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Development of Mobile Applications 7.5 p  
5DV155

**User Interface for Mobile Systems**

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## 1 Introduction

The aim of this assignment is to translate a desktop mail client application to a mobile app. This includes both functional and design related aspects. The functionality shall be described in terms of Android elements and concepts such as activities, layouts, menus, dialogs, fragments and messages. A main aspect is to decide and reason which functionality should be stripped from the desktop version and eventual additional functionality needed in the mobile app.

The design shall account for usability aspects following concepts from the course literature [1] and platform guidelines [2]. The report has to include several prototype designs of which at least one shall be made in 'Android Studio' and one by hand or any design/drawing application of choice.

Further, one section of the report shall describe differences and changes in the design when the proposed Android application would be ported to another mobile platform of choice.

## 2 The Desktop Mail Client - Apple Mail

Here the 'Apple Mail' client was chosen as desktop application to be ported to an Android mobile app. The version at hand was 10.3 (3273) in a macOS Sierra Environment (10.12.5). Initially, a systematic inventory of the available functionality in Apple Mail was conducted.

### 2.1 Description of main UI of Apple Mail

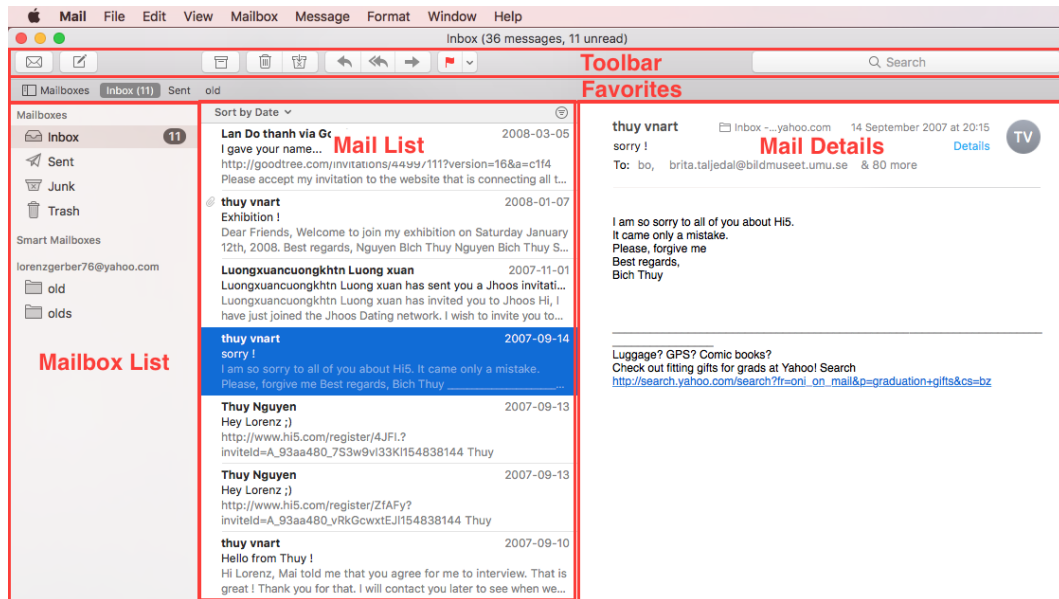
The main UI of Apple Mail is shown in figure ?? . It consists of three columns of which only the 'Mail List' and 'Mail Details' column are shown by default. The 'Mail List' presents all mails of the active mailbox. the list entry can be customised in the 'Preferences', accessible through the 'File' drop down menu. The 'Mail List' has by default a sort/filter bar with a drop down menu for various list sort methods and an icon button to apply filters. The 'Mail List' scrolls vertically when not all mails of the mailbox fit on the screen. Inspired by the Apple iOS interface, mail list items implement horizontal swipe actions. By default, to the right for deleting and to the left for toggling read/unread.

The 'Mail Details' frame shows the detail view of one email, the one selected in the 'Mail List'. This view scrolls if needed both vertically and horizontally. Various options regarding the visualization can be chosen in the 'Preferences' menu. By default, the header of the mail contains a number of 'hyperlink' style functionality for toggling visibility of some less often needed information but also as shortcut for the common mail actions 'Delete', 'Reply', 'Reply to all', 'Forward' and access to attachments.

