Dear Calendar Report

Programming for Mobile Devices

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1 Abstract

This report discusses some popular calendar mobile applications and describes a new such application.

2 Users and Goals

There are two types of calendars: online that focus on group events and offline that only track the user's events. The end goal is a stand-alone offline Calendar application for android.

The users are people that want to keep track of alot of deadlines or appointments and want to make sure they don't miss any or they simply want to keep a journal of events.

Getting user feedback is done only on the website that it is published.

3 State of art

This type of application already exists and is extensively used by people from every category, but from the looks of things the top calendar applications look very similar and have the same features with a few twists. [3]

The applications seen as references have the days shown in a grid structure, the main display formats are day, week, month, and schedule (like a to do list). Other common features are the event creation and search functionality.

Google Calendar: Event creation really shines if there are multiple users of the application such that they can all see events that they share. A nice feature is that it shows holidays as events (only if you are logged in with an account).

As for options there are light and dark themes available and alternate calendars (Chinese, Hebrew, and so on)

Microsoft Outlook: The focus of the application is shared events with email integration.An account is needed to use the application.

A nice feature is that the user can have multiple calendars and can see them in overlay (combined) mode.

DigiCal Calendar Agenda: The app has an introduction on first run that lets you choose some visual styles. This is a local calendar, as such events will not notify the participants.

It has a similar feel to Google calendar. Premium features include the integration of: holidays, news, finance, more primary colors.

4 Original Contributions

- Event creation with images. The user can select any image from the device and put it as an icon for events. Images added in this way can be previewed by select an event and then selecting the image.
- The option of setting a password and being able to lock events. This feature is optional and can be used to store the event title and details in an encrypted format. If events are locked the user is still able to see the colors of events from the calendar page but all other features involving events are unavailable until the users unlocks them with the password.

5 User Guide

The user guide is found in a separate document: User Guide.pdf

6 System Design

6.1 Overview

Technologies and languages used:

- Android Studio - The main SDK used to develop the application.
- Java - The main programming language
- XML - Used in combination with Android Studio, provides a way to define layouts and other visual elements
- SQLite - Used to store data received from the user.

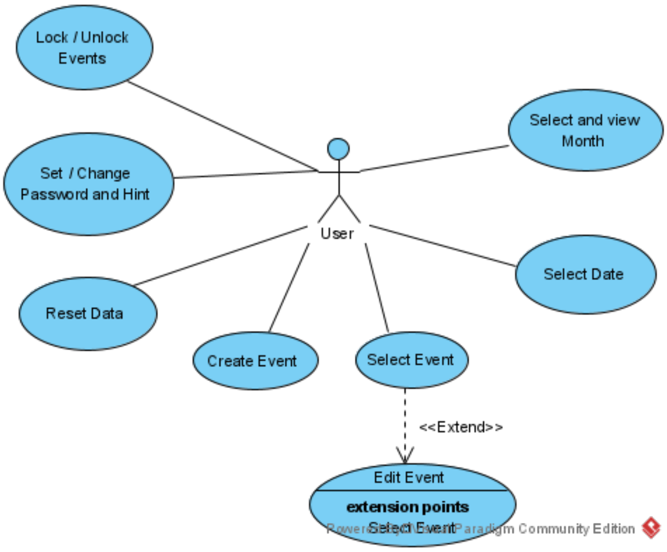
6.2 Database Design

- events - Events created will be stored here with the fields:
(id, recurrenceId, title, state, color, start, end, startDate, recurrenceType, recurrenceDuration, details)

- eventImages - Images attached to events will be stored here with the fields:
(imageId, target, content)

- users - Contains only the password and the password hint set by the user. The password is stored in a hashed format and the fields are:
(user, password, passwordHint)

6.3 Use-Case diagram



6.4 Details

The GUI consists of two main parts:

- The main activity that holds the toolbar and the navigation menu - MainActivity class.
- The current fragment whose content depends on the selected option.

When dates, events or the create button is selected some values are sent between the old fragment and the new one. The date is sent when selecting the date and a variable task is also sent when creating or editing events.

The **Calendar** itself is a fragment that is a grid of dates (RecyclerView). This was the starting point for the project taken and improved. [1]

Classes:

- MonthFragment holds the final grid, handles the selection of the date.
- MonthDisplayHolder stores data for each cell
- MonthDisplayAdapter converts a list of days and makes the cells

By Selecting a date another fragment is started namely the Day fragment that displays a list of events for that date.

Classes:

- Day Fragment displays a list of events if there are any, also displays a button used to create new events.
- EventListAdapter, EventHolder, EventViewHolder are used to generate a custom list view containing the events.

The **Event Creation** fragment accessible by the + button from the day fragment is just a basic form, the class responsible : CreateEventFragment.

If an event is created with **recurrence** then multiple entries will be created in the database having the same recurrenceId. If an event has a recurrence all sub-events will share the same image but all other fields are independent.

The **Settings** fragment contains some options for password protection. The Reset Data option simply deletes all events, images and resets the password. If a password is set then event title and details will be saved to the database encrypted and upon starting the app events will be locked.

If the Lock Events option is selected and confirmed then events cannot be created or edited.

Separate activities are used when selecting the buttons: Add Image and Github Page. Alert-Dialog structures are used for the Image preview and all the password protection features.

Utility Classes:

- DatabaseHandler is used for all SQLite database operations.
- EncryptionHandler is used to encrypt, decrypt and hash data.
  Inspired and improved by [2] .

7 Conclusion

In the end my application is very basic compared to what is currently on the market but it still manages to introduce some new functionality.

For the future the more basic features have to be added like: search functionality, localization. A few things to be improved:

- No image duplication in the database
- Swiping up or down on the calendar should be redone
- The calendar RecyclerView classes should be redone

References

[1] Cal. Recycleview. `github.com/codeWithCal/CalendarTutorialAndroidStudio`.

[2] Karim, W. Aesutils. `https://wajahatkarim.com/2018/08/encrypt-/-decrypt-strings-in-android/`.

[3] May, T. Calendar app design. `https://automate.io/blog/calendar-apps/`. Accessed March 14 2021.