

TPER Bus Finder

An Android app for Emilia-Romagna public transport users (on roads)

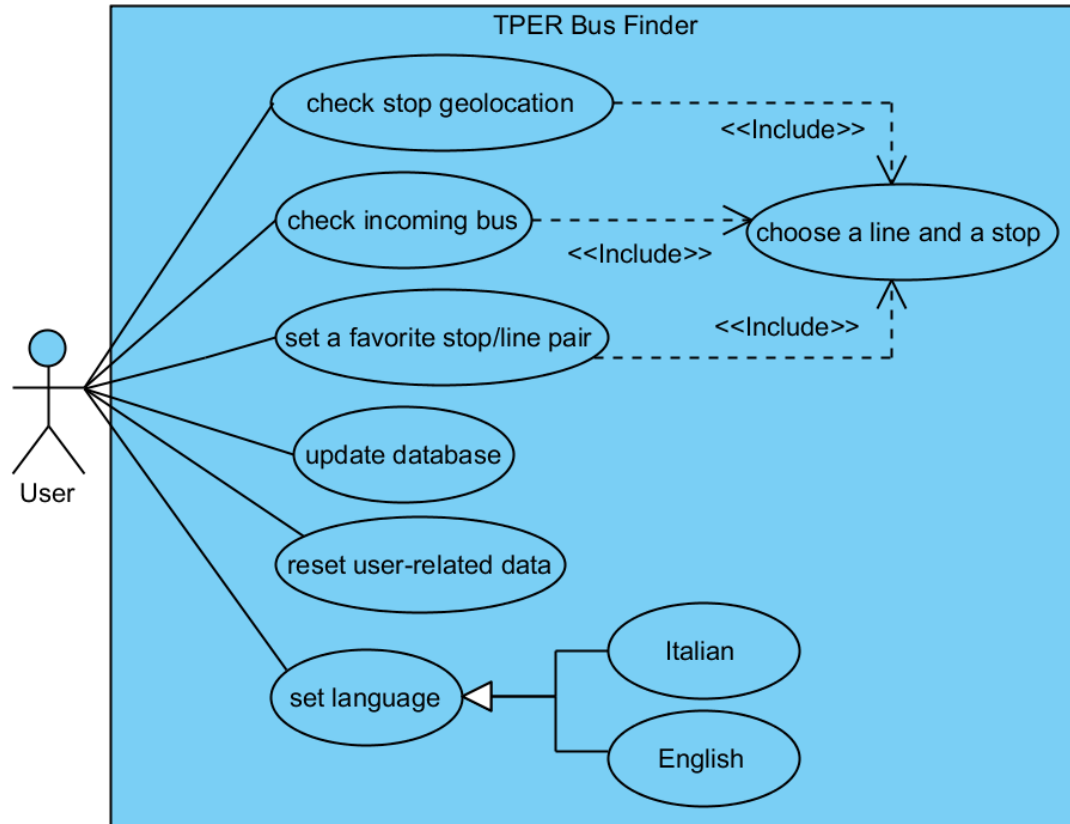
Outline

- Objectives
- Features
- Requirements
- Implementation
- Critical aspects
- Use cases
- TODO list

