Smart NFC Manager

Smart NFC Manager is an Android application that allows one to read and write commands to a NFC tag and automatically execute NFC commands contained in the NFC Tag on the Android device.

Simple and intuitive, Smart NFC Manager writes commands to the NFC Tag. First, the user creates the command by easily entering the necessary information on the screen, then tap the "Write to Tag" button and bring the android device close to the NFC tag. When the device detects the presence of the NFC tag, the command will be automatically written to the tag.

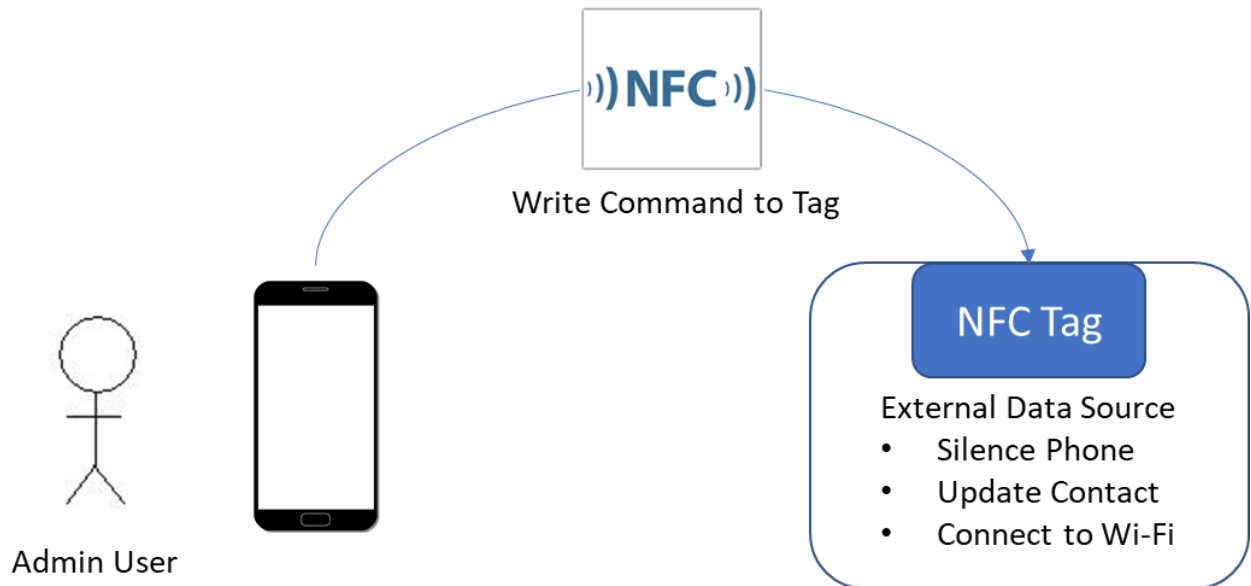The first version of the Smart NFC Manager supports

- muting and unmuting the Android device
- Adding new contact
- Automatically connect to a Wi-Fi network

