

Application Development for Mobile and Ubiquitous Computing

Campus Surfing

Final Presentation

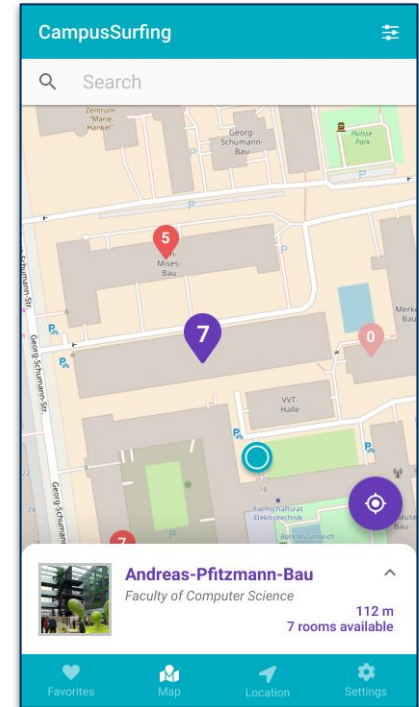
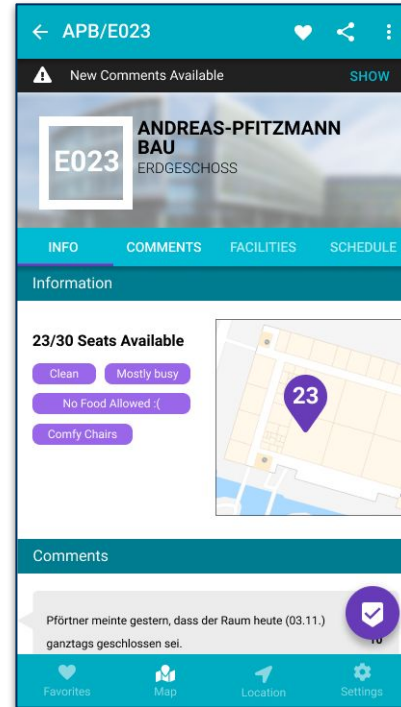
Group 12

Antonio Pietzsch, Maximilian Vollstädt

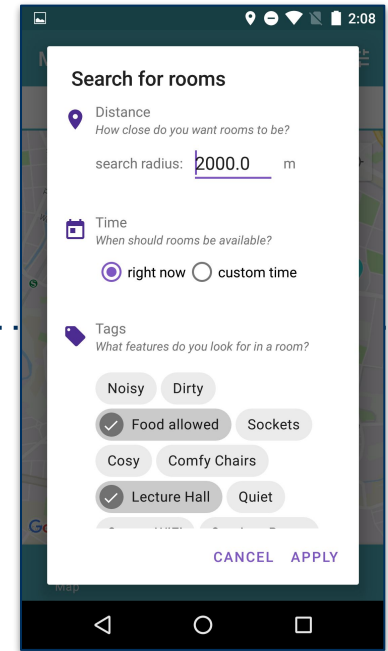
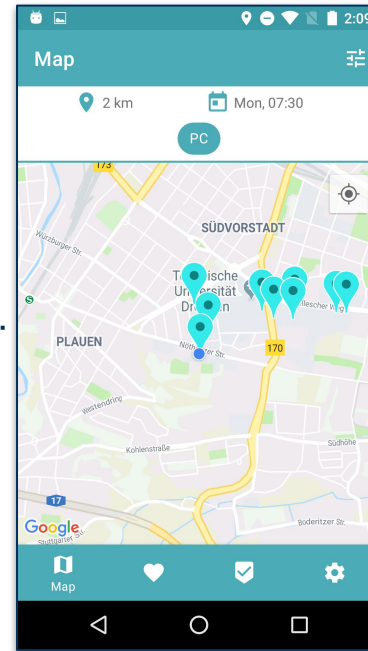
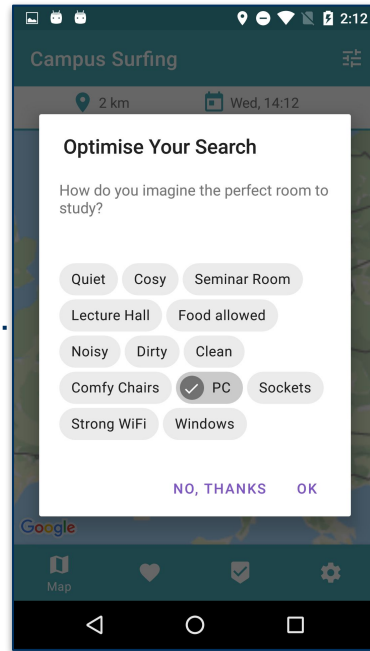
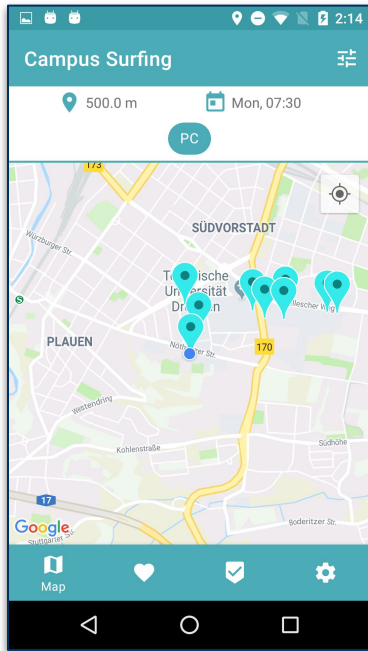
Recap: Application Scenario / Idea