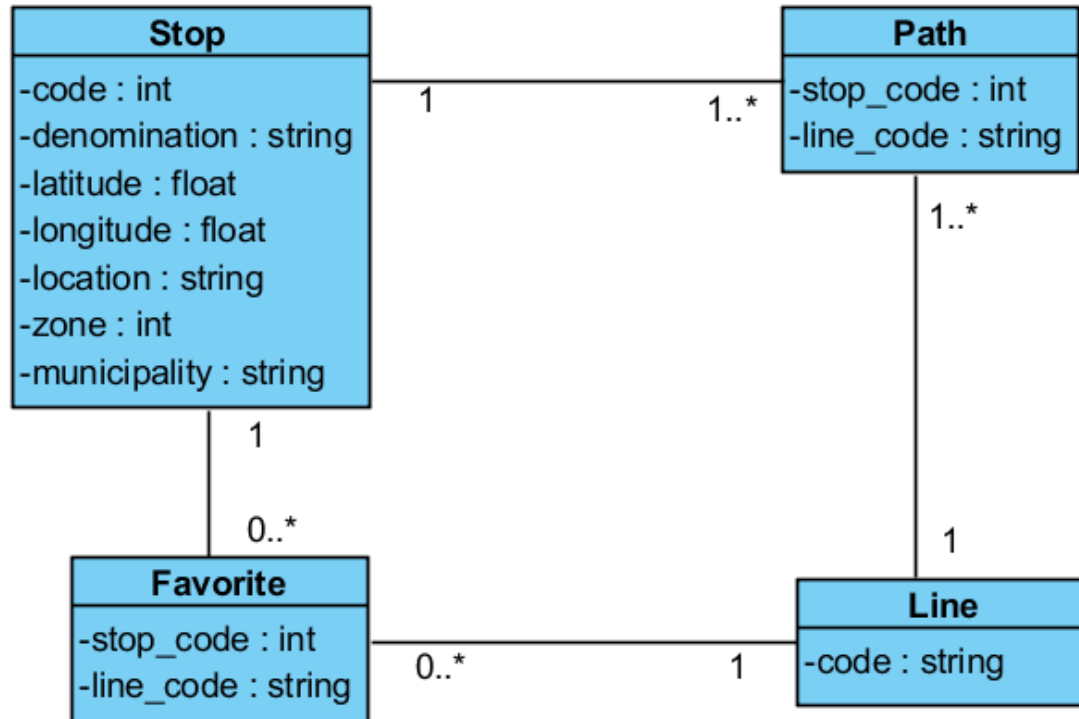
Objectives

- Exploit the **Open Data** and **web services** offered by TPER concerning:
 - Bus stops
 - Bus lines
 - Bus paths
- Enable the user to find and check the geo-location of bus stops and the arrival time of bus lines.

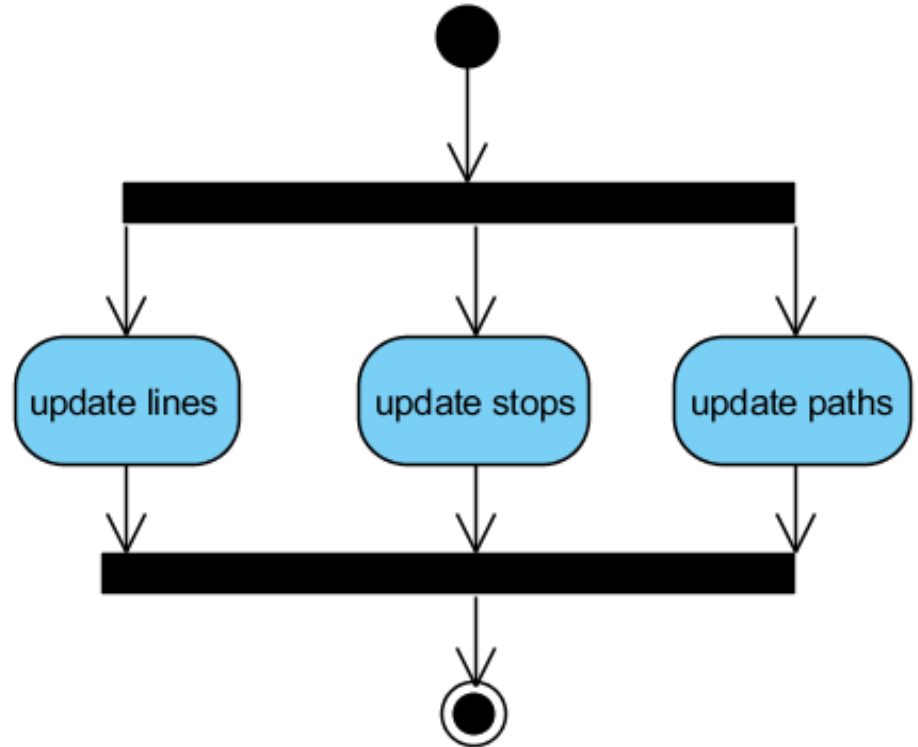
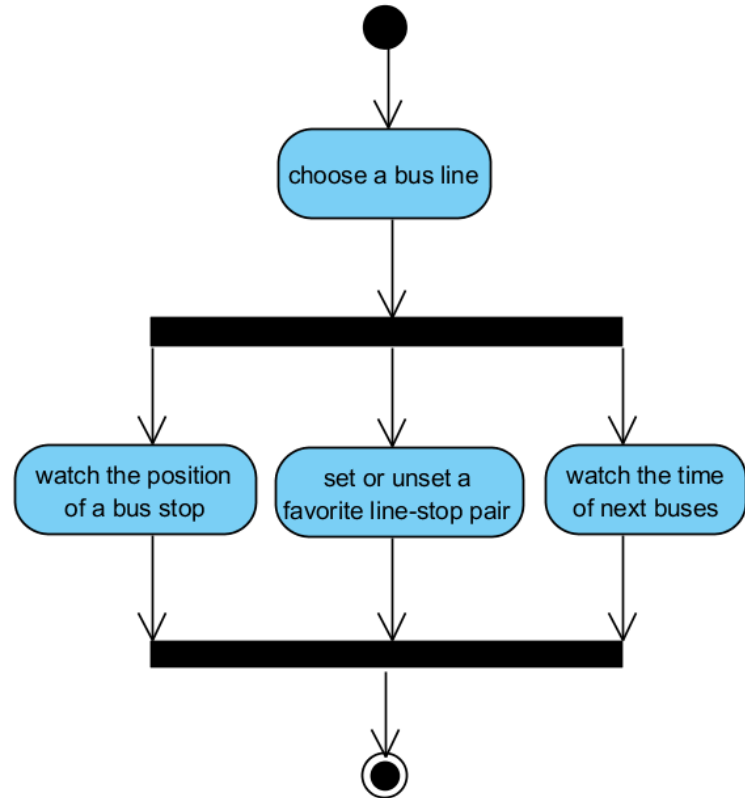
Use Case Diagram



