity, dobierz odpowiednie API (min. 26).
2. Otworzyć dokumentację:

https://developer.android.com/training/location/permissions

https://developer.android.com/reference/kotlin/android/location/LocationManager?hl=en

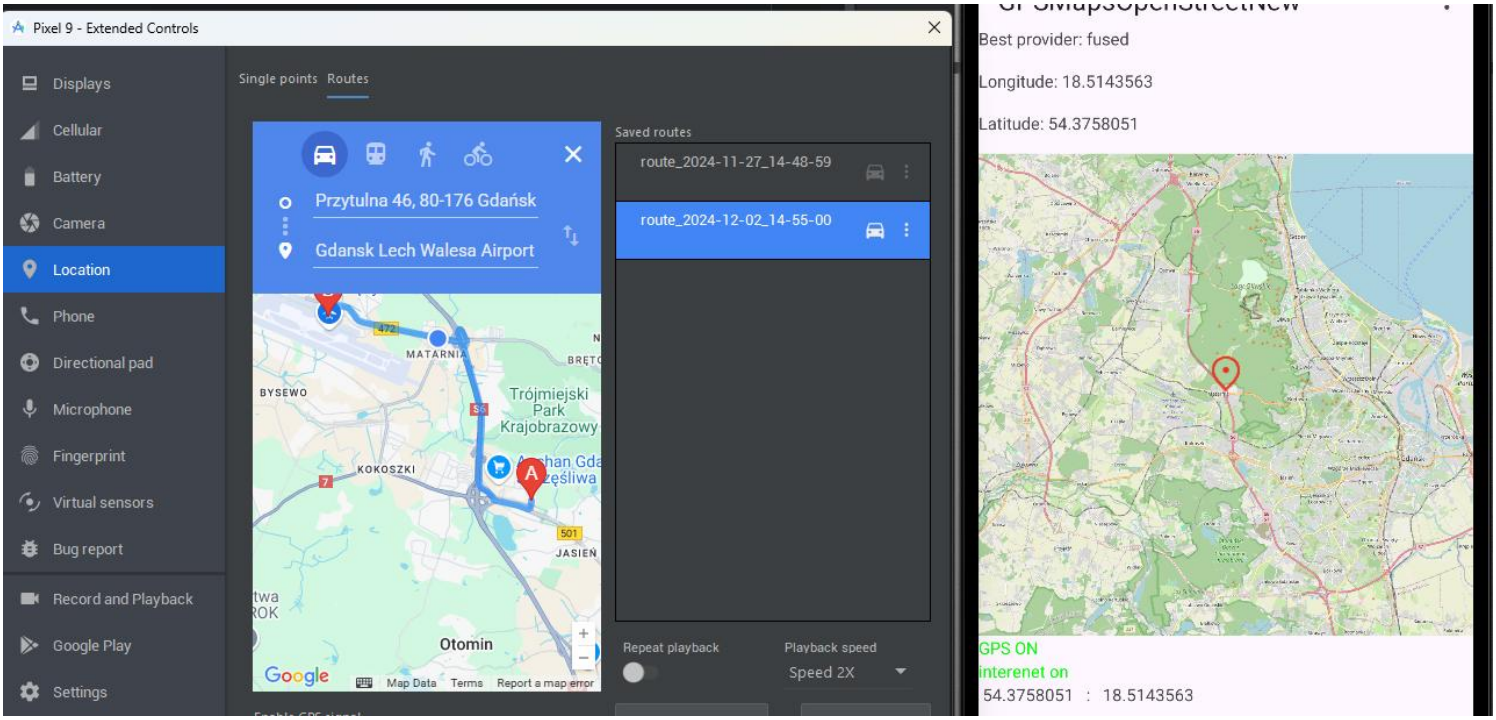
https://developer.android.com/training/location/request-updates

https://developer.android.com/reference/android/location/Location

3. Dodaj zależności (aktualna wersja na https://github.com/osmdroid/osmdroid):

```
dependencies {
    implementation ("org.osmdroid:osmdroid-android:6.1.20")
```