Smart NFC Manager is not just an NFC tag reader or writer it goes further, with a simple motion of the Android device over the NFC tag can automatically silence the phone, add a new contact or connect to a Wi-Fi network all by itself without any further user entry. It eliminates errors, automates repetitive tasks, improves Wi-Fi security and enables easy sharing of data.
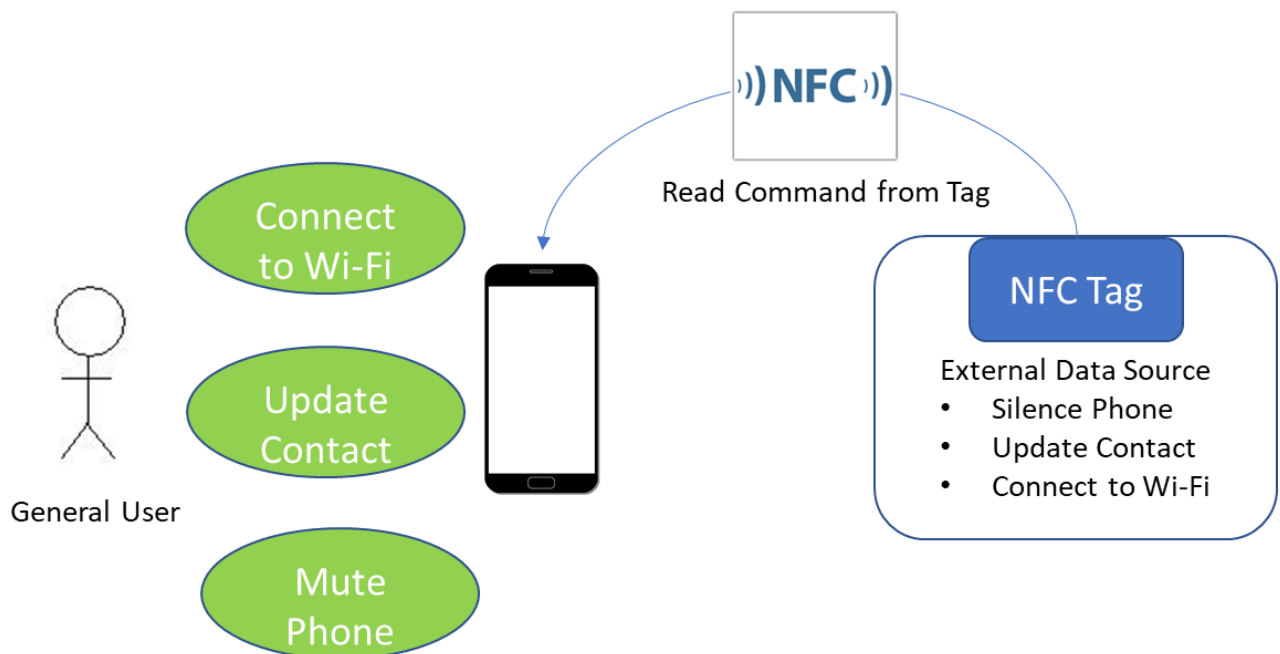
1) 1 Architecture / System Diagram: Here show how your application integrates with users, device features and internal / external data sources
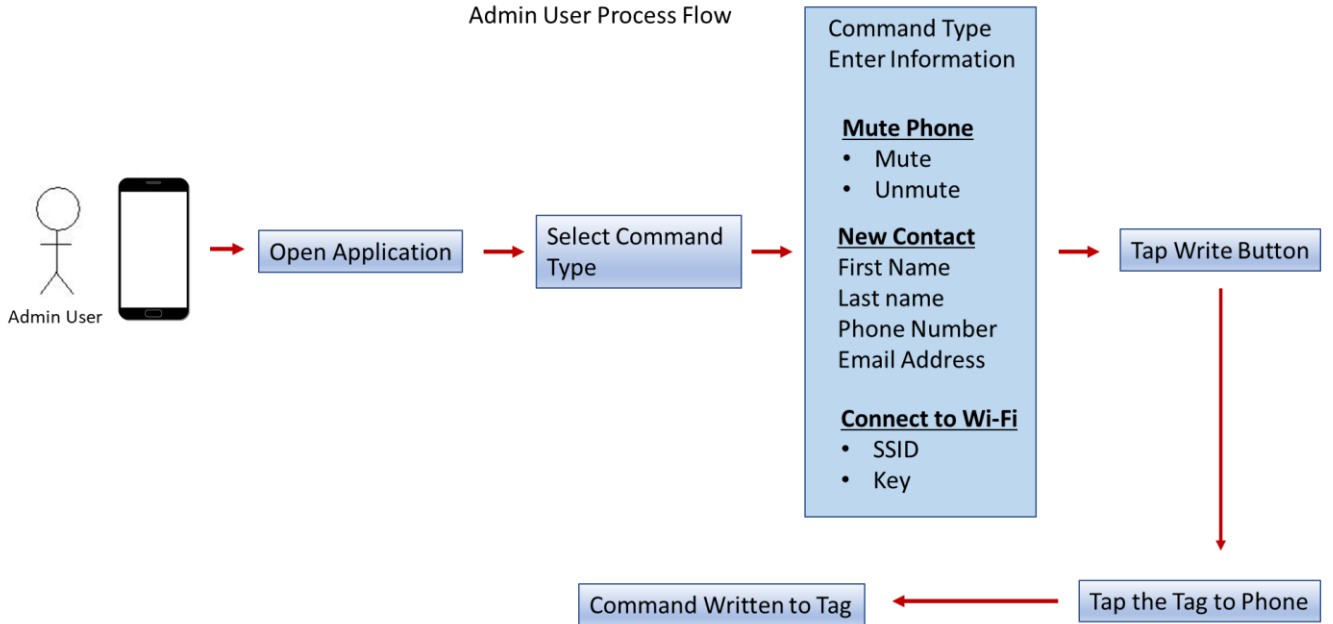
High Level Physical Architecture

