Notehub: Android & Django Development

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Faculty Advisor: Yusuf Pisan
Sponsors: Aaron Vega, Aden Shukuroff

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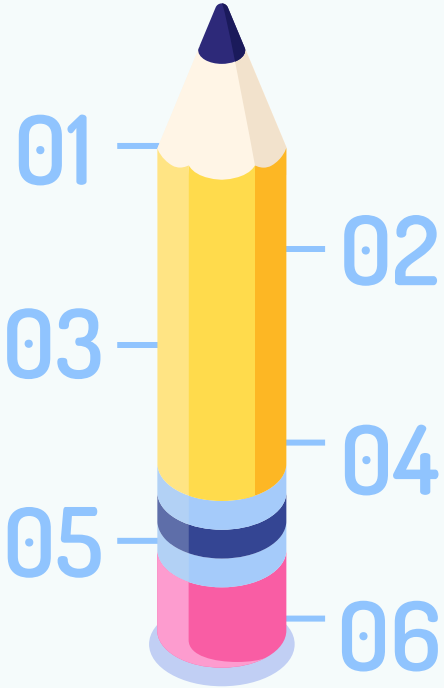


01

Introduction

Goals & Project Overview

Goal

- Provide a platform for new or current students to share notes
- Expose them to a variety of notes
    - In doing so, teach them new ways of organizing their notes
- Provide additional resources, so students can succeed in their classes

Project Overview

NoteHub:

- Android application
- Platform for universities students to share notes
- Supported by a backend created with Django

Main Features:

- Upload Notes
- Download Notes
- Search Notes
- View Notes
- Private Groups
- Comment
- Favorite
- Rate

02

Process

Roles, Rapid Application Development, and Tools & Technology

Roles

Front-End Development (Alan):

- Design UI
- Develop Android application
- Perform usability tests

Back-End Development (JD):

- Develop back-end using Django
- Assist integrating API into Android application
- Perform usability tests

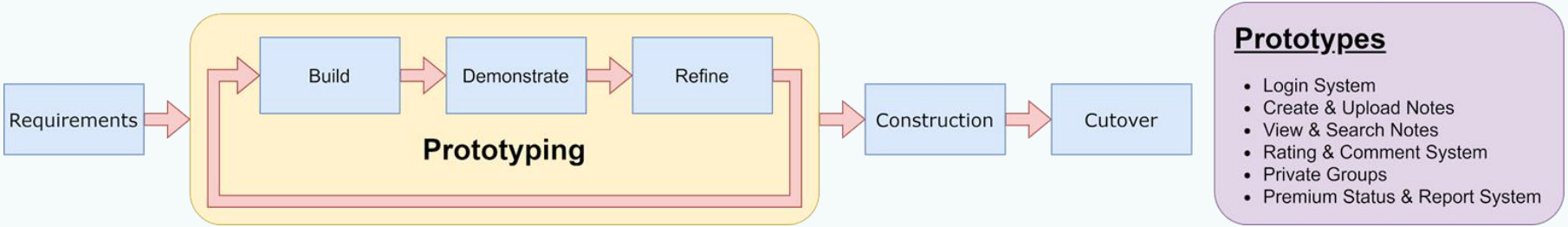
Rapid Application Development (RAD)

Prototyping:

- Prototype for every week
- Focus on specific features
- Showed to sponsors for feedback
- Use feedback to improve prototype

Construction:

- Combine prototypes into working application
- Start usability testing for feedback
- Use feedback for final adjustments