The 'Mailbox List' column can be toggled visible/invisible by a button in the 'Favorites' bar which otherwise contains text buttons for the available mailboxes. The 'Mailbox List' in combination with the 'Mail List' offers extensive 'drag & drop' functionality to put mail messages from one folder to another.

Above the 'Favorites' bar there is the 'Toolbar' that contains in the default setup nine buttons and a search field. The buttons are from left to right: 'Get new messages', 'Compose new mail', 'Archive selected', 'Delete selected', 'Selected to junk', 'Reply', 'Reply All', 'Forward' and 'Flag selected'. The search field allows for text search in all or in a specific mailbox. Both the content and the layout of the 'Toolbar' is freely customizable with a number of additional functions/buttons not visible in the default setup.

Both the 'Mail Message' and the 'Folder' object on the screen provide context sensitive



**Figure 1:** The main view of Apple Mail has three columns: 'Mailbox List', 'Mail List' and 'Mail Details'. The 'Mailbox List' column is however hidden in the standard configuration.

menu on 'right-click'.

## 2.2 Description of Menu accessible Functionality in Apple Mail

The 'Menu Bar' contains the dropdown menus 'File', 'Edit', 'View', 'Mailbox', 'Message', 'Format', 'Windows' and 'Help'. Most of the menu items are functionality that is also directly accessible in the UI. The menu shows keyboard shortcuts for much of the functionality. Menu items not found in the UI are either for configuration and customizing the UI, or for setting up and configuring the user data such as mailboxes accounts and smart assistant functions.

## 2.3 Establishing the Mobile Application Profile

The core functionality of a mail application is receiving, writing and sending mail messages. Mail Message, Mail account and Mailbox administration is secondary functionality. A desktop application like 'Apple Mail' offers 'the full package' of primary and secondary functionality. More over, a wealth of settings to tailor parts of the layout and application envelope according to the users preferences. Here it is assumed that the application profile of mobile mail client users is by default more limited. A mobile application does not need to offer the same flexibility for customization and the profile of available functions will be more narrow.

The most important functionality for a mobile mail client user is to have easy access to the newest information. This includes receiving messages, getting informed about new messages, quick access to new messages but also convenient access methods for old messages. Writing new mail messages is of lower importance. For quick informal messages most people use nowadays special message/chat application that offer a more direct type of communication and interaction with people. Further, it is not very convenient to type and layout longer mail messages with the on-screen keyboard on mobile device compared to a

real physical keyboard.

It is also not considered primary functionality in a mobile mail message client to organize the Accounts, Mailboxes and Messages.

## 2.4 Desktop to Mobile Transformation

While a desktop application has very little space constraints and can compartmentalize the main screen in different sub containers, the mobile app will mostly use one screen for one purpose. In Android Framework terms, this means one ‘Activity’ for one purpose. For reasons of modularization and reuseability, there is however often used a second layer of abstraction, the Fragment. As this is irrelevant for design purposes, ‘Activity’ will be used in the whole text. The desktop app has two main containers, the ‘Mail List’ and the ‘Mail Details’. In the Android app there will three main activities: ‘Mail List’, ‘Mail Detail View’ and ‘Mail Detail Edit’ [?]. The ‘Mailbox List’ foldable column in the desktop application is translated into a ‘navigation drawer’ that slides in from the left side [?].

The rich set of customizable buttons in the toolbar is not translated to the mobile application. The main aim of the mobile application is to offer the most important primary functionality as direct interaction with the respective objects.

The components of the email application model are ‘Mailbox Account’ ‘Mailbox Folder’ and ‘Mail Message’. The desktop client offers a rich set of functionality to create, navigate and maintain folder structures to which mail messages can be assigned by drag & drop action.

Administrating the mailbox accounts is however not a high priority for the mobile mail client. Hence, this functionality is not implemented as direct interface interaction (drag & drop) but rather through menus.

