Message Scheduler Application (Drop it)

STUDENT OF:

UNIVERSITÀ DEGLI STUDI DI GENOVA

COURSE: MOBILE DEVELOPMENT

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INTRODUCTION

In the busy schedule of life, a common person can forget occasions, events to wish or celebrate.

Message Scheduler Application carries all the worries and brings ease to life.

This application is designed for users who are not good at remembering events, especially those events that are not supposed to be missed at any cost. The application helps the user to add Events and carry the worry out of sending the message to a person at a certain time.

Users just have to register on the application and create an event with significant knowledge of the event like when this event occurs, the recipient Info, or message type. Just leave the message and schedule it to send, the rest of the worries will be handled by **Drop it**.

We are providing some of the following unique features:

This app also allows users to schedule messages in a **Group** or as **Individuals**, easy way to add a User from **Contact App**, set different **Templates,** and use them while drafting the message, setting the **Signature** of the messages.
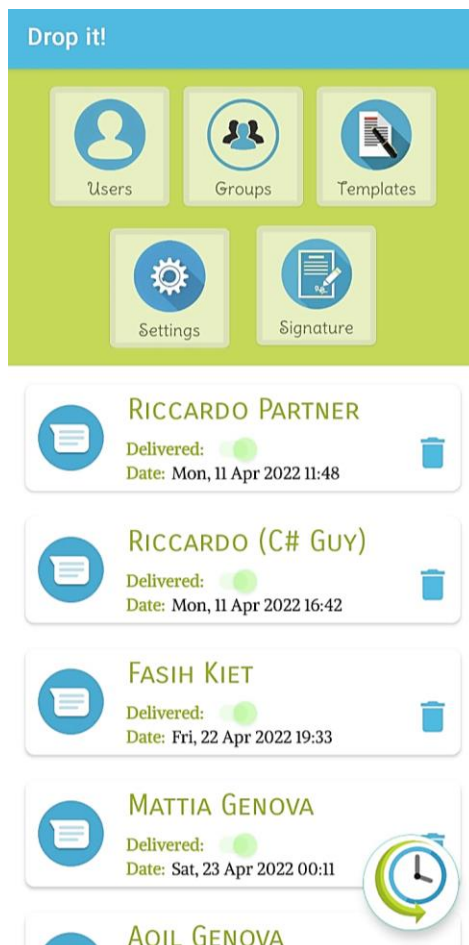
Project Overview:

This application is a message scheduler, professional and easy-to-use schedule planner to manage your business events and programs. The scheduler is a free and easy-to-use Schedule Messages app that lets you schedule SMS and Email.

We know that people forget birthdays, and some Important occasions to wish. So, bringing the convenience to:

Scheduled message whether for Anniversary, Meetings, or any other occasion.

The customized service we offer is key to making sure that people get to relax without any worry to report on time via text.

Supported Features: (How to use)

- **SCHEDULE MESSAGE:**

    App will enable you to schedule your message to individual

    or as Group.

    By providing:

    - Select Recipient Type: User/ Group
    - Select Recipient
    - Select Message Type: SMS/ Email
    - Select Date Time
    - Select Template

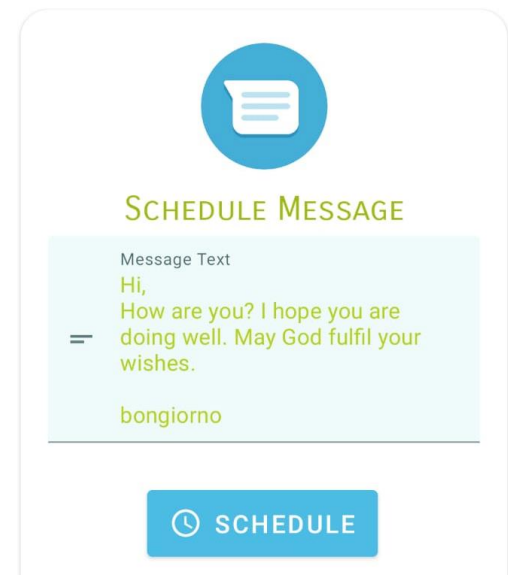   Compose button, redirect you on Message Compose

    screen.

A. MESSAGE AS SMS:

It allows you to send SMS to your contacts with the text content.