- search for available rooms and buildings based on:
 - current location/distance
 - time
 - individual preferences
- users can register at rooms
 - estimate availability
 - detect nearby rooms via BT
- view schedules, comment, mark rooms as favorites, ...

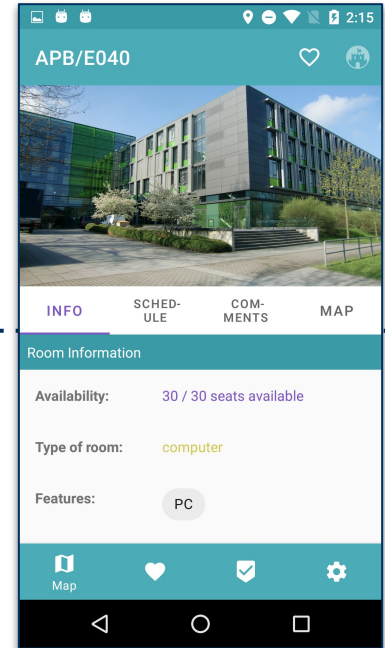
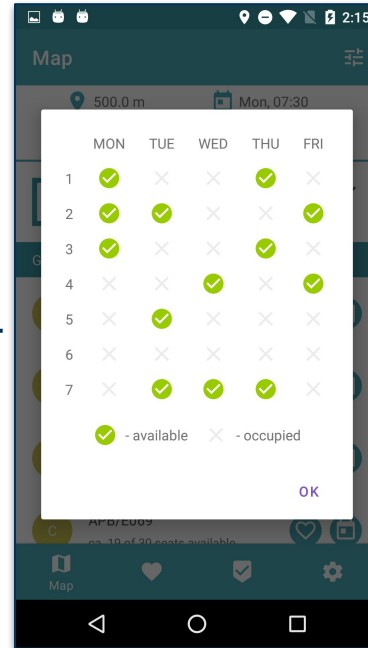
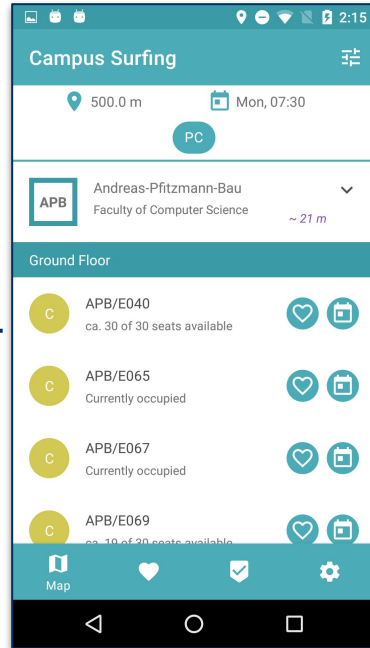
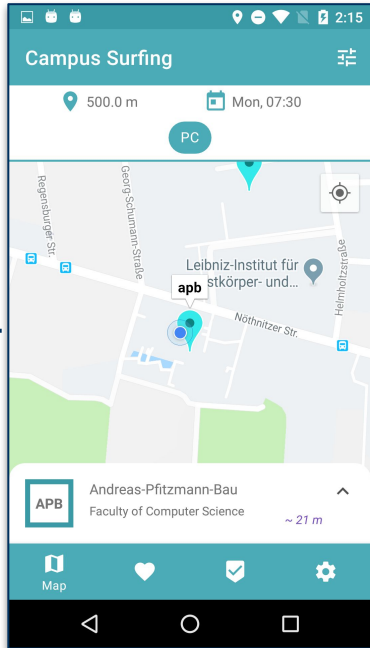
initial mockups