))NFC))

Write Command to Tag

NFC Tag

External Data Source
- Silence Phone
- Update Contact
- Connect to Wi-Fi

Admin User

High Level Physical Architecture

))NFC))

Read Command from Tag

NFC Tag

External Data Source
- Silence Phone
- Update Contact
- Connect to Wi-Fi

Connect to Wi-Fi

Update Contact

General User

Mute Phone

Admin User Process Flow

Admin User

Open Application → Select Command Type →

Command Type
Enter Information

Mute Phone
- Mute
- Unmute

New Contact
First Name
Last name
Phone Number
Email Address

Connect to Wi-Fi
- SSID
- Key

→ Tap Write Button

Command Written to Tag ← Tap the Tag to Phone

General User Process Flow

General User

Tap the Tag to Phone →

Automatically Execute Command Stored in Tag
- Mute Phone
- Update Contact
- Connect to Wi-Fi
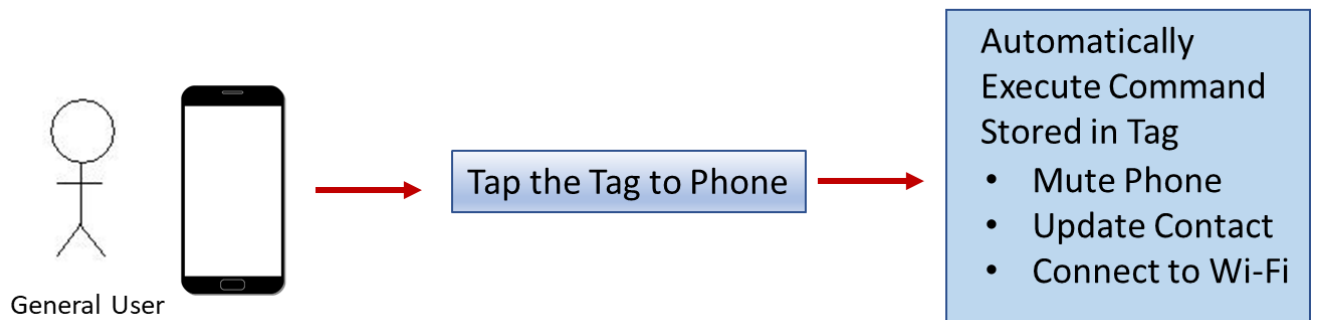
Software Flow Diagram for Admin User

```
Open App
   │
   ▼
┌─────────────┐
│     NFC     │──N──▶ Show Error Message ──▶ Exit
│  Available  │       Application Requires
└─────────────┘       NFC Hardware
   │
   ▼
┌─────────────┐
│     NFC     │──N──▶ Show Error Message ──▶ Exit
│  Turned On  │       Turn on NFC in
└─────────────┘       Settings
   │
   ▼
Select Message Type
   │
   ▼
┌─────────────┐
│   Silence   │──Y──▶ Display screen to ──▶ (A)
│    Phone    │       select Mute or
└─────────────┘       Unmute phone
   │ N
   ▼
┌─────────────┐
│   Update    │──Y──▶ Display screen to ──▶ (A)
│   Contact   │       enter contact details
└─────────────┘
   │ N
   ▼
┌─────────────┐
│   Wi-Fi     │──Y──▶ Display screen to ──▶ (A)
│   Detail    │       enter Wi-Fi details
└─────────────┘
```

```
(A) ──▶ Listen for Tag Write ──▶ User Moves the Tag ──▶ Android OS ──▶ Receive NFC Tag ──▶ Write Command to
        Button Tap              closer to Phone        Broadcasts TAG     Detected Intent      NFC Tag
                                                       Detected Intent
```

Software Flow Diagram for General User

```
User Taps Phone on
NFC Tag
        │
        ▼
Android OS
Broadcasts TAG
Detected Intent
        │
        ▼
Receive NFC Tag
Detected Intent
        │
        ▼
   ◇ Silence Phone Command ◇ ──Y──▶ Mute/Unmute Phone ──▶ (B)
        │
        N
        │
        ▼
   ◇ Update Contact ◇ ──Y──▶ Add/Update Contact ──▶ (B)
        │
        N
        │
        ▼
   ◇ Wi-Fi Detail ◇ ──N──▶ Display Unsupported Command Error
        │
        Y
        │
        ▼
Start Thread to Initiate Wi-Fi connection
        │
        ▼
Start Broadcast received for Wi-Fi connection update
        │
        ▼
       (B)
```