Class Diagram



Activity Diagrams



Requirements

- Internet connection
- GPS receiver

Implementation

- Data source
- Data organization
- Activities
- AsyncTask

Data Source (1)

- Bus Lines:

- URL = <https://solweb.tper.it/tperit/webservices/opendata.asmx/OpenDataLinee>

- Output =

```
<NewDataSet>
```

```
  <Table>
```

```
    <codice_linea>1</codice_linea>
```

```
  </Table>
```

```
  <Table>
```

```
    <codice_linea>101</codice_linea>
```

```
  </Table>
```

```
  ...
```

```
</NewDataSet>
```

Data Source (2)

- Bus Stops:

- URL = <https://solweb.tper.it/tperit/webservices/opendata.asmx/OpenDataFermate>

- Output =

- <Table>

- <codice>1</codice>

- <denominazione>STAZIONE CENTRALE</denominazione>

- <ubicazione>PIAZZA MEDAGLIE D'ORO (PENSILINA C)</ubicazione>

- <comune>BOLOGNA</comune>

- <coordinata_x>686344</coordinata_x>

- <coordinata_y>930918</coordinata_y>

- <latitudine>44.505736</latitudine>

- <longitudine>11.343174</longitudine>

- <codice_zona>500</codice_zona>

- </Table>

Data Source (3)

- Bus Paths:

- URL = <https://solweb.tper.it/tperit/webservices/opendata.asmx/OpenDataLineeFermate>
- Output =

<Table>

<codice_linea>1</codice_linea>

<codice_fermata>110113</codice_fermata>

<denominazione>IMOLA OSPEDALE VECCHIO</denominazione>

<ubicazione>VIALE AMENDOLA 6/2</ubicazione>

<comune>IMOLA</comune>

<latitudine>44.35605</latitudine>

<longitudine>11.707197</longitudine>

<codice_zona>510</codice_zona>

</Table>

Data Source (4)

- Real time query:

- URL = <https://solweb.tper.it/tperit/webservices/hellobus.aspx/QueryHellobus?fermata=6212&linea=19&oraHHMM=0930>
- Output =
<string xmlns="<https://solweb.tper.it/tperit/webservices/hellobus.aspx>">
TperHellobus: (x09:30) 19C Previsto 09:34, 19 Previsto 09:41
</string>

Data Organization

- SQLite tables:

- Lines:

- `LINE_ID, LINE_USAGE.`

- Stops:

- `STOP_ID, STOP_ZONE, STOP_DENOMINATION, STOP_LOCATION,
STOP_MUNICIPALITY, STOP_LATITUDE, STOP_LONGITUDE.`

- Paths:

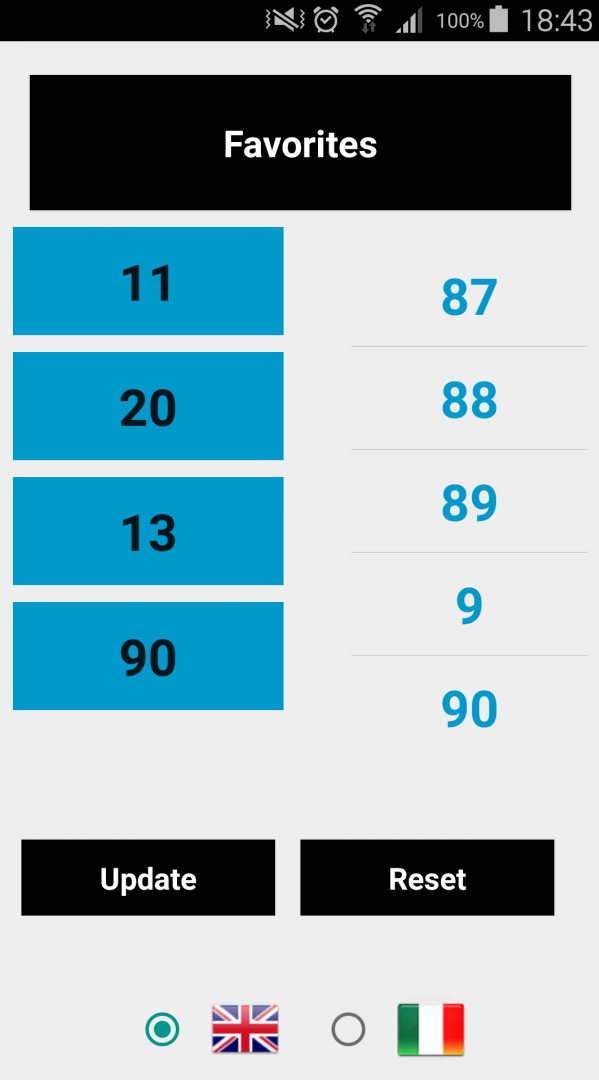
- `STOP_ID, LINE_ID.`

- Favorites:

- `STOP_ID, LINE_ID.`

Activities (1)

- The **main activity** presents:
 - a button to reach the favorites;
 - two lists: a listview of all the available lines and a gridview of all the previously clicked lines ordered by usage;
 - a button to update TPER data and a button to reset user related data (usage and favorites);
 - two check buttons to set the application language (English or Italian).



Activities (2)

- The **stops list activity** presents:
 - a list of all the stops related to the selected bus line, showing:
 - The stop denomination;
 - The distance from the phone;
 - A button to show the geolocation via Google Maps;
 - A checkbox (styled as star) to set or unset a favorite stop/line pair.
 - a real-time generated sublist of the incoming buses (one or two or any).



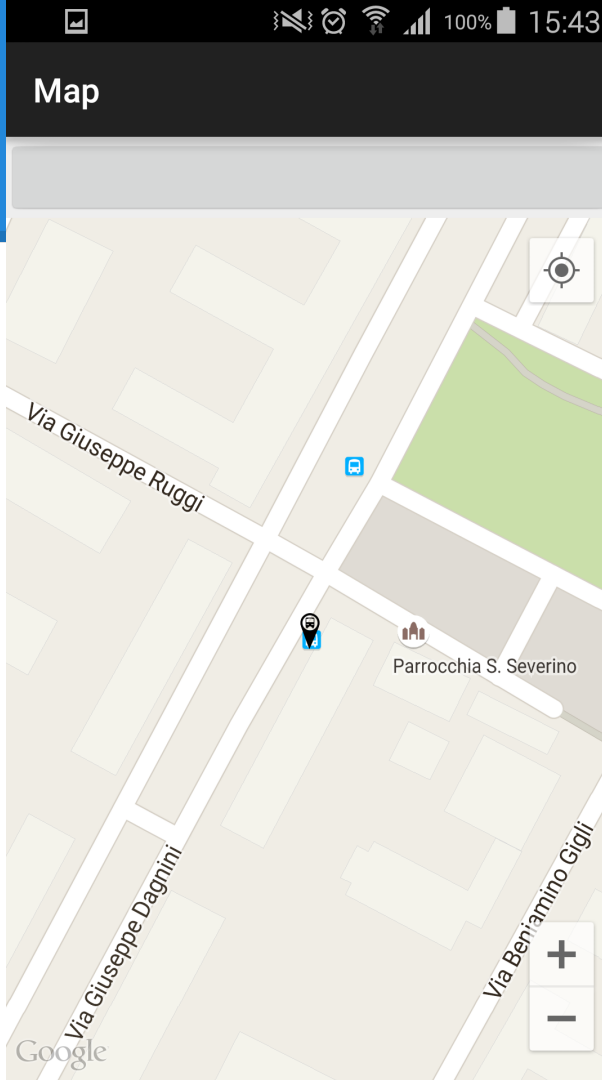
Activities (3)

- The **favorites activity** presents:
 - a list of all the favorite line/stop pairs for a fast access, showing:
 - The line and stop denomination;
 - The distance from the phone;
 - The one/two/any incoming buses;
 - A button to show the geolocation via Google Maps;
 - A button to update the real-time data (distance and incoming buses);
 - A button to remove the favorite pair.



Activities (4)

- The **map activity** presents:
 - a map generated via Google Maps with the geolocation of the selected bus stop.



Activities (5)

- The **update activity** presents:
 - progress bars concerning the updating of bus lines, stops and paths;
 - a button changing from “WAIT...” to “DONE!” as soon as the whole process has terminated.

Aggiornamento

Linee:

314/314

Fermate:

4996/10228

Percorsi:

Scaricamento...

ATTENDI...

Critical aspects (1)

- Quality of TPER web service and open data:
 - data redundancy
 - data correctness
 - slow server response
 - language consistency

Critical aspects (2)

- Human-readable *versus* machine-readable:

```
<answer>
  <bus>
    <code>19C</code>
    <time>09:34</time>
  <bus>
  <bus>
    <code>19</code>
    <time>09:41</time>
  <bus>
</answer>
```

TODO list

- Extending the application to the train service.
- Adding more features:
 - distinguish between different paths within the same bus line;
 - find the shortest path to connect two points;
 - create an alarm system able to adapt to the real arrival time of a selected bus.