If you select SMS as Type of Message, App will show only the required attributes for SMS scheduling: The only attribute SMS requires is Message Text.
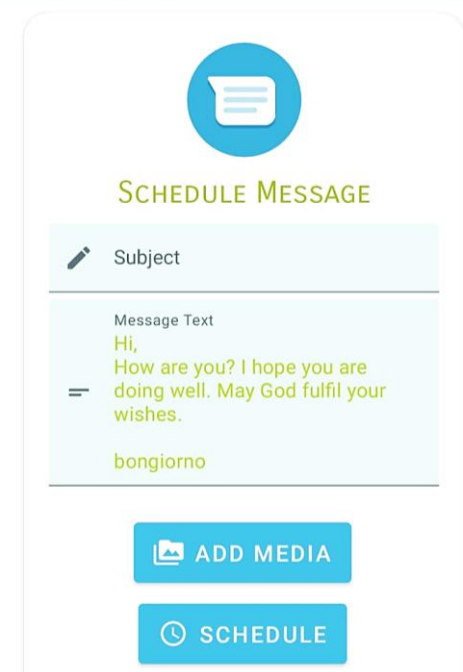
B. MESSAGE AS MAIL WITH MEDIA:

It allows you to send emails to your contacts with the media.

If you select MAIL as the Type of Message, App will show only the required attributes for Mail scheduling: Message Text is the common attribute for SMS and MAIL. But, some of the additional attributes for MAIL are the **Subject** of the MAIL and the **Attachment of Media**.

Schedule Button actually schedules your message. And show a popup about the scheduled time and disappears in a few seconds.

- **MANAGE USERS:**

    You can save your contacts, which will help you to find recipients while scheduling the event. You can see the list of Users with the basic details, update them, and are able to delete them.

    You can start adding user action by clicking on the Floating Button with Add Icon. To update, just touch on the user.

    You need to add the user by providing some basic details of the user's information.

    This activity Is the same for Add and Update operation, two things change in each case.

    - Label (Add User / Update User)
    - Button (Add / Update) with different Icon

    1. Necessary Information to send the message:

    - Phone
    - Email
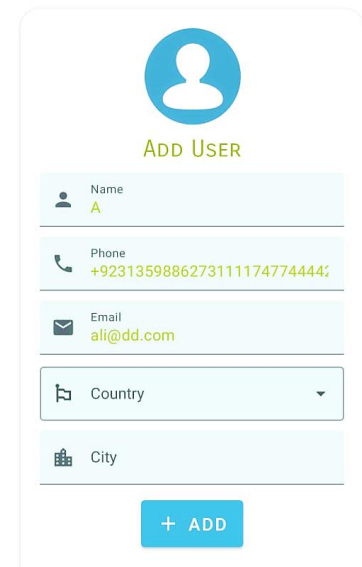
     2. Filtration Information to create a group:

    - Country
    - City

    Select contact Information from Android Contact App, by clicking on the contact Icon.

It automatically fills the Users Input from the Android Contact App as much as It's already existed in the system app.

- **MANAGE GROUPS:**

  You can create, update, see, and delete the groups (consist of users), that will help you to find recipient while scheduling the event.

  You can start add user action by clicking on Floating Button with Add Icon. To update, just touch on group.

  You need to add the user by providing some basic details of users Information.

This activity Is same for Add and Update operation, two things change in each case.

- Label (Add User / Update Group)
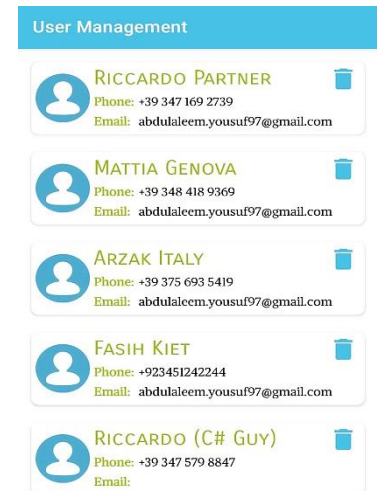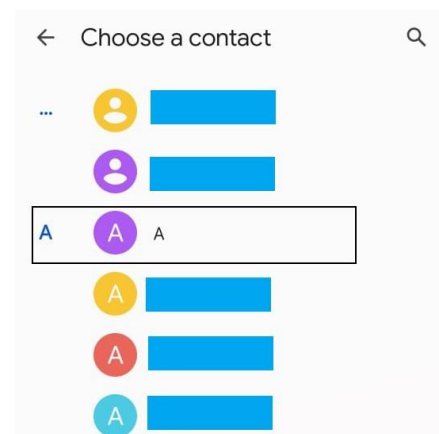- Button (Add / Update) with different Icon
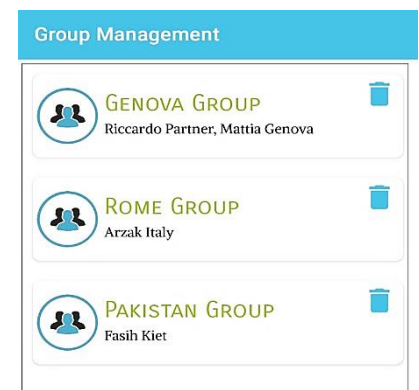
You can filter your Users by Country and City as stored in step 2.2. You can select multiple members of from the drop down, which has a filtered list of users according to the country and city. If you left filters empty, then dropdown has all the users.
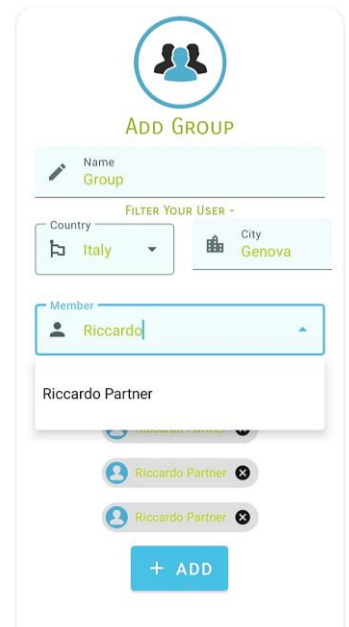
- **MESSAGE TEMPLATES:**