(B) ──▶ Display progress message
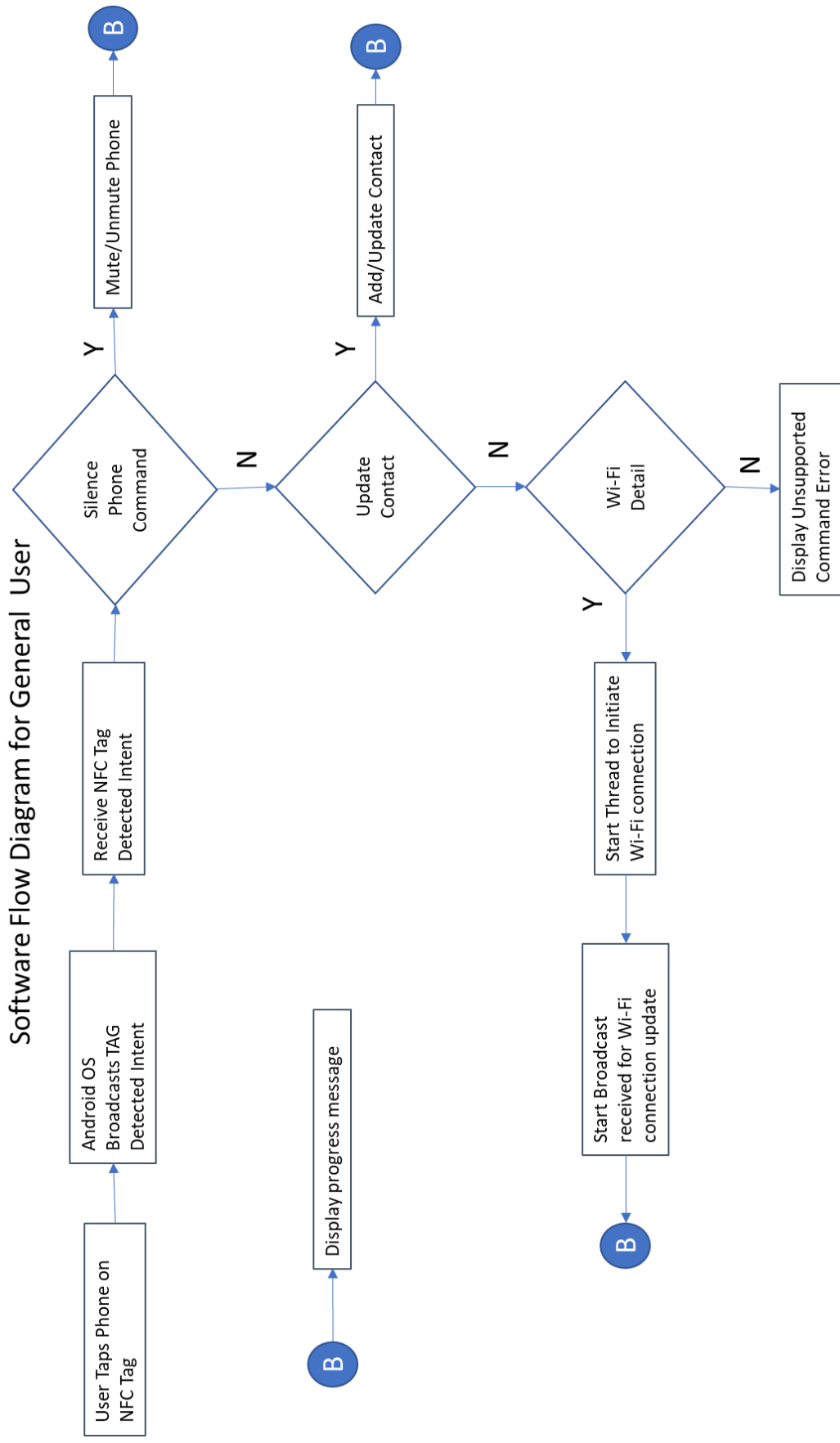
2) 3-5 Use Case Diagrams (i.e. system functionality): A use case is a list of functions typically defining the interactions between system components. Here, you will consider 3-5 interactions between the user and your application.

