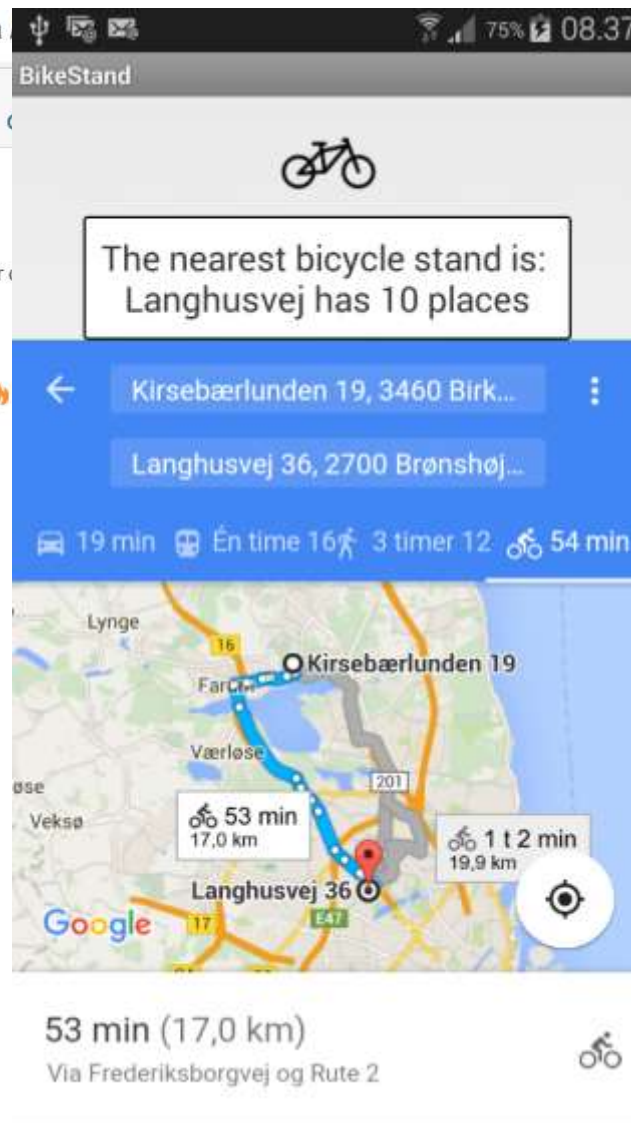
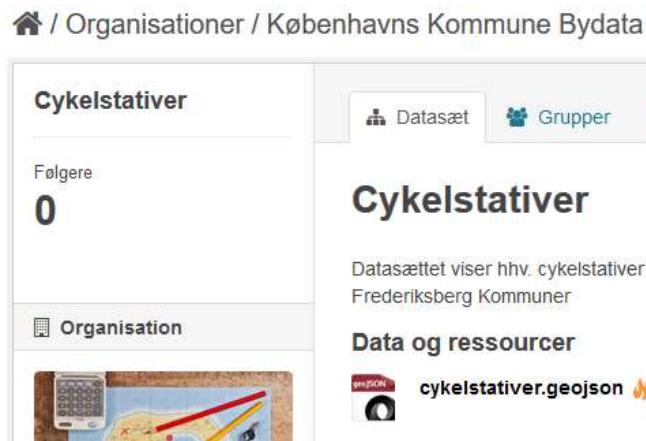




- Location aware apps
 - Finding the nearest neighbour
 - Google play services (text book ch. 31)
 - Google map service (text book ch. 32)
- Privacy
- Feedback second mandatory assignment
- Examination
- Exercises (work plan 13)

BikeStand app



Finding the closest
bikestand
(nearest neighbour)?