  You can see the list of templates with the name and some text of the template to identify the template. Also, you can create, update, see, and delete the templates.

  While sending the message as described, our app enables you to select the template of the message. That will help you to save your time, and give an idea of the message.
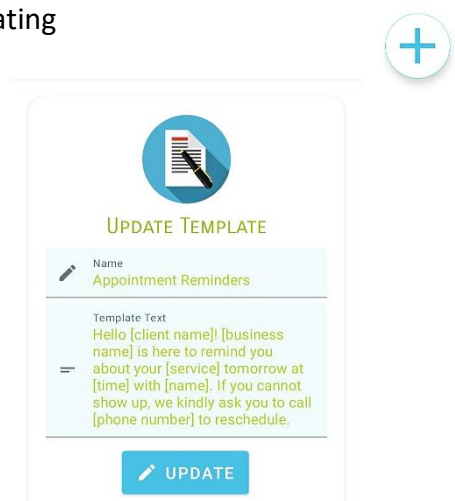
  You can start adding template action by clicking on the Floating Button with Add Icon. To update, just touch on the template.

  You need to add/update the template by providing some basic details of the template like name and text.

- ## MESSAGE SIGNATURE:

  You can save your basic text regarding your identity **(Signature)** of the message, which will automatically be attached to your messages.

  You need to update the signature by providing the exact text of the signature with spaces and commas.

- ## MESSAGE SETTING:

  Basic settings that help the user to set up accounts and configuration.

  Authorize access to your Google account

  Sign In to your [Google Account](#).
  Go to **Security** > **Less secure app access**. Click **Turn on access**.
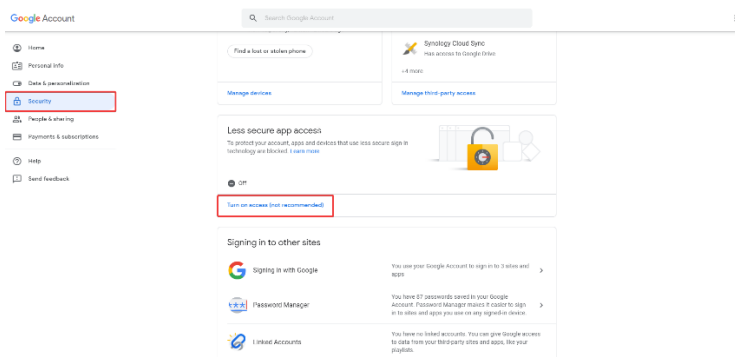
  Email: Senders email (Enter your Gmail address).
  Password: Password of sender (Enter your Google password).

  SMTP Settings:
  - Port: SMTP Port
  - Host: SMTP Server
  - Security connection (SSL/TLS) is required
  - Authentication required

  Reference:
  [Tutorial to find these details](#)

Technical Details:

Technology	We selected
Application Type	Mobile Application
Technology Stack	Android
Programming Language	Java
Storage	Local Storage
Storage Type	Permanent Storage
Database	SQLite
Unit Test Framework	- Espresso (androidx.test.espresso) - AndroidJUnitRunner (androidx.test.runner.AndroidJUnitRunner) - JUnit (junit:junit:4.+)
UI Framework	- Google Android Material (com.google.android.material) - A circular ImageView for Android (de.hdodenhof:circleimageview)
Message Provider	- Android SMS Library - Jakarta Mail API For Android Library (mail:android-mail)
Theme	Tutorial followed for Inputs: - Material Input Components - CircleImageView - Create dynamic lists with RecyclerView Colours: <table><tr><td>Colour</td><td>Dark</td><td>Light</td></tr><tr><td>Blue</td><td>#59b4d9</td><td>#3999c6</td></tr><tr><td>Green</td><td>#abc230</td><td>#98af2d</td></tr></table> Icons: - Create app icons with Image Asset Studio - Photoshop
3rd Party Apps Intent	Android Contact App

Technical Challenges:

In the beginning of the project, I created a task chart that guide me towards the journey. Few things I didn't realized Initially about the technical challenges.