4. Docelowo chcemy uzyskać coś na kształt(marker ustawić na czerwony!!!):



5. Stwórz podstawowe struktury np.:

dimens.xml | MainActivity.java | activity_main.x

```xml
<?xml version="1.0" encoding="utf-8"?>
<resources>
    <dimen name="hightextview">35dp</dimen>
</resources>
```

6. Stwórz layout dla aplikacji jak poniżej lub podobny:

```xml
<?xml version="1.0" encoding="utf-8"?>
<androidx.swiperefreshlayout.widget.SwipeRefreshLayout
    xmlns:android="http://schemas.android.com/apk/res/android"
    xmlns:app="http://schemas.android.com/apk/res-auto"
    xmlns:tools="http://schemas.android.com/tools"
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    android:id="@+id/refreshLayout"
    tools:context=".MainActivity">
<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="match_parent"
    android:orientation="vertical"
    >


    <TextView
        android:id="@+id/bestprovider"
        android:layout_width="match_parent"
        android:layout_height="35dp"
        android:text="TextView" />
```

dimens.xml | MainActivity.java | activity_main.xml

```
10      <TextView
11          android:id="@+id/bestprovider"
12          android:layout_width="match_parent"
13          android:layout_height="35dp"
14          android:text="TextView" />
15
16      <TextView
17          android:id="@+id/longitude"
18          android:layout_width="match_parent"
19          android:layout_height="35dp"
20          android:text="TextView" />
21
22      <TextView
23          android:id="@+id/latitude"
24          android:layout_width="match_parent"
25          android:layout_height="35dp"
26          android:text="TextView" />
27
28      <org.osmdroid.views.MapView
29          android:layout_width="match_parent"
30          android:layout_height="400dp"
31          android:id="@+id/osm">
32      </org.osmdroid.views.MapView>
33
34      <ScrollView
35          android:layout_width="match_parent"
36          android:layout_height="match_parent">
37      <TextView
38          android:id="@+id/archival_data"
39          android:layout_width="match_parent"
40          android:layout_height="wrap_content"
41          android:text="TextView" />
42  </ScrollView>
43  </LinearLayout>
```

7. Dodaj listener dla layoutu SwipeRefreshLayout:

```
SwipeRefreshLayout swipeRefreshLayout;
private TextView text_network;
private TextView text_gps;
@Override
protected void onCreate(Bundle savedInstanceState) {
    super.onCreate(savedInstanceState);
    setContentView(R.layout.activity_main);

    swipeRefreshLayout = findViewById(R.id.refreshLayout);
    text_network = findViewById(R.id.text_network);
    text_gps = findViewById(R.id.text_gps);
    swipeRefreshLayout.setOnRefreshListener(() -> {
        swipeRefreshLayout.setRefreshing(false);
        boolean connection=isNetworkAvailable();
        if(connection){
            text_network.setText("internet connect");
            text_network.setTextColor(Color.GREEN);

        }
        else{
            text_network.setText("no internet");
            text_network.setTextColor(Color.RED);

        }

    });
    swipeRefreshLayout.setColorSchemeColors(Color.YELLOW);
```

8. Zadeklaruj w MainActivity.java:

```
private static String TAG = "2022";
private static final int MY_PERMISSION_ACCESS_FINE_LOCATION = 1;
private static final int MY_PERMISSION_ACCESS_COARSE_LOCATION = 2;
private TextView bestprovider;
private TextView longitude;
private TextView latitude;
private TextView archivaldata;
private LocationManager locationManager;
private Criteria criteria;
private Location location;
private String bp;
private int amount;
-------------- Part 2 --------------------------
private MapView osm;
private MapController mapController;
```

9. W onCreate() dodaj:

```
bestprovider = findViewById(R.id.bestprovider);
longitute = findViewById(R.id.longitude);
latitude = findViewById(R.id.latitude);
archivaldata = findViewById(R.id.archival_data);

criteria = new Criteria();
locationManager = (LocationManager) getSystemService(LOCATION_SERVICE);
bp = locationManager.getBestProvider(criteria, enabledOnly: true);
```

