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| Team Report  Living History - A Mobile App to explore preserved historic buildings and locations in the city of Zurich  **Authors:**  Julia Burgermeister  Charalampos Gkonos  Rebecca Ilehag  December 2015 |
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# Idea and Goals

## Theme of the Application

The inspiration for this project came from the fact that there are over 8000 historic preserved objects and buildings (Denkmalschutzobjekte) in the city of Zurich and no one really knows where they’re located.

Therefore, the theme for our application is the exploration of historic Zurich, mainly focusing on the preserved sites and gardens and also providing historic maps to the user. The target user group was narrowed down to people with an interest of historic preservation, more specifically Swiss tourists or inhabitants of Zurich under the assumption that these two groups are mainly those interested in historical preservation. Therefore, the language used in the app was chosen to be German.

## Vision and Project-Goals

The visions and the goals of the project were the following points.

* Let users experience historic preserved Zurich
  + Highlight preserved, historic objects
  + Locate and guide the user through history
  + Provide thematic tours to explore
  + Make it user-friendly

# Planning and Organization

## Schedule

To plan the project, we divided the work into tasks and subtasks. The tasks were assigned to a group member that was responsible for it, but the subtasks could still be executed by other members of the group. The first draft of the schedule can be seen in Figure 1:

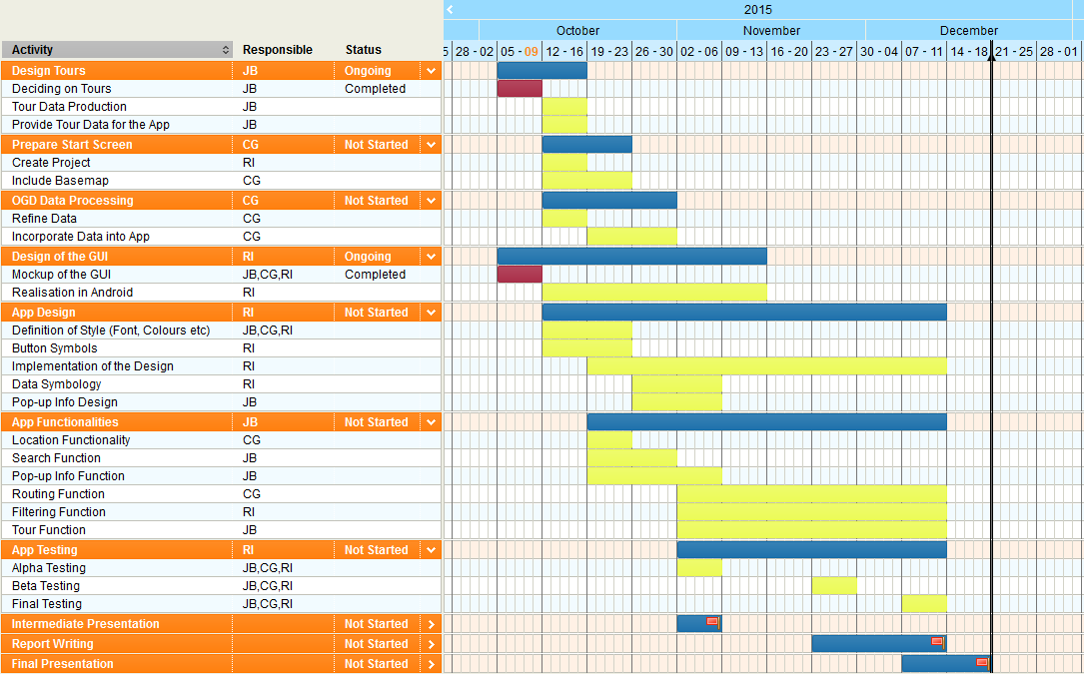


Figure 1: First draft of the schedule

The initial plan was to have all main tasks as well as the less code demanding functionalities done by the intermediate presentation in order to have enough time for the more time consuming functionalities at the second half of the semester. However, certain functionalities took more time than expected due to various factors (i.e. group members were not familiar with the use of Android Studio or BitBucket softwares). As a result, some of the tasks scheduled at a later stage of the project were never completed due to lack of time or uncompleted related tasks (i.e. filtering functionality). The final version of the schedule can be seen in Figure 2:

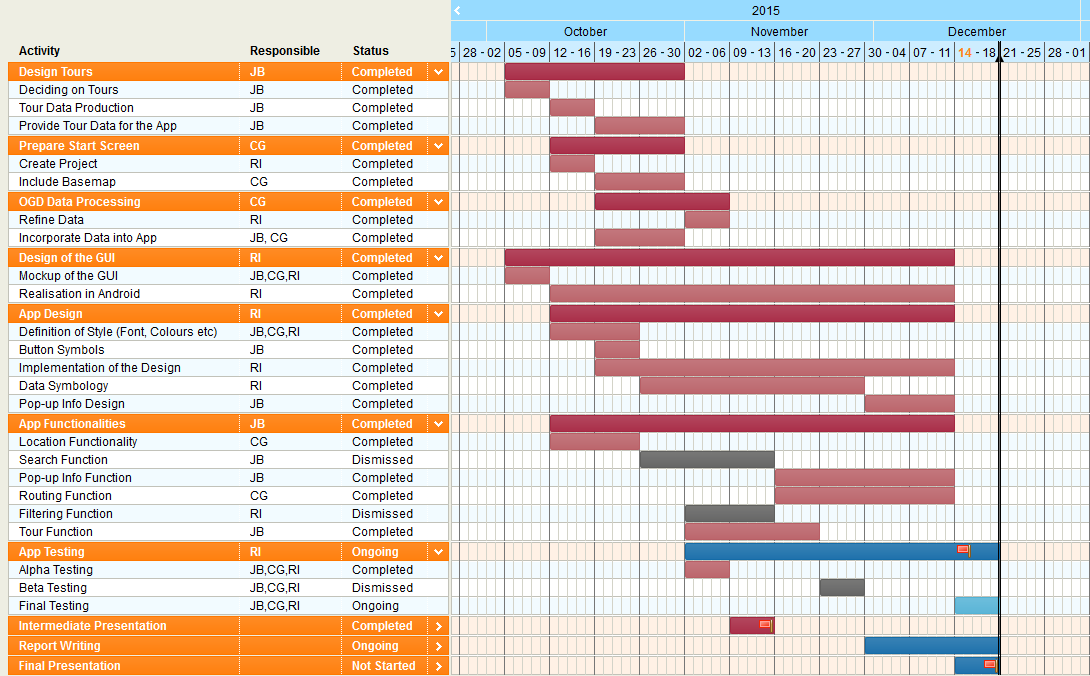


Figure 2: Final version of the schedule

## Responsibilities

From the previous figures, it can be seen that two main responsibilities (in orange color) were assigned to each student, plus several subtasks (under each of the main responsibilities). The student that was responsible for a task is represented by the student’s initials. The initial assignments of the tasks were not completely followed, since it occasionally happened that students helped each other when one got stuck or lacked the time to finish the task at the planned date. Hence, the true division of the tasks can be seen by following the comments on the code. Of course, some of the tasks were more time consuming than others and some of them remained incomplete. Unfortunately, this kind of information cannot be observed directly from the source code.



# Data

## Open Data Zürich

### Historic Point and Polygon data

Two layers containing preserved objects were available as WMS on Open Data Zürich, one containing historical and preserved objects as points (“Denkmalschutzobjekte”) and the other contained preserved gardens as polygons (“Gartendenkmalschutzobjekte”). A layer containing viewing points were chosen as well (“Aussichtspunkte”) as an additional layer. The initial plan was to include a layer with wells and fountains as well. However, the dataset only contained the coordinates of the objects and any additional information was missing. It was therefore considered as “not suitable” for the project.

### Historic Basemaps

The historic basemaps were all available on Open Data Zürich as WMS. Four historical maps were used as basemaps, which are dated from the years 1793, 1860, 1900 and 1970. The reasoning behind picking these years was to have several base maps over a large time period. Since the city of Zurich has grown during these years, the maps cover different areas. The default base map is the current city plan map, which is dated from 2014.

## Other data

### Tour Geometry and Information

As one of the many services the city of Zurich provides its residents and visitors, there are 20 city walks created to explore the city. The walks are called “Züri z’Fuess” and can be found online[[1]](#footnote-2). They are available as PDF-plans with additional information concerning the theme, the stops, as well as their duration.

As this project should provide some tours to explore historic Zurich and most of the “Züri z’Fuess” walks also incorporate historic sites, the tours were digitized in ArcMap software based on the PDF plans. Afterwards, the tour geometries including styling and labelling were published to ArcGIS Online as a Feature Service and a Tiled Map Service.

# Application

## Functionality

The initially planned functionalities were those presented below. They are shown according to the order of the scheduled implementation with a small description of how each functionality should be like.

1. Map view – the default map one would see in the start window
2. Location – the user’s location tracking
3. Layer Filtering – choosing which layers should be displayed
4. Search-function (closest / radius) – filter out objects and displays those within the chosen radius
5. Search-function (by name or subcategory, autofill) – filter out objects by either using the name or a defined subcategory with autofill
6. Routing – using the user’s location and find the shortest route to a chosen location
7. Info window – a pop-up window that would display information about the object of interest
8. List view (show search results in a list) – display the search results in a list
9. Language Selection – being able to switch the app language between German and English

## Implementation

### Creating the Map View and adding the Basemaps and Layers

#### User’s location

Location information of the user is of major importance when it comes to location-aware services. In order to be able to support the user according to his context, this kind of information is critical. For that reason, a functionality that tracks user’s current location and centers the map at that position was developed from the beginning. This functionality was planned to be used later for two main purposes: a) to present information relevant to the user’s location (“find objects that are up to 200 meters away from my current position”), and b) to provide routing guidance by using his current location as the starting point.