3) 3-5 App Interface Mock-ups with descriptions: Provide some example screenshots of your application with descriptions. Feel free to use the Android Studio Layouts feature or another wire-framing application to construct your non-functional prototype.

Smart NFC Manager supports 3 different tasks.

1. Mute / Unmute phone

2. Add contact

3. Connect to Wi-Fi

To execute these tasks, we first need to configure them to the NFC tag. After configuring, we can read the tag and execute task with single tap.

Application start screen
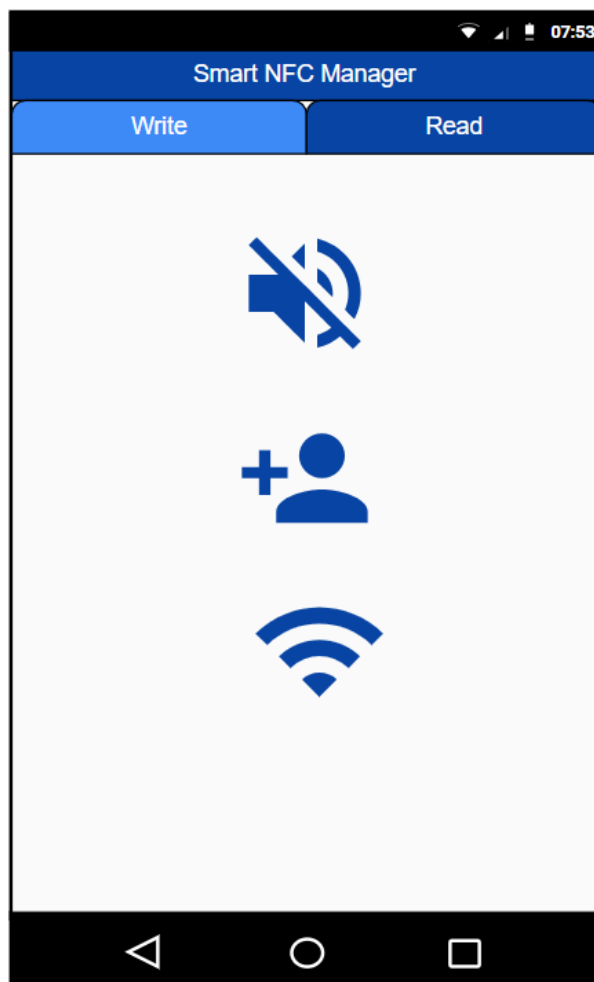
First Screen represents two main tabs.

Write – Writes selected configuration to the NFC tag.

Read – Reads information from NFC tag, and executes the task according to received information from tag.
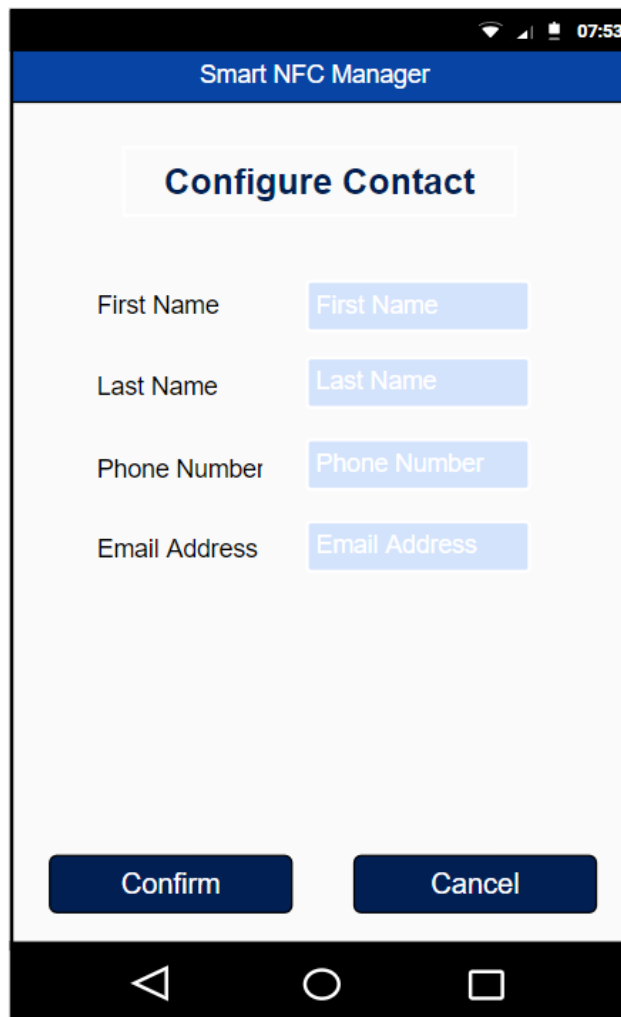
To configure NFC tag with specific task, we need to select write tab.