10. Dodaj (ważne: zwróć uwagę na kolejne dwa punkty!!!):

```
location = locationManager.getLastKnownLocation(bp);
```

11. W AndroidManifest.xml sprawdź czy masz uprawnienia:

```
<uses-permission android:name="android.permission.ACCESS_COARSE_LOCATION" />
<uses-permission android:name="android.permission.ACCESS_FINE_LOCATION" />
```

12. Add permission check (if z checkSelfPermission doda się automatycznie po wybraniu tej opcji)
    W trakcie realizacji ćwiczeń należy dodać stosone inne, wymagane uprawnienia!!!

```
64          bp = locationManager.getBestProvider(criteria,  enabledOnly: true);
65
66          if (ActivityCompat.checkSelfPermission( context: this,
67                  Manifest.permission.ACCESS_FINE_LOCATION) != PackageManager.PERMISSION_GRANTED
68                  && ActivityCompat.checkSelfPermission( context: this,
69                  Manifest.permission.ACCESS_COARSE_LOCATION) != PackageManager.PERMISSION_GRANTED) {
70              requestPermissions(new String[] {Manifest.permission.ACCESS_FINE_LOCATION}, MY_FINE);
71              requestPermissions(new String[] {Manifest.permission.ACCESS_COARSE_LOCATION}, MY_COARSE);
72
73              return;
74          }
75
76          location = locationManager.getLastKnownLocation(bp);
77
78          locationManager.requestLocationUpdates(
79                  provider: ""+bp,
80                  minTimeMs: 500,
81                  minDistanceM: 0.5f,
82                  listener: this
83          );
```

13. Sprawdź czy zaimplementowałeś/aś metodę onRequestPermissionResult, np.:

```
@Override
public void onRequestPermissionsResult(int requestCode, @NonNull String[] permissions, @NonNull int[] grantResults) {
    super.onRequestPermissionsResult(requestCode, permissions, grantResults);
    switch (requestCode) {
        case MY_PERMISSION_ACCESS_FINE_LOCATION: {
            if (permissions[0].equalsIgnoreCase(Manifest.permission.ACCESS_FINE_LOCATION)
                    && grantResults[0] == PackageManager.PERMISSION_GRANTED) {

                Log.d( tag: "GPSA",  msg: " uprawnień" + requestCode + " " + permissions[0] + grantResults[0]);
                // Permission was granted
                Log.d(TAG,  msg: "Permissions ACCESS_FINE_LOCATION was granted");
                Toast.makeText( context: this,  text: "Permissions ACCESS_FINE_LOCATION was granted", Toast.LENGTH_SHORT).show();
                this.recreate();
            } else {
            // Permission denied
            Log.d(TAG,  msg: "Permission ACCESS_FINE_LOCATION denied");
            Toast.makeText( context: this,  text: "Permission ACCESS_FINE_LOCATION denied", Toast.LENGTH_SHORT).show();
        }
        break;
        }
        case MY_PERMISSION_ACCESS_COARSE_LOCATION: {
            if (permissions[0].equalsIgnoreCase(Manifest.permission.ACCESS_COARSE_LOCATION)
                    && grantResults[0] == PackageManager.PERMISSION_GRANTED) {

                Log.d( tag: "GPSA",  msg: " uprawnienia" + requestCode + " " + permissions[0] + grantResults[0]);
                // Permission was granted
                Log.d(TAG,  msg: "Permissions ACCESS_COARSE_LOCATION was granted");
                Toast.makeText( context: this,  text: "Permissions ACCESS_COARSE_LOCATION was granted", Toast.LENGTH_SHORT).show();
                this.recreate();
            }else {
                // Permission denied
                Log.d(TAG,  msg: "Permission ACCESS_COARSE_LOCATION denied");
                Toast.makeText( context: this,  text: "Permission ACCESS_COARSE_LOCATION denied", Toast.LENGTH_SHORT).show();
            }
        break;
        }
        default:  Log.d(TAG,  msg: "Another permissions");
    }
```