Finding the closest BikeStand



```
private BikeStand findClosest(BikeStand[] b,  
                               BikeStand target ) {  
  
    int i= b.length -1;  
    BikeStand closest= b[i];  
    double min= distance(closest, target);  
    while (i>0) {  
        i= i-1;  
        temp = distance(b[i], target);  
        if (temp < min) {  
            closest = b[i];  
            min = temp;  
        }  
    }  
    return closest;  
}  
  
private double distance (BikeStand p1, BikeStand p2) {  
    return p1.getLocation().distanceTo(p2.getLocation());  
}
```

Hans' algorithm



```
double radius = 300;
double distance = 10000; // some big number
int index = 0;
boolean resultin = false;
while (!resultin) {
    stands = standDB.getStandDB(myLocation, radius);

    for (int i = 0; i < stands.size(); i++) {
        temp= stands.get(i);
        if (myLocation.distanceTo(temp) < distance) {
            distance = myLocation.distanceTo(temp);
            index= i;
            resultin= true;
        }
    }
    radius = radius *2;
}
```

Hans' algorithm



```
double radius = 300;
double distance = 10000; // some big number
int index = 0;
boolean resultin = false;
while (!resultin) {
    stands = standDB.getStandDB(myLocation, radius);

    for (int i = 0; i < stands.size(); i++) {
        temp= stands.get(i);
        if (myLocation.distanceTo(temp) < distance) {
            distance = myLocation.distanceTo(temp);
            index= i;
            resultin= true;
        }
    }
    radius = radius *2;
}
```



MySQL vers 5.7

values of type GEOMETRY e.g. a point or polygon

ST_Within(g1,g2): Returns 1 or 0 to indicate whether g1 is spatially within g2

SpatialLite

<https://www.gaia-gis.it/fossil/libspatialite/wiki?name=splite-android>

R*Tree – see paper in learnIT

<https://www.sqlite.org/rtree.html>

Android Open Source vs. Google Services



- Android open source – Google (Play) Services is not
- Core Android components like the phone app and various libraries are contained in the *Android Open Source Project (AOSP)*
- Key components in most modern Android devices like Google Maps, Gmail and Google Services are proprietary Google software that requires the device manufacturer to obtain a license
- Google Services are auto-updated, these features do not depend on a manufacturer to update Android to a new version
- Concerns about Google Services increases your dependency on Google
- Geocoding (using Google repositories)

Geocoding

Geocoding is the process of converting addresses (like “Rued Langaards Vej 7, 2300 Kbh S”) into geographic coordinates (latitude, longitude)



```
List<Address> addresses=
    geocoder.getFromLocationName( where, max);
for (Address a : addresses) {
    ...
}
```

Reverse geocoding is the process of converting geographic coordinates into a human-readable address. e.g.:

```
List<Address> addresses= geocoder.getFromLocation(lat, long,
    max));
```