Write tab will display 3 different configurations –

1. Mute / Unmute Phone

2. Contact

3. WiFi

If we select contact, app will display new activity to enter contact details as shown below.

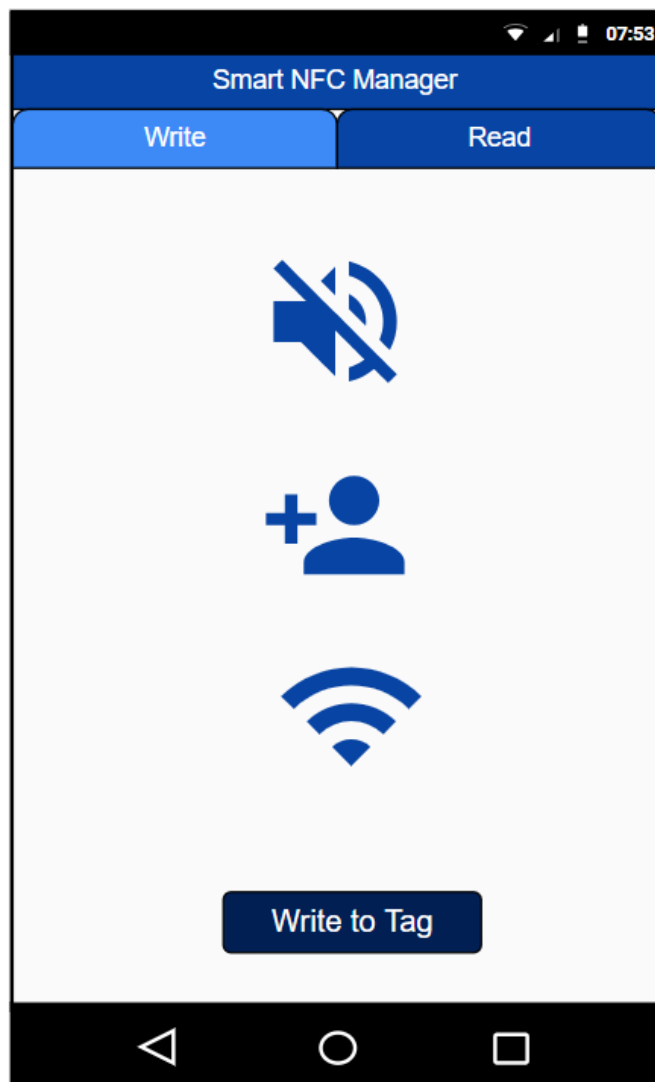Activity to get Contact details / Configure Contact

To configure contact details to the NFC tag, user needs to provide below information.

- First Name

- Last Name

- Phone Number

- Email Address

On click of Confirm button, app will display main screen with "write to Tag" button as shown below.

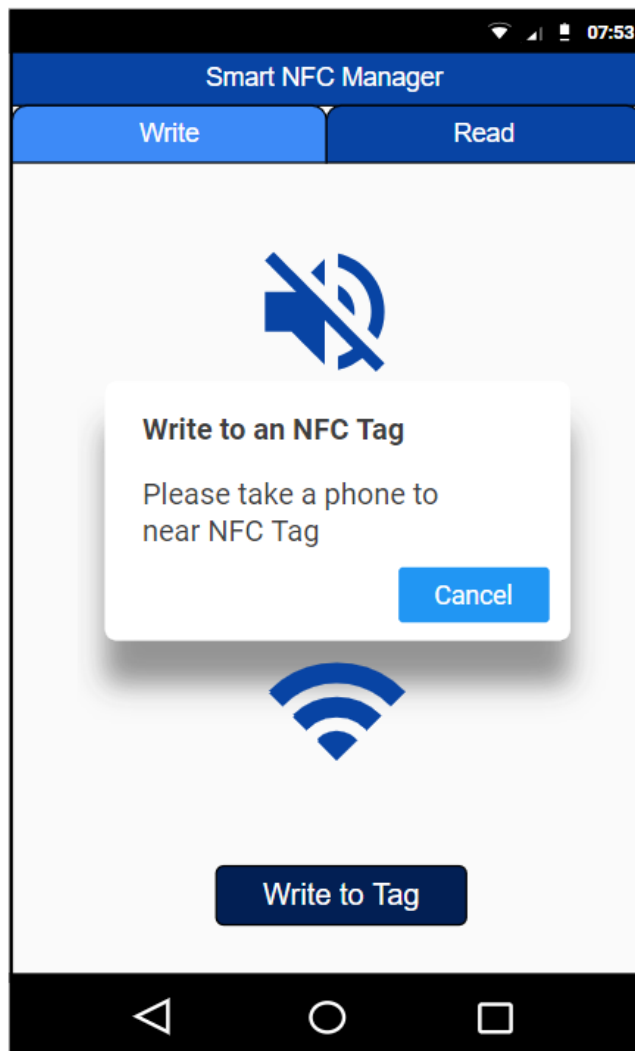Main screen with received contact details from previous screen