14. Sprawdź czy wypisujesz odczyty:

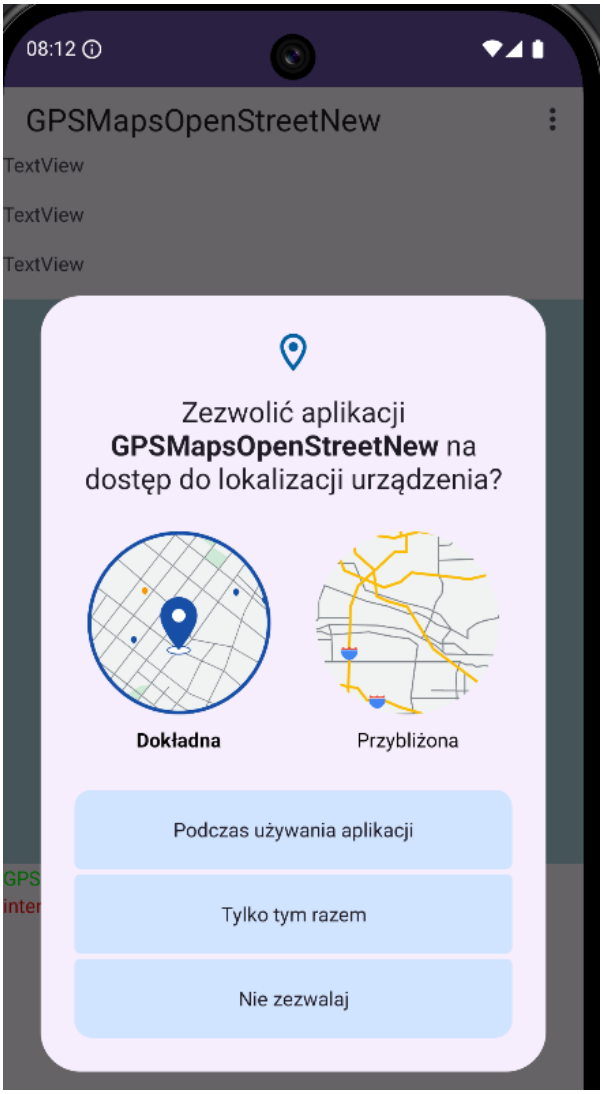
```
locationManager.requestLocationUpdates(
        provider: ""+bp,
        minTimeMs: 500,
        minDistanceM: 0.5f,
        listener: this
);

bestprovider.setText("Best provider:" + bp);
longitute.setText("Longitute:" + location.getLongitude());
latitude.setText("Latitude: " + location.getLatitude());
archivaldata.setText("Measurement readings:\n\n");
Log.d( tag: "GPSA",  msg: bp + " " + location.getLongitude() + " " + location.getLatitude());
```

15. Zaimplementuj LocationListener z potrzebnymi metodami:

```
public class MainActivity extends AppCompatActivity implements LocationListener {
    private static String TAG = "2022";
    private static final int MY_PERMISSION_ACCESS_FINE_LOCATION = 1;
    private static final int MY_PERMISSION_ACCESS_COARSE_LOCATION = 2;
    private TextView bestprovider;
```

```
@SuppressLint("SetTextI18n")
@Override
public void onLocationChanged(@NonNull Location location) {
    bp = locationManager.getBestProvider(criteria,  enabledOnly: true);
    if (ActivityCompat.checkSelfPermission( context: this, Manifest.permission.ACCESS_FINE_LOCATION) != PackageManager.
    location = locationManager.getLastKnownLocation(bp);
    bestprovider.setText("Best provider:" + bp);
    longitute.setText("Longitute:" + location.getLongitude());
    latitude.setText("Latitude: " + location.getLatitude());
    archivaldata.setText(archivaldata.getText()+" "+location.getLongitude()+"    :    "+location.getLatitude()+"\n");
    amount+=1;
    Log.d( tag: "GPSA",  msg: amount+" pomiar: "+bp + " " + location.getLongitude() + " " + location.getLatitude());
    //Toast.makeText(getApplicationContext(),amount+" pomiar: "+bp + " " + location.getLongitude() + " " + location.ge
}
```