<http://developer.android.com/reference/android/location/Geocoder.html>

BikeStand: Google Play LocationServices



Library: com.google.android.gms:play-services:8.4.0

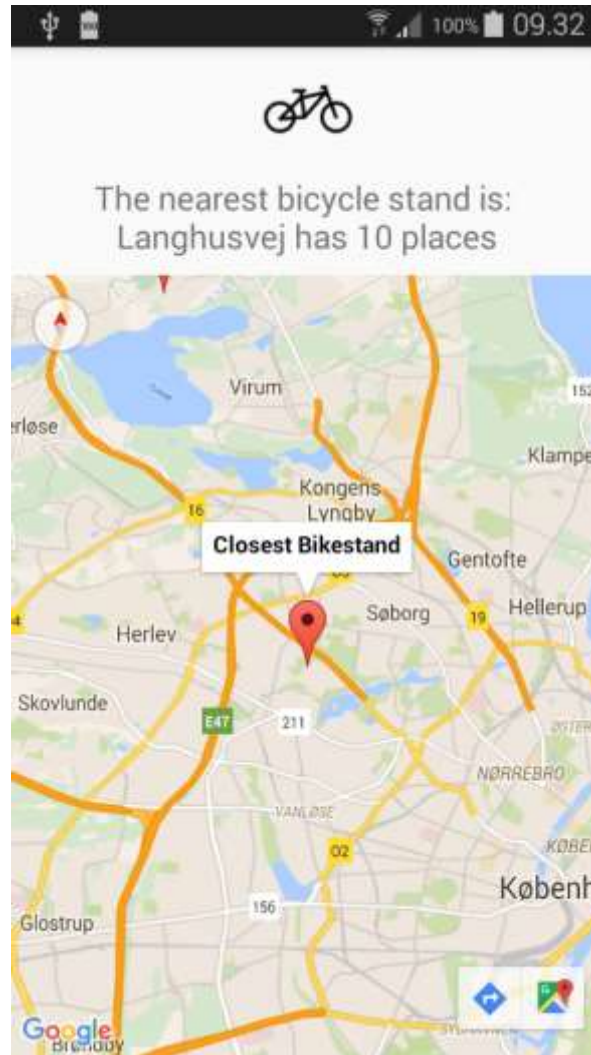
May 2016

```
public class BikeActivity extends Activity implements
ConnectionCallbacks {

    private GoogleApiClient mClient;
    private Location lastPos;

    public void onCreate(Bundle savedInstanceState) {
        ...
        buildGoogleApiClient();    ...    }

    @Override
    public void onStart() { mClient.connect(); super.onStart(); }
    @Override
    public void onStop() { mClient.disconnect(); super.onStop(); }
    @Override
    public void onConnected(Bundle connectionHint) {
        lastPos= LocationServices.FusedLocationApi.getLastLocation(mClient);
    }
}
```



The manifest



```
<uses-permission android:name="android.permission.INTERNET"/>
<uses-permission android:name="android.permission.ACCESS_FINE_LOCATION"/>
<uses-permission android:name="android.permission.ACCESS_NETWORK_STATE"/>
<uses-permission android:name="android.permission.WRITE_EXTERNAL_STORAGE"/>
```

```
<application...
```

```
  <meta-data
```

```
    android:name="com.google.android.maps.v2.API_KEY"
```

```
    android:value="AIzaSyBjwVSR7 xxxx OVSCSzDLMUI"/>
```

```
  <activity android:name=".BikeActivity">      ...      </activity>
</application>
```



<https://developers.google.com/maps/documentation/android-api/start>

and text book chapter 23

Setting up the layout



Use a *MapFragment* or *SupportMapFragment*
(depending on whether you use the support library or
not) in your layout

```
<fragment xmlns:android="http://schemas.android.com/apk/res/android"  
    android:id="@+id/map"  
    android:tag="map"  
    android:name="com.google.android.gms.maps.SupportMapFragment"  
    android:layout_width="match_parent"  
    android:layout_height="match_parent" />
```

Accessing the map in code



```
public class BikeActivity extends FragmentActivity implements  
OnMapReadyCallback {
```

```
    MapFragment mapFragment = (MapFragment)  
        getSupportFragmentManager().findFragmentById(R.id.map);  
    private GoogleMap mMap;
```

```
    mapFragment.getMapAsync(this);
```

```
    @Override  
    public void onMapReady(GoogleMap map) {  
        mMap = map;  
    }
```

```
    LatLng t = new LatLng(closest.getLocation().getLatitude(),  
                           closest.getLocation().getLongitude());
```

```
    mMap.addMarker(new MarkerOptions()  
        .position(t)  
        .title("Closest bikestand"));
```

Class GoogleMap



```
setMapType (GoogleMap.MAP_TYPE_NORMAL)  
setMapType (GoogleMap.MAP_TYPE_HYBRID)  
setMapType (GoogleMap.MAP_TYPE_SATELLITE)  
setMapType (GoogleMap.MAP_TYPE_TERRAIN)
```

```
setTrafficEnabled(boolean enabled)
```

```
addCircle(CircleOptions options)
```

```
addPolygon(PolygonOptions options)
```

<https://developers.google.com/maps/documentation/android-api/>

Map: Camera



To change:

- the map center,
- zoom level, and
- viewing angle

Create a new *CameraPosition* with the desired center, zoom and tilt

```
CameraPosition position= CameraPosition
    .builder()
    .target(latLng)
    .zoom(16)
    .tilt(45)
    .build();
```

Create a CameraUpdate object

```
CameraUpdate cameraUpdate= CameraUpdateFactory.newCameraPosition(position);
map.animateCamera(cameraUpdate);
```

Example of use of options



```
private void showOnMap(BikeStand closest) {
    LatLng t= new LatLng(closest.getLocation().getLatitude(),
                        closest.getLocation().getLongitude());
    mMap.addMarker(new MarkerOptions().position(t)
                    .title("Closest bikestand"));

    CircleOptions circleOptions= new CircleOptions()
        .center(t)
        .radius(100); // In meters
    mMap.addCircle(circleOptions);

    mMap.setMapType(GoogleMap.MAP_TYPE_SATELLITE);

    mMap.setTrafficEnabled(true);

    CameraPosition cameraPosition= new CameraPosition.Builder()
        .target(t)          // Sets the center of the map to Closest Bikestand
        .zoom(15)           // Sets the zoom
        .tilt(30)           // Sets the tilt of the camera to 30 degrees
        .build();           // Creates a CameraPosition from the builder
    mMap.animateCamera(CameraUpdateFactory.newCameraPosition(cameraPosition));

    mMap.addMarker(new MarkerOptions().position(new LatLng(lastPos.getLatitude(),
                                                            lastPos.getLongitude()))
        .icon(BitmapDescriptorFactory.defaultMarker(BitmapDescriptorFactory.HUE_GREEN))
        .title("You are here"));
}
```


Copenhagen airport

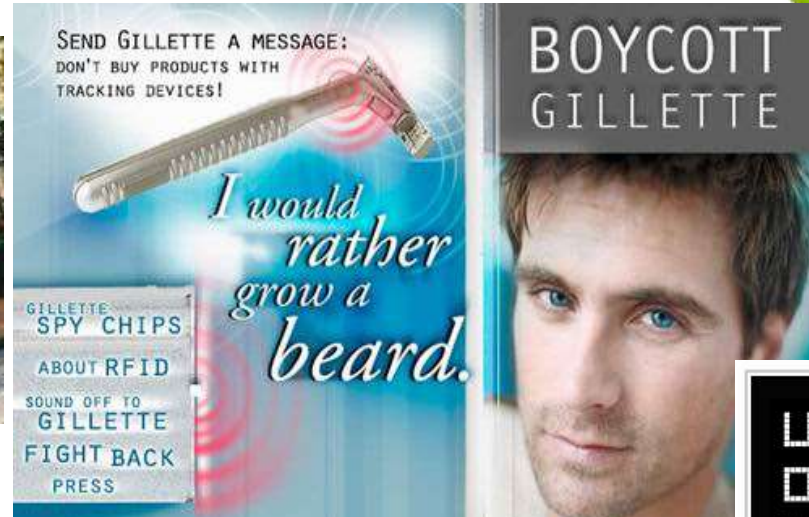


Tracking

A screenshot of the Blip Systems website. The header is dark blue with the 'BLIP systems' logo on the left and navigation links 'HOME', 'PRODUCTS', 'LATEST NEWS', and 'REFERENCES' on the right. The 'PRODUCTS' link is highlighted. Below the header, there's a large banner image of a crowd of people with the text 'Products' and 'Data from multiple sources, across multiple secure data warehouse.' To the right of the banner, a dropdown menu lists various products: BlipTrack Indoor Sensor, BlipTrack Outdoor Sensor, Radar, Irisys Gazelle, BlipTrack Travel Time Measurement, BlipTrack Queue Measurement, BlipTrack Queue Prediction, BlipTrack Barcode Measurement, BlipTrack Passenger Appearance Forecasting (Live), BlipTrack Queue Forecasting (Live), and BlipTrack Capacity Optimizer (Live).