#### Basemap option

If the user would press the button called “Karten”, a group of radio buttons would be displayed making it possible to pick from the various historical basemaps. Only one base map can be displayed, and hence if the user picks another basemap and first one gets hidden. The basemap is always placed as the bottom layer.

#### Layer option

If the user would press the button called “Ebenen”, a group of check boxes would be displayed making it possible to show or hide the layers “Denkmalpflege”,”Gartendenkmal” or “Aussichtspunkte”. The drawing order of the layers would be the points on the top and polygons underneath.

#### Filter and tour buttons

If the user either presses the filter or the tour button, a new intent would be created and a new window would appear. Either the uncompleted filter menu or the tour menu would then be displayed.

#### Pop-up window

//Julia

#### Routing

Routing functionality is one of the most important in mobile location aware services. It offers the application user the information needed in order to reach his destination in the most optimal and efficient way. In the framework of this project, the ArcGIS routing service was used and a method was developed that calculated and visually displayed driving directions to the mobile phone’s screen of the user. The current location of the user is always used as the starting point of the route, while he has the possibility to select the destination point from all the places of interest that are used from the application, according to his individual preferences and interests.

### Filter Function

The planned filtering was never completed due to lack of time, since more crucial tasks need to be implemented first. However, the mockup of the menu was implemented and the explanation of the reasoning behind the unimplemented functions can be read below.

#### Filtering based on search distance

The user would have been able to write a distance that would work as a buffer, hence the objects outside this distance would not be displayed in the map.

#### Filtering based on subcategory

The user would have been able to pick which subcategory of the gardens should be displayed. The subcategories of the gardens are already defined in the dataset, which was not the case for the historical preserved objects. Hence, categorizing roughly 7000 points manually would require a lot of time and therefore, this option would have only been available for the gardens.

#### Filtering based on year

The user would have been able to filter the historical preserved objects based on the year they were built. A number of historical objects didn’t contain a building date, so they were deleted from the dataset.

### Tour Function

#### Tour Activity

In the framework of this project, only one of the tours was implemented. However the principle remains the same for any tour. By selecting a tour from the list, the tour’s corresponding button would be adding results to an intent that would transfer data to the main activity. The tour activity would finish once the button is pressed, returning the user to the main menu.

#### Display Tour on Map

The tour chosen in the previous window would now be displayed, in addition to the already chosen base map and layers. A button that makes it possible to remove the tour from the map appears also on the screen.

#### Stop viewing the Tour

If the user presses on the “Stop Tour” button, the tour is removed from the map by calling the deselect method.

### License the App with ArcGIS online

To make sure that the app can be used by everyone and to remove the watermark on the map, the app needs to be licensed[[2]](#footnote-3). Providing an ArcGIS-Online account, the app can be registered on the “ArcGIS for Developers” platform. By doing so, you get a unique client ID with a corresponding “Client Secret”, a password-like information that should be stored in a secure location. Using those credentials, the app is allowed to use different services provided by ArcGIS, like for example the Routing service.

# Discussion

## Major Challenges

### Code Repositories

To share the code and merge it after working on the app individually, GitExtensions and BitBucket were used. However, the “Pull” request wasn’t pulling the current version from BitBucket always, and “Commit” and “Push” didn’t work always as expected. In addition to that, the merge software “K3diff” didn’t work properly, so it was impossible to save the solved conflicts. Therefore, the merged file resulted in being corrupt and the merge needed to be cleaned up by hand.

To avoid these problems, the Server provided by IKG was used to exchange the current project folder, copy it to the Git-folder and then continue working with that version. Nevertheless, this procedure took a lot of time and we consider it can be really frustrated for bigger projects.

### ArcGIS for Android SDK

The online help and

### Unimplemented functionalities

#### Search functionality

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## Outlook and future functionalities

### Tours

More tours could be implemented

Addition of sound, by adding the stories to be found on this website:

<https://www.stadt-zuerich.ch/ted/de/index/stadtverkehr2025/zu-fuss/hoerspiele.html>

1. <https://www.stadt-zuerich.ch/ted/de/index/stadtverkehr2025/zu-fuss/routen.html> [↑](#footnote-ref-2)
2. <https://developers.arcgis.com/android/guide/license-your-app.htm> [↑](#footnote-ref-3)