16. Przetestuj aplikację, uruchom na urządzeniu. Przemieść się .



17. Część druga – dodanie mapy

```
49      private MapView osm;
50      private MapController mapController;
```

18. Parametry:

```
osm = findViewById(R.id.osm);
Context context = getApplicationContext();
Configuration.getInstance().load(context, PreferenceManager.getDefaultSharedPreferences(context));

osm.setTileSource(TileSourceFactory.MAPNIK);
osm.setBuiltInZoomControls(true);
osm.setMultiTouchControls(true);

mapController = (MapController) osm.getController();
mapController.setZoom(12);
```

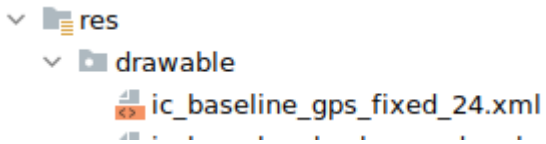
19. Dodanie punktu:

```
GeoPoint geoPoint = new GeoPoint(location.getLatitude(),location.getLongitude());

mapController.setCenter(geoPoint);
// osm.invalidate();
mapController.animateTo(geoPoint);
```

20. Dodanie markera i setMapListenera (nie obligatoryjne) :

```
addMarkerToMap // (geoPoint);

osm.setMapListener(new MapListener() {
    @Override
    public boolean onScroll(ScrollEvent event) {
        Log.i( tag: "GPSA",  msg: "onScroll()");
        return false;
    }

    @Override
    public boolean onZoom(ZoomEvent event) {
        Log.i( tag: "GPSA",  msg: "onZoom()");
        return false;
    }
});
```

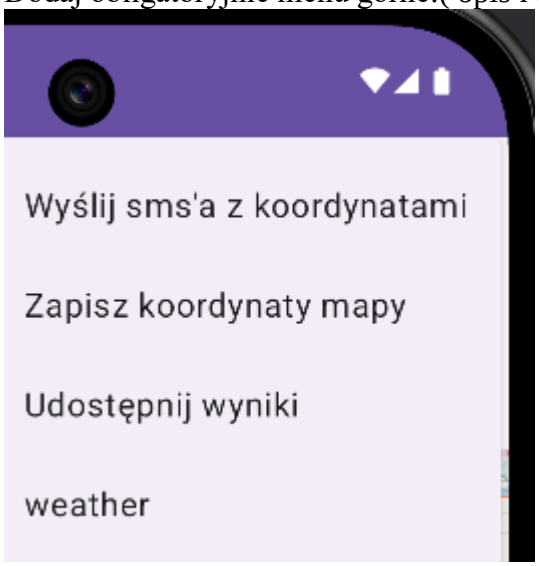
21. Dodaj iconę markera, najlepiej plik.png itp:



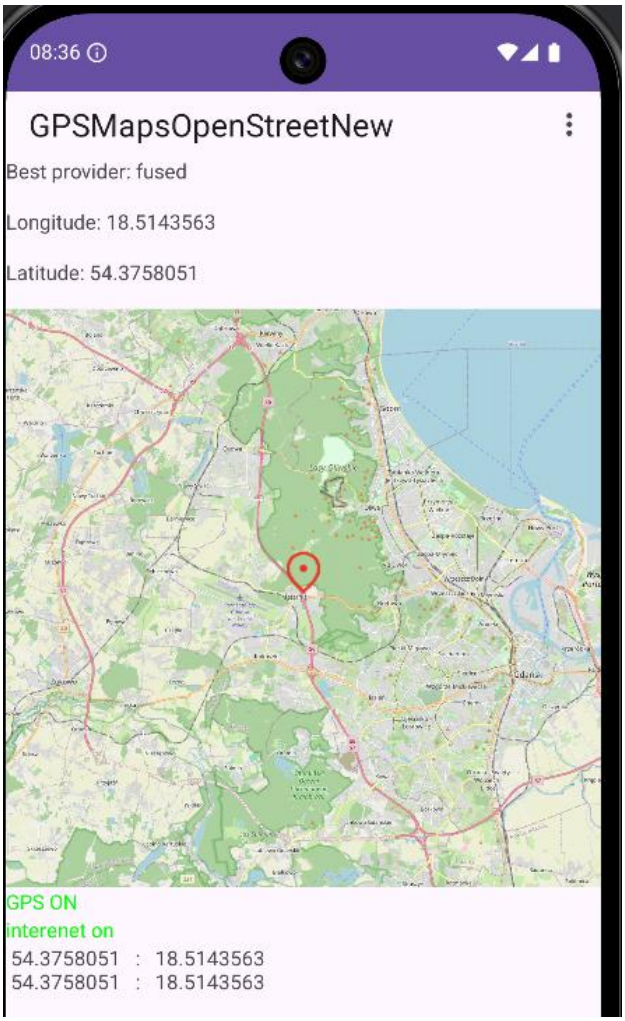
22. Marker:

```
public void addMarkerToMap (GeoPoint center){
    Marker marker = new Marker(osm);
    marker.setPosition(center);
    marker.setAnchor(Marker.ANCHOR_CENTER, Marker.ANCHOR_BOTTOM);
    marker.setIcon(getResources().getDrawable(R.drawable.ic_baseline_gps_fixed_24));
    osm.getOverlays().clear();
    osm.getOverlays().add(marker);
    osm.invalidate();
    marker.setTitle("My position");
}
```

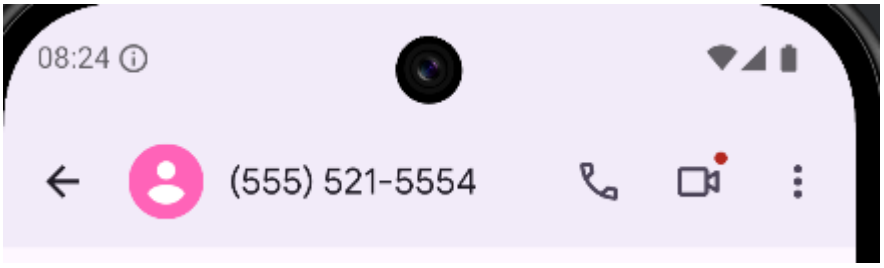
23. Dodaj obligatoryjnie menu górne:(opis i objaśnienie w punkcie 25)