‘Mailbox accounts’ are mostly a matter of application setup. During daily usage, they contribute structures as basis for data visualization in the UI. Note that there is no ‘User’ entity in the application model. This is because the email client is bound to the global system user account on the desktop system. The same concept will be used also for the mobile application. Hence all general settings in the application can be seen as the ‘User’ settings.

The functionality used most often is centered around single mail messages: ‘Compose new’, ‘View Message’, ‘Reply’, ‘Reply All’, ‘Forward’. Here, as another significant modification in functionality, the mobile app will offer only functionality to ‘Archive’ but not ‘Delete’ messages. This measure solves a dangerous design inconsistency that some popular mobile mail clients suffer from: When multiple mail accounts of different types (IMAP, POP3) are aggregated, depending on the account type, the same user action, often swiping a mail list entry off screen, can result either in deleting or archiving of the message. As this report is mostly considered with design, the implementation of archiving for mail account types that by default don’t offer this operation will not be discussed here.

‘Archive’, ‘Flag’ and ‘Junk’. From these actions, the first five are directly related to the main purpose of the applications, ‘sending and receiving mail messages’. The last four are secondary functionality to enable a more convenient organization and administration of the mail messages.

Functionality that acts upon a selection of mail messages is ‘Sort’, ‘Filter’, and ‘Search’.

From all the described functionality, it seems that in a mobile context receiving new information (i.e. mail messages) and retrieving information (i.e. searching) are the most important. Of course, there should be the possibility to also write and send mail messages, however this functionality is physically limited on a mobile screen keyboard. Short mes-

sages without the need for a more traditional layout are today mostly the domain of direct messaging apps. Hence, below follows the functionality profile for the mobile mail client app:

1. Receive and Present new Mail Messages
2. Search for Mail Messages
3. Write and Send Mail Messages

## 2.5 Interpretation and Translation of UI

The translation of the UI from desktop to mobile is driven by several factors such as 'Screen size', 'Functionality Profile', 'Touch vs. Mouse' and 'Platform Standards'. As a first consequence of the screen size limitation, the 2-(3) column design of the desktop app was changed into individual screens on the mobile app. The design elements are chosen from the google material design guidelines [2].

## 2.6 Notifications

Showing a status bar icon pulsing the device's LED peeking onto the current screen adding to the notification drawer

### Mail Message Viewer

#### Scrollable Mail Message List

List, according to material design guidelines up to three lines of text. Swipe "Leave-behinds" for Delete/archive floating action button for search (main activity)

reloading by swipe scrolling down at the top of the list.

Navigation Drawer

Thumb does most of the work 49% single handed with thumb plus 26% double handed still with thumb (chapter 1, 'How we hold our gadgets').

Independent of left or right hand, center and down to the middle of the screen (chapter 1, 'The Phone's thumb zone')

According to 'Designing for Touch' (chapter 1, fig. 1.24), no navigation bar at the bottom, only a floating action button.

Touch target 7mm minimum 'Designin for Touch' (chapter2, Good enough Size: 7mm). 7-11mm depending on location. Thumb fan. 44 dp in Android corresponds to 7mm, 69 pixels is 11mm.

make the interface fast (chapter 3, 'Enable primary tasks directly form list view').

Reducing the number of buttons to where direct interaction is not possible (chapter 4, 'Buttons are a Hack')

### Mail Message Editor

Text Area

## 3 Design with Android Elements

How to splitup the functionality into activities, layouts, menues, dialogs, fragments and messages. Elaborate which functions that are most important and that should be included.

Which functions can be left out to compensate for the mobile context Is there needed some additional functionality for the mobile context reflect on the different aspects regarding usability describe how the interaction shall happen. Motivate design descisions.

**4 Some design examples from Android Studio UI Designer, some pen paper designs**

**5 describe how all main functionality in the app**

**6 Describe needed changes for another mobile platform**

### **References**

[1] Josh Clark. *Designing for Touch*. A book apart, New York, USA, 2015.

[2] Google material design. <https://material.io>, 2017. accessed: 2017-07-18.