On this screen user has received contact information from previous screen.

App provides further instruction from "Write to Tag" button.

On click of Write to Tag button, dialog box will appear as shown below.

Dialog box screen to instruct next action.

On click of "Write to Tag" button, a dialog box will appear to instruct next action. To write any information to the NFC tag, we need to take our device near to the NFC tag.

Here application will wait for user to take next action.

If user taps device to the tag, contact information will get written on the tag and dialog box will disappear.

If user does not want to write information to the tag, he may click "cancel" button.
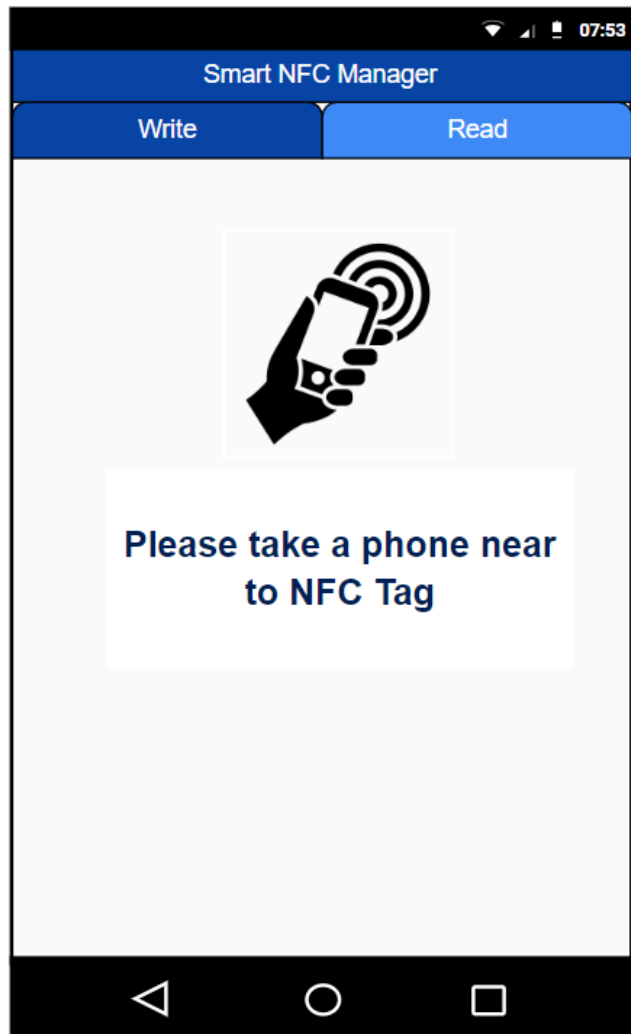
Tag update success screen
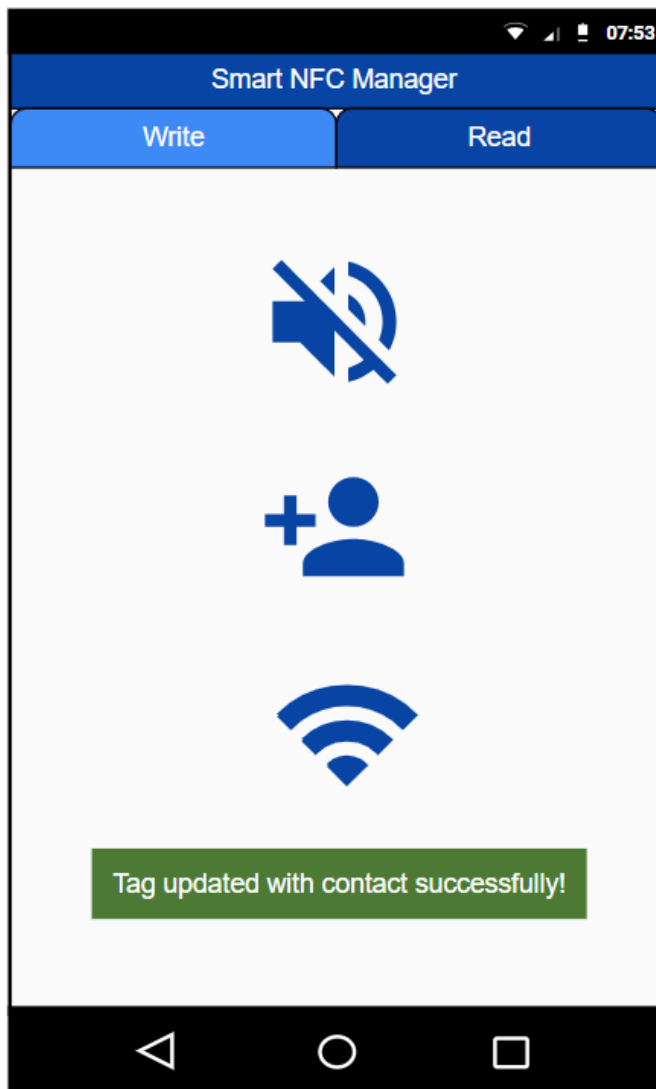
If information got added to the NFC tag, application will display success message to inform user.