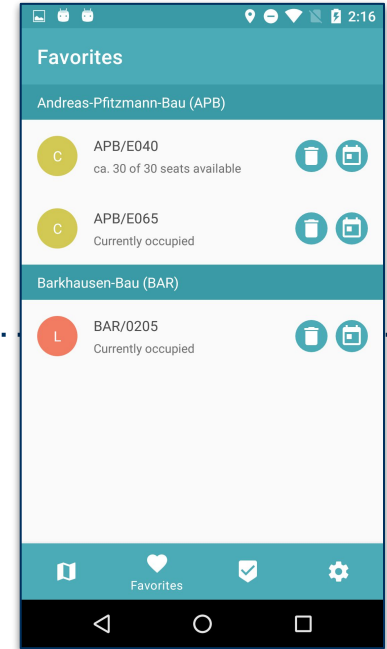
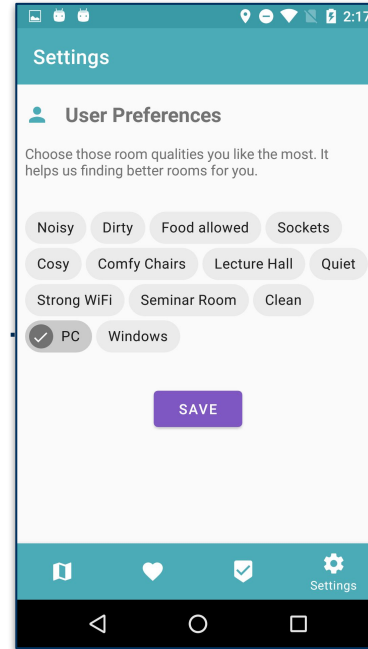
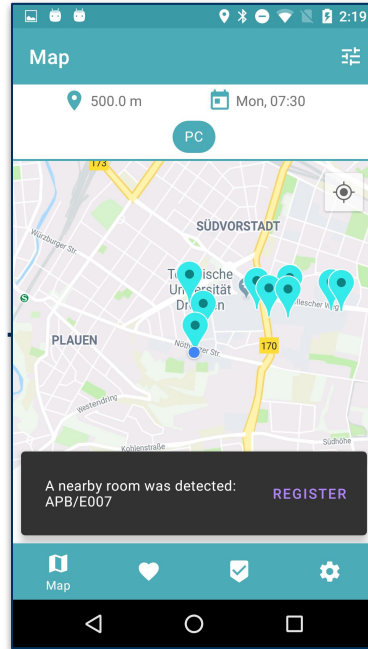
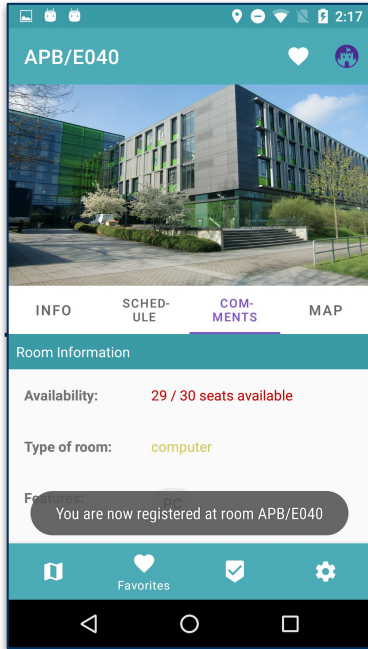
Use Case Scenario ~ Filtering