1) WHATSAPP INTEGRATION:

Initially, I decide to Integrate with WhatsApp. The ultimate goal of this feature Is to automatically send the message on WhatsApp using our App.

Reference of this statement:
      i.   https://developer.android.com/reference/android/accessibilityservice/AccessibilityService.html
     ii.   https://stackoverflow.com/questions/49654674/send-message-via-whatsapp-programmatically

PROBLEM:
I face so many other Issues and the main one Is WhatsApp provides paid API for direct Integration. For now, I am not able to pay the fee of API.

SOLUTION:
I found some of the following solutions which lead me to drop this Idea,

1. **Open the WhatsApp app using Intent**, so It's just redirected the app with the text message. But, the sole purpose of the project Is to program (automatically) to send the message.
    Reference: Send through WhatsApp App intent

2**. Send WhatsApp messages without user interaction** using the android accessibility service. But, again the audience of this app Is not disabled.
    Reference: Send Messages to WhatsApp without interaction

2) TELEGRAM INTEGRATION:

When I was not able to find the solution for WhatsApp, I go for Telegram Integration. I start digging things and found a few things.

I hardly found some solutions which use **tdlib** (Telegram API for the customized app). Everyone is using a REST API for Telegram BOT (Which I already do). The problem is I am unable to find any good solution to integrate **tdlib** or telegram API (as a user) with JAVA. I find telethon for python.

Telegram API Is divided into two approaches, BOT, and the API.

I was able to send the message from my Android App to Telegram, using BOT API. It's quite simple.

But, the goal of my App Is to send on behalf of the sender not from the BOT. So, I start searching for the Message API of Telegram.

I found the Python script that will fulfil my requirement. This script works in the following sequences:

i) Create a session file (a file with an extension of session for example abc.session), and this file Is created locally.

    (1) This session will be created by entering the phone number.
    (2) It will send the code on your number, scripts wait for the code Input.
    (3) When you enter the code, Script will generate the session file locally.

ii) Now, my calling a function will send the message on behalf of the given number.

I try to store this script Inside the Android studio project, and call It with the phone number.

Reference:
[Execute python script from my java android app](#)

But, the problem Is User Is expecting that my App will send the message on a particular time without any Interaction, without passing the authentication code in my App.

The user should not open my App, and pass the code. While doing this activity script waits for the parameter of Auth code and delays the timer.

3) **TASK SCHEDULING:**

Initially, I decided to create a single thread with an Infinite loop. Which lookup every time In the database for the events which are not sent yet and the execution Is matched with the current time.

But, it will be running even if there is no event to send. Also, the thread needs some exceptional permission to read and update the database.

SOLUTION:
So, I create a separate task for each event with the desired time.

4) BACKGROUND SCHEDULING:

I started and ended my journey using TimerTask to schedule a task with time (Task: it takes the message and phoneNo, and sends the message). It works fine.

Reference: [Run multiple thread with a timer](#)

PROBLEM:
But, I am trying to run it in the background (for now, when I close my app, the scheduled task will not run).

SOLUTION:
Alarm Manager:
[Run task in background using Alarm Manager](#)

PROBLEM:
I try to implement AlarManager, by creating my custom AlarmManager using ALARM_SERVICE. I override onReceive method, which should be triggered at a particular time.

I am not sure about reason, but couldn't successfully achieve my goal. Because onReceive method is not triggering on the given time. I tried many solutions from stack overflow, and one of them is referred here.

Reference: [Alarm manager not triggering with the correct time](#)

5) UNIT TESTING:

Being a Back-End Engineer, a started from the backend layer of this app by designing the Database, Data Access Layer (DAL), and Middleware (Controller)

PROBLEM:
It's time taken activity without ensuring the backend code is correct or not.

The purpose of including unit testing is to test my DB without creating UI. So, I write some unit test code.

PROBLEM:

But when I try to run those test cases, I face this error "No instrumentation registered! Must run under a registering instrumentation". This Issue Is occurring because of the Incorrect context.