<http://blipsystems.com/>

Tracking and privacy



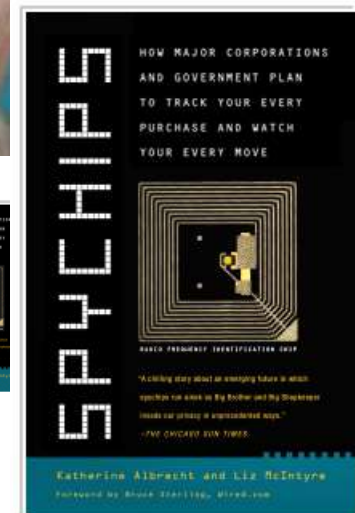
RFID
NINETEEN
EIGHTY-FOUR

Spychips: How Major Corporations and Government Plan to Track Your Every Purchase and Watch Your Every Move
by Katherine Albrecht and Liz McIntyre

>> [click here](#) to order the new paperback...
>> [click here](#) to learn more about the other books in the "Spychips" series...

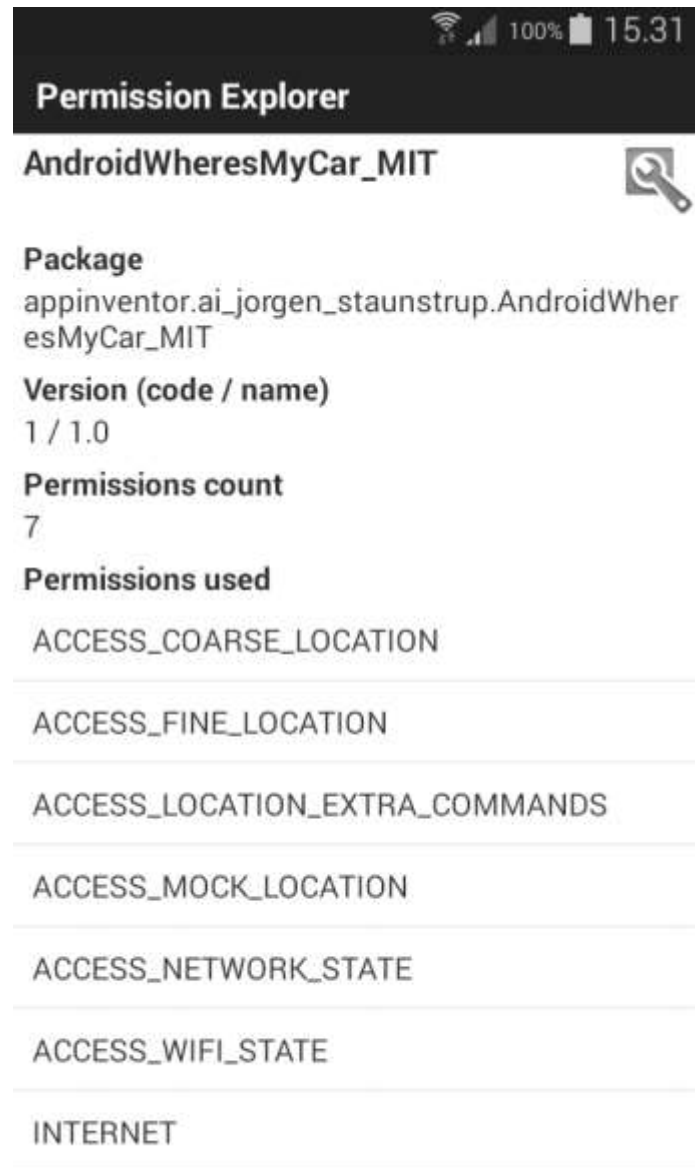


SPYCHIPS⁽¹⁻¹⁾.COM



Android permissions

- Contacts
- Camera
- Networking
-



Permission Explorer

AndroidWheresMyCar_MIT

Package
appinventor.ai_jorgen_staunstrup.AndroidWheresMyCar_MIT

Version (code / name)
1 / 1.0

Permissions count
7

Permissions used

- ACCESS_COARSE_LOCATION
- ACCESS_FINE_LOCATION
- ACCESS_LOCATION_EXTRA_COMMANDS
- ACCESS_MOCK_LOCATION
- ACCESS_NETWORK_STATE
- ACCESS_WIFI_STATE
- INTERNET