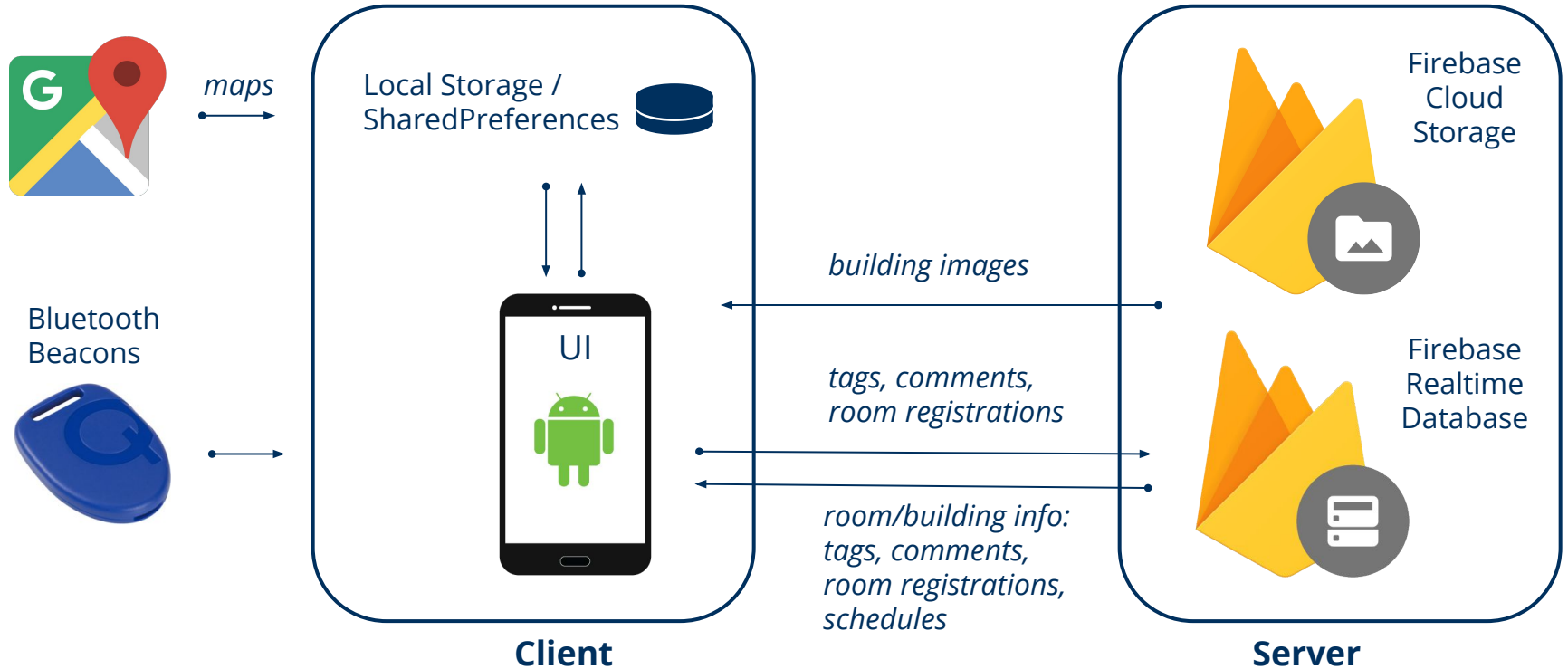
Use Case Scenario ~ Finding



Use Case Scenario ~ Registering, Personalising



Architecture



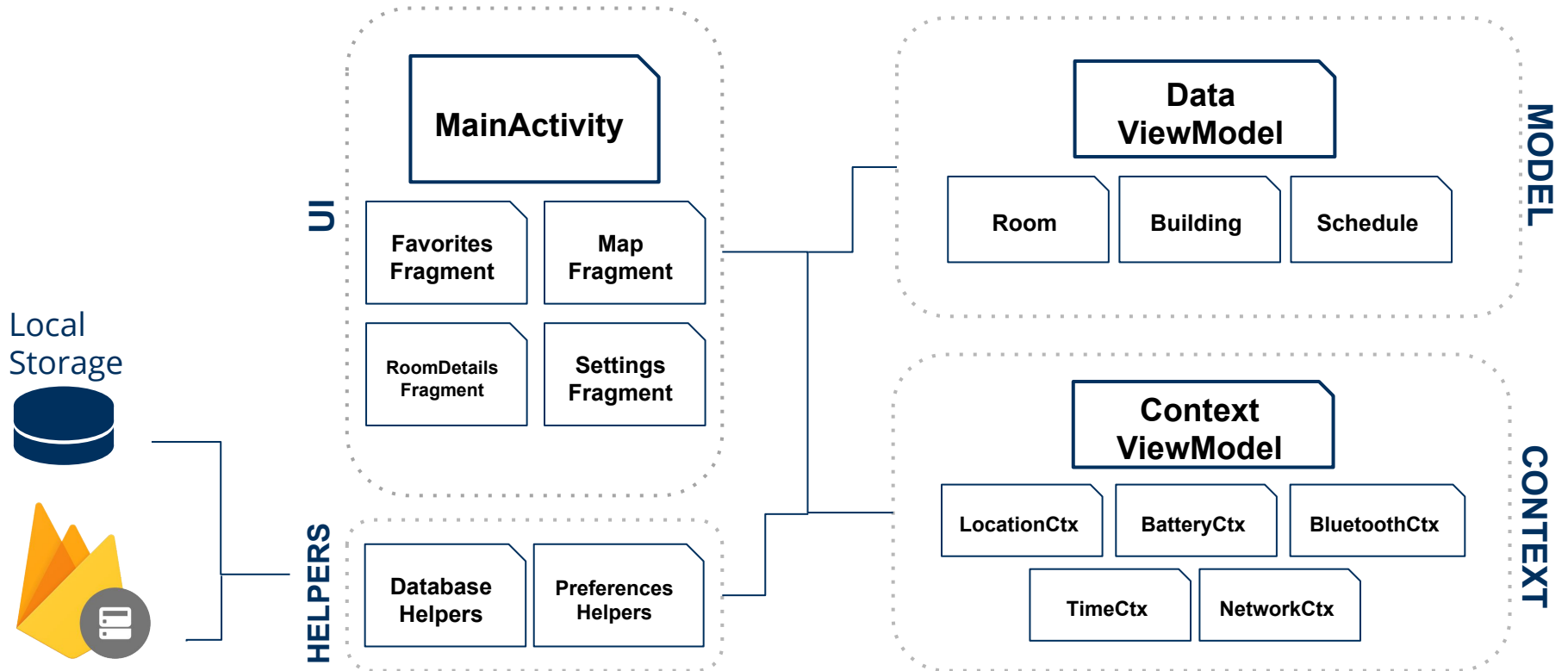
Technologies



{ JSON }



Application Structure



Contexts

- context data can be accessed by
 - polling using **Android Jetpacks LiveData**
 - pulling
- context is **Lifecycle-Aware**
- sensor data retrieved by **Androids Sensor APIs**



Adaptations: Location

Contexts

Adaptations



user location

- show user location on map
- filter for rooms within radius from current location



distance to building

- only register at room if close enough (based on GPS/GSM)
- enable search for BT Beacons only if < 80 m



distance to room

- only register at room if close enough (based on BT)
- automatically prompt user to register at room

Adaptations: Network

Contexts

Adaptations



WiFi

- update locally saved info only if WiFi connection



Mobile data

- data reduction: leave out building images and room comments



No connection

- display data saved locally as SharedPreferences (favorites, registered room)
- display data cached by Firebase; queuing of new posts

Adaptations: Battery

Contexts

Adaptations



Low ($\leq 15\%$)

- location updates via GSM → update interval 1 - 6 min
- disable BT Beacon discovery



OK ($> 15\%$)

- location updates via GPS → update interval: 10 - 30 s
- enable BT Beacon discovery

Adaptations: Time + Personal

Contexts

Adaptations



(Current) Time

- allow registration only at currently available rooms
- unregister users if room status changes
- filter for rooms based on current/preferred time



Preferred Tags

- create 'profile' of room tags to use as default filter setting

Open Issues

General Functionality:

- sharing rooms
- reserving room seats for future periods
- improving usability

Adaptations:

- refine location adaptations based on
 - user movement speed and
 - distance to POIs

Lessons learned

- more features = higher complexity = higher importance of code structure
- firebase has its up and down sides
- context knowledge is key to good usability

Any Questions?