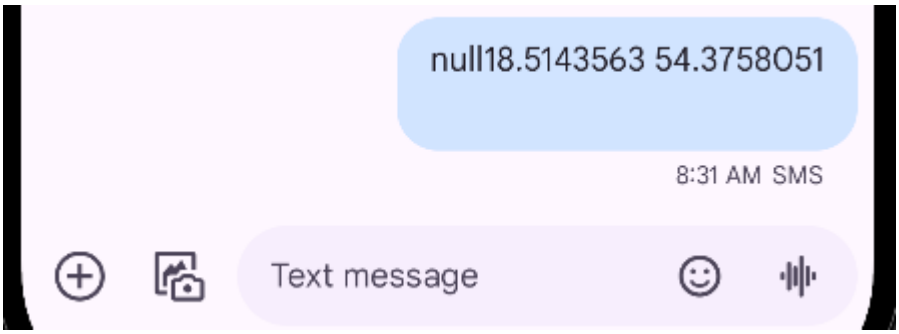


24. Dodaj metodę sprawdzającą dostęp do GPS i internetu (colory czerwony i zielony na TextView)

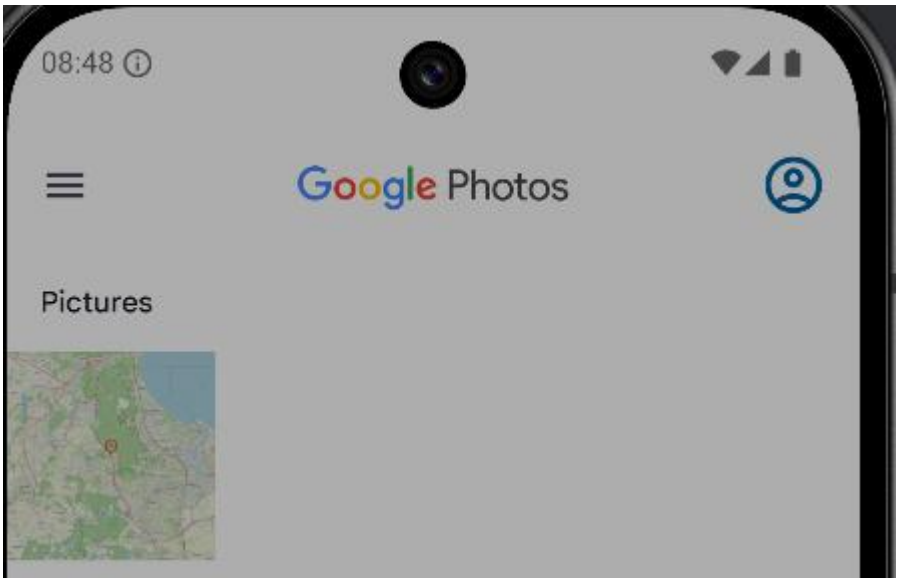


25. Wykonaj zadania
    a) wysłanie sms-em koordynat

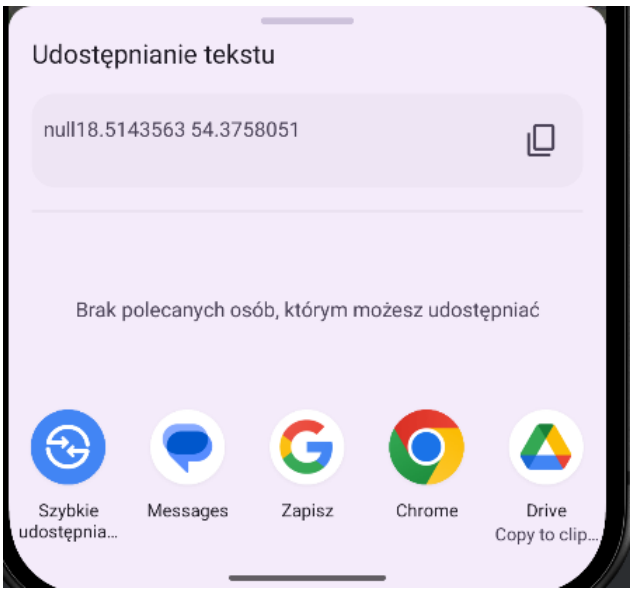




    b) zapisanie zdjęć mapy na karcie



    c) udostępnienie wyników



26. Dodatkowe zadanie: wczytaj dane pogodowe dla obecnej lokalizacji:

```
public class HttpRequest {
    1 usage
    public static String excuteGet(String targetURL) {...}
}
```

```
public class MyWeather extends AppCompatActivity {
    // String CITY = "London,uk";
     1 usage
     String CITY = "Gdansk,pl";
```

```
protected String doInBackground(String... args) {
    String response = HttpRequest.excuteGet(
            targetURL: "https://api.openweathermap.org/data/2.5/weather?q="
                    + CITY + "&units=metric&appid="
                    + MY_API);
    return response;
}
```


08:34
Gdańsk, PL
Updated at: 19/03/2025 08:30 AM
CLEAR SKY
6.13°C
Min Temp: 5.61°C
Max Temp: 7.58°C
Sunrise
04:50 AM
Sunset
04:56 PM
Wind
8.75
Pressure
1027
Humidity
66
AG
MyName

27. KONIEC.