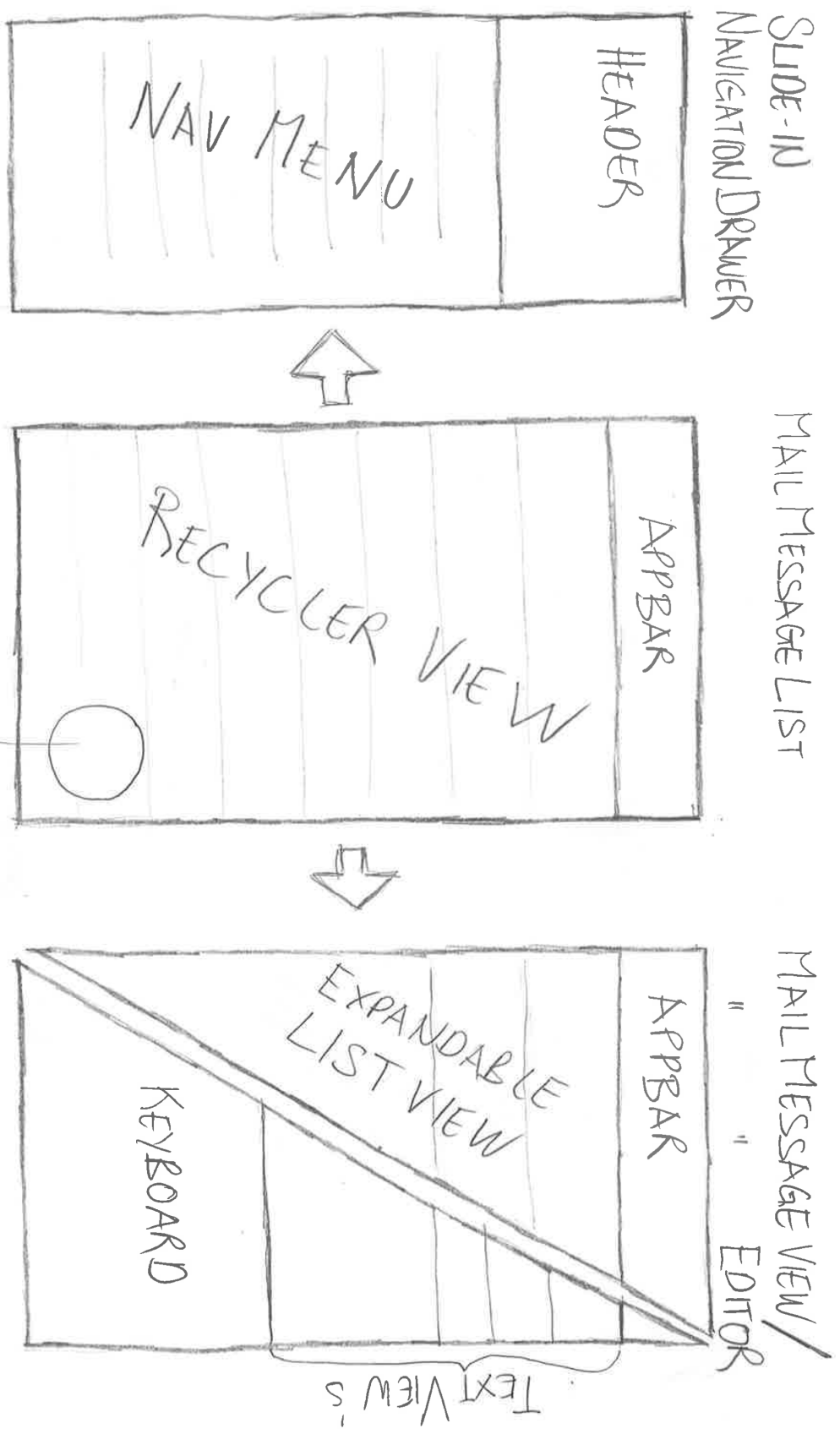
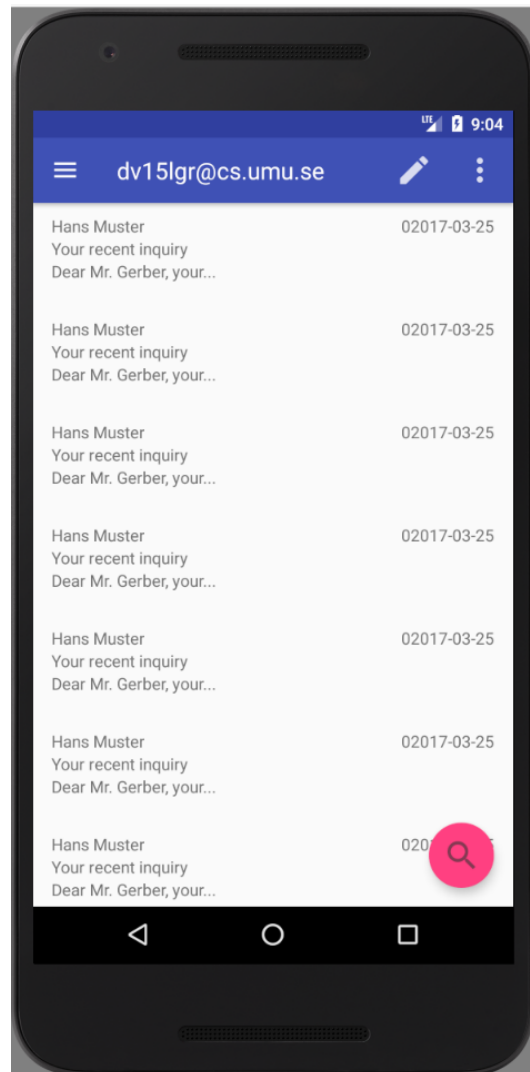
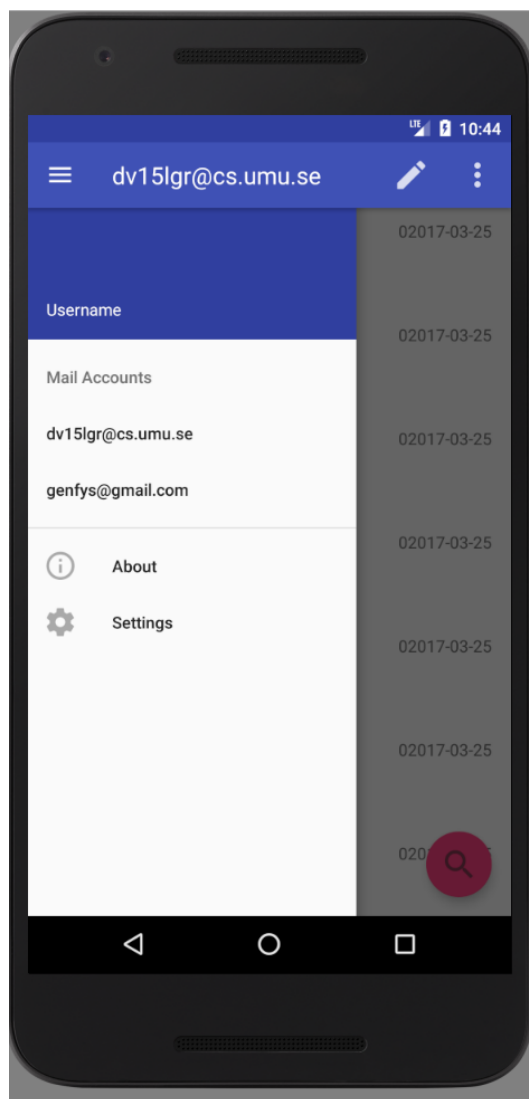


Figure 2: Design draft on the Android Mail Client.





**Figure 3:** *The main view of Apple Mail has three columns: 'Mailbox List', 'Mail List' and 'Mail Details'. The 'Mailbox List' column is however hidden in the standard configuration.*



**Figure 4:** The main view of Apple Mail has three columns: 'Mailbox List', 'Mail List' and 'Mail Details'. The 'Mailbox List' column is however hidden in the standard configuration.