Why do I need context?
Because all of the unit tests are for testing database functionality, DbContext needs a context object.

So, I try to get the application context and pass It. But I was using this line to get the context which was wrong:
" this.getInstrumentation().getTargetContext().getApplicationContext()".

SOLUTION:

I found a solution that Is using the static method of InstrumentationRegistry for the Context. Also downgrade my testing core library, because InstrumentationRegistry Is deprecated now.

Entity Relationship Diagram:
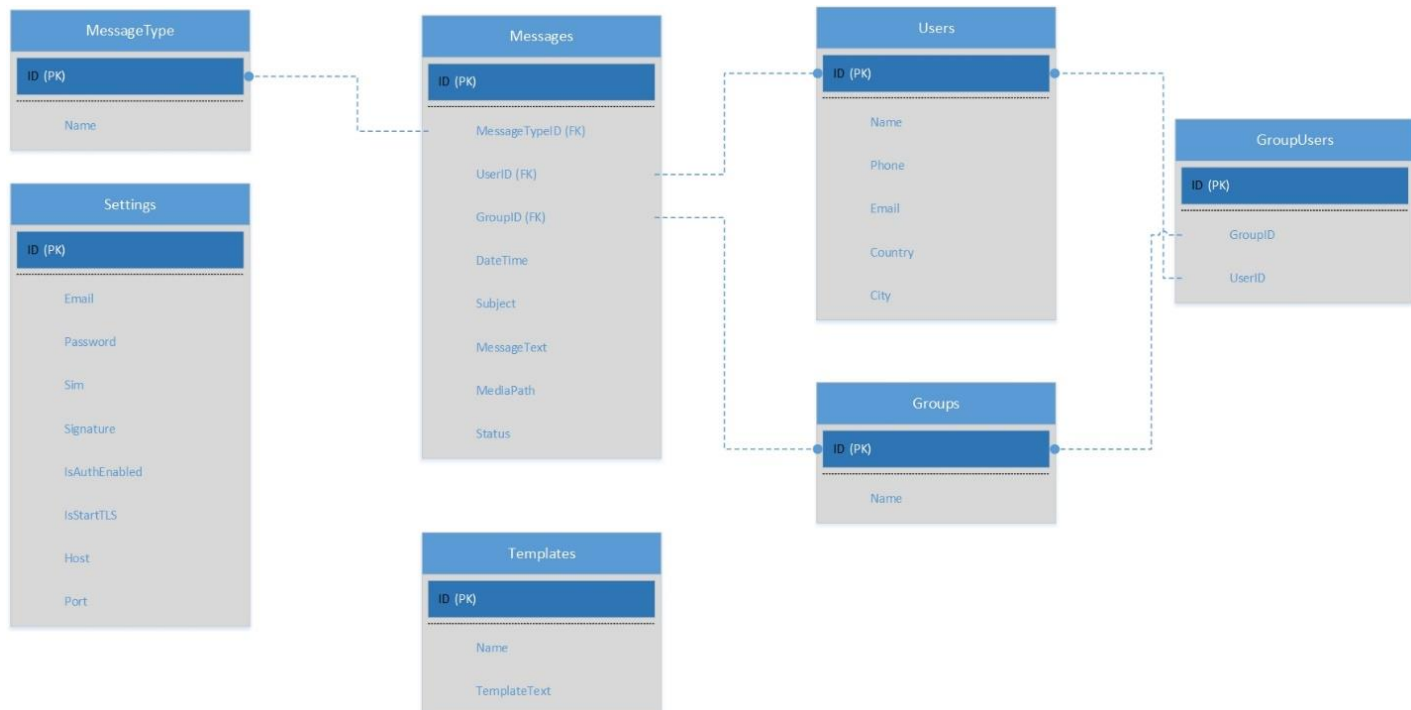
Summary:

"Drop it" comes with a simple and easy-to-use interface that allows you to schedule your message (SMS/EMAIL) to be sent on a specific date and time.

No more reminders are needed or a specific person to remind you. Simply select the person or group of persons, date, and time with a particular message and attachments to be delivered and leave the rest time for important.

"Drop it" is an android application built on Java, which enables users to delay their message by specifying a time and date along with the receiver's information.

App automatically sends the message at the time specified to the user or group of users and adds a pre-defined message which will be sent when the specified time is reached.

Why this Application?

* You keep forgetting to send event details to someone.
* You have that friend who does not seem to know what an alarm is.

Cover the following points:

- Introduce you to the Application
- Build credibility of this app with the user.

Schedule Messages or a timetable, as a basic time-management tool, consists of a list of times at which possible tasks, events, or actions are intended to take place. Automate your text messages with this application.