The right to be let alone *Louis Brandeis, 1890*

”The poorest man may in his cottage bid defiance to all the force of the Crown. It may be frail; its roof may shake; the wind may blow through it; the storms may enter, the rain may enter,—but the King of England cannot enter; all his forces dare not cross the threshold of the ruined tenement!”
Willian Pitt, Earl of Chatham, Speech on the Excise Bill, 1763

No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence
Human rights declaration, 1948

Privacy – Data Protection Regulation

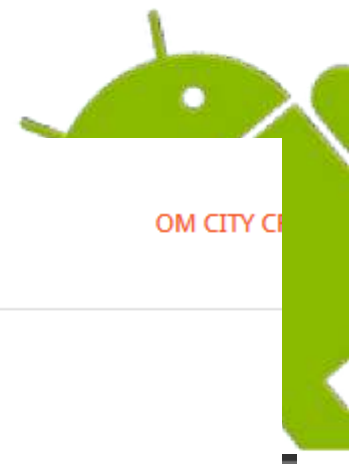


<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=URISERV%3AI14012>

Data processing is **only lawful** if:

- the data subject has **unambiguously given his consent**; or
- processing is **necessary for the performance of a contract to which the data subject is party**; or
- processing is **necessary for compliance with a legal obligation** to which the controller is subject; or
- processing is **necessary to protect the vital interests of the data subject**; or
- processing is **necessary for the performance of a task carried out in the public interest** or in the exercise of official authority vested in the controller or in a third party; or
- processing is **necessary for the purposes of the legitimate interest** pursued by the controller or by the third party, except where such interests are overridden by the interests for fundamental rights and freedoms of the data subject which require protection.

<https://ico.org.uk/media/for-organisations/documents/1596/privacy-in-mobile-apps-dp-guidance.pdf>



CITY CREATORS *A COWI blog about Urban Development*

City Sense™ blåstempler af Erhvervsstyrelsen!

27. marts 2015 by [cowi_byudvikling](#) | [Skriv en kommentar](#)

Den seneste tid har der i medierne været stor bevågenhed omkring digital overvågning og persontracking. I den forbindelse har forskellige medier bragt en række artikler, der hævder, at indsamling af MAC-adresser skulle være ulovligt ifølge EU's "cookiedirektiv".

COWI City Sense™ er netop baseret på indsamling af MAC-adresser. Derfor har vi sammen med vores underleverandør, Blip systems A/S, haft travlt med at afklare, hvorvidt systemet er omfattet af "cookiebekendtgørelsen".

Persondatasikkerhed i City Sense™ ligger os meget på sinde i COWI. Data må ganske enkelt ikke kunne bruges til at identificere, finde eller følge enkeltpersoner. Det vil vi ikke bidrage til. Og det kan vi heller ikke.

COWI City Sense™ indsamler ganske vist data fra mobiltelefoner og andre Bluetooth- og Wi-Fi-enheder, men de lagres ikke i en identificérbar form. Et avanceret krypteringssystem sørger for, at de indsamlede MAC-adresser anonymiseres, så det ikke kan lade sig gøre at finde tilbage til de enheder, adresserne stammer fra. Hertil kommer, at der hyppigt skiftes krypteringsnøgle, så en given MAC-adresse tildeles en ny værdi. Dermed er det også umuligt at genkende enheden over tid.

Second Mandatory Assignment



resubmission before **May 19 24:00** (May 20 (00:00))



May 6: Mandatory reading / Exam questions in learnIT

May 11 Lecture: questions/comments
extra session (Danish oral exams)

June 15, 17:00: Extra "class" ("spørgetime") in Aud 2

June 22 – June 28: Examination – schedule in learnIT