In previous screen user added contact information to the tag, so user will receive success message as –

"Tag updated with contact successfully!"

Read screen to add contact from NFC to smartphone

When user wants to add the contact information to the device with the help of NFC, 1st he needs to select "READ" tab.

Screen displays the instruction message.

"Please take a phone near to NFC tag"

User needs to tap the phone to NFC tag. Now, application will read contact information from NFC tag and automatically add the contact to user's device (Phone Contacts).

With single tap, user can add contact details from NFC tag to smartphone.

Also, user receives success message as shown in next screen.

Add contact success message screen
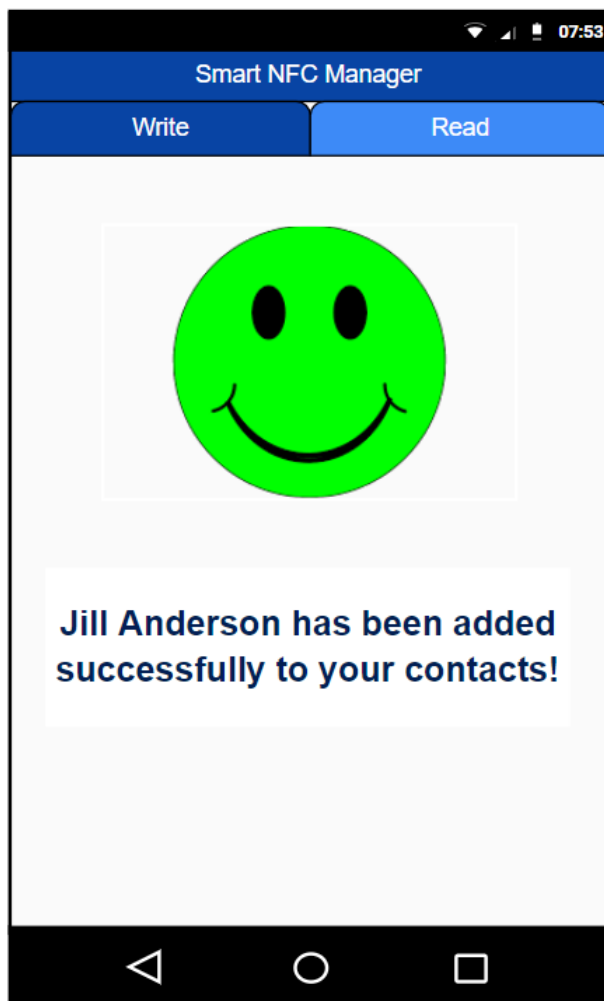
Once contact details get saved in user's device, user will receive success message.

For instance, if user reads, Jill Anderson's contact details from NFC tag, then he will receive success message as below –

"Jill Anderson has been added successfully to your contacts."