Tools & Technology

Front-End

Both

Back-End

Front-End Development

Walkthrough of Application

03

Free

User's with limited features
Can only join 3 groups
Max upload size: 15 MB

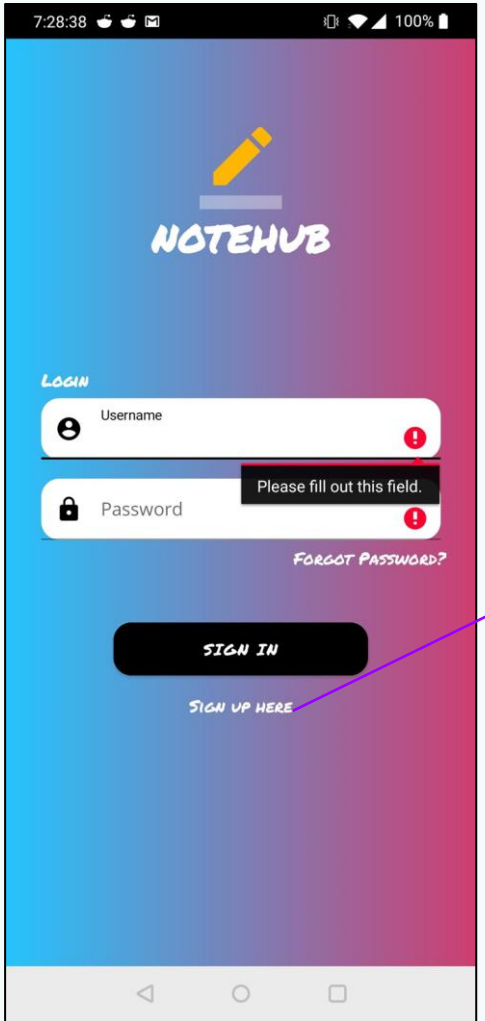
Premium

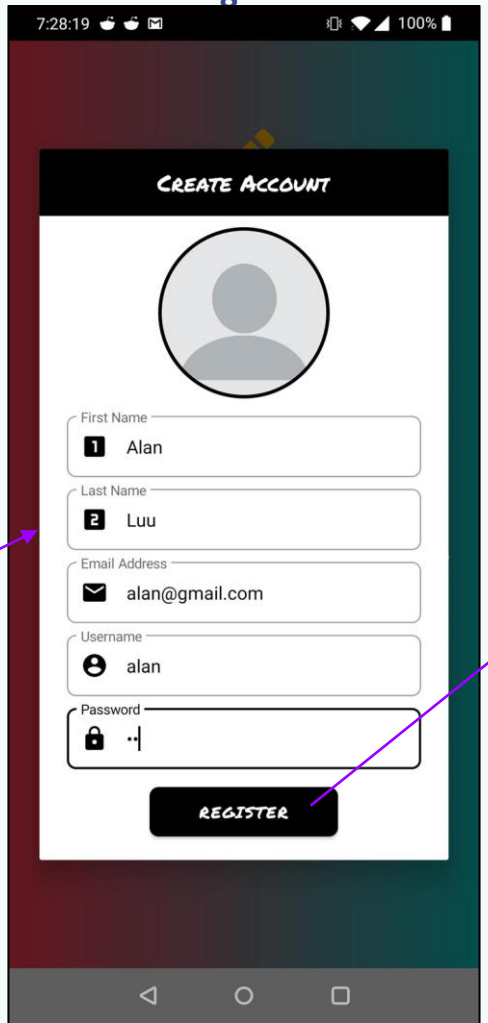
Has access to all features
Unlimited groups
Max upload size: 50 MB

Moderator

An owner of a group
Can add or remove users
Can delete any note in group

Sign In


7:28:38
100%
NOTEHUB
LOGIN
Username
Please fill out this field.
Password
FORGOT PASSWORD?
SIGN IN
SIGN UP HERE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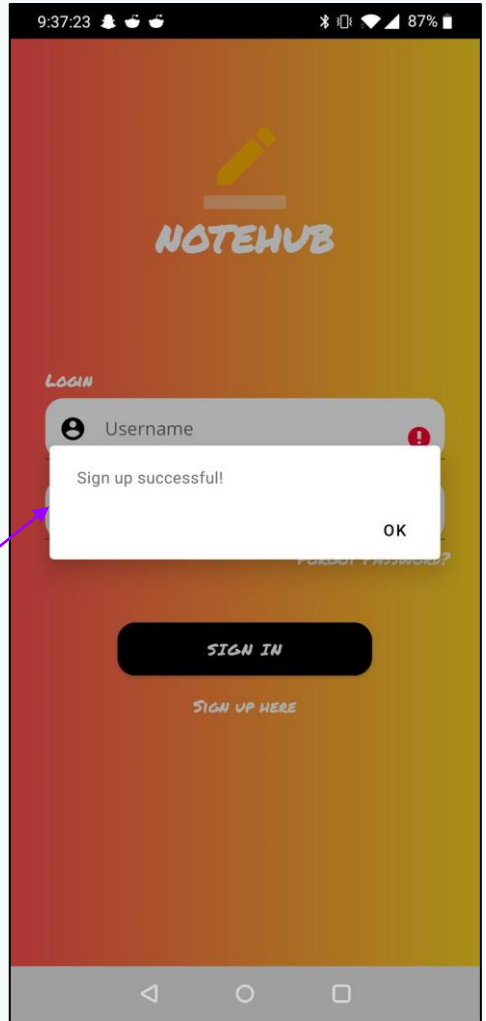
CREATE ACCOUNT
First Name
Alan
Last Name
Luu
Email Address
alan@gmail.com
Username
alan
Password
REGISTER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87%
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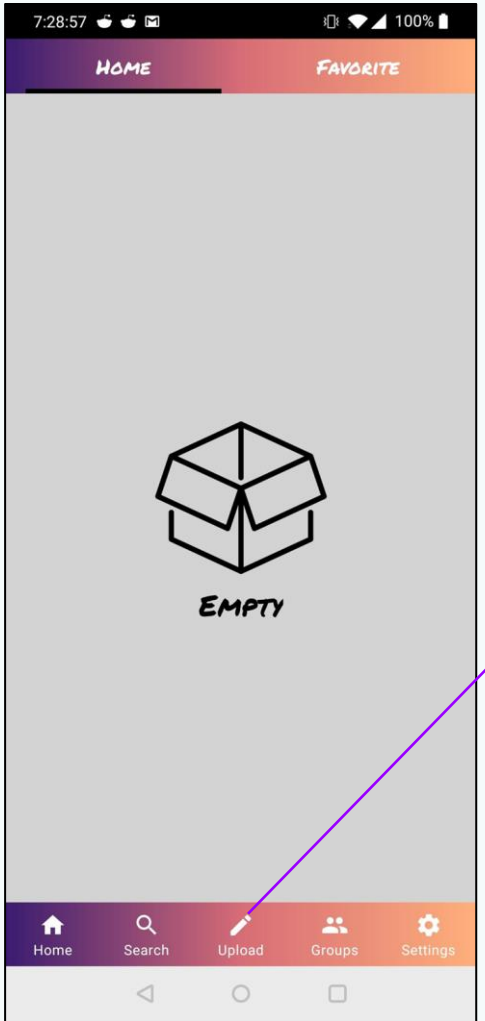
LOGIN
Username
Sign up successful!
OK
SIGN IN
SIGN UP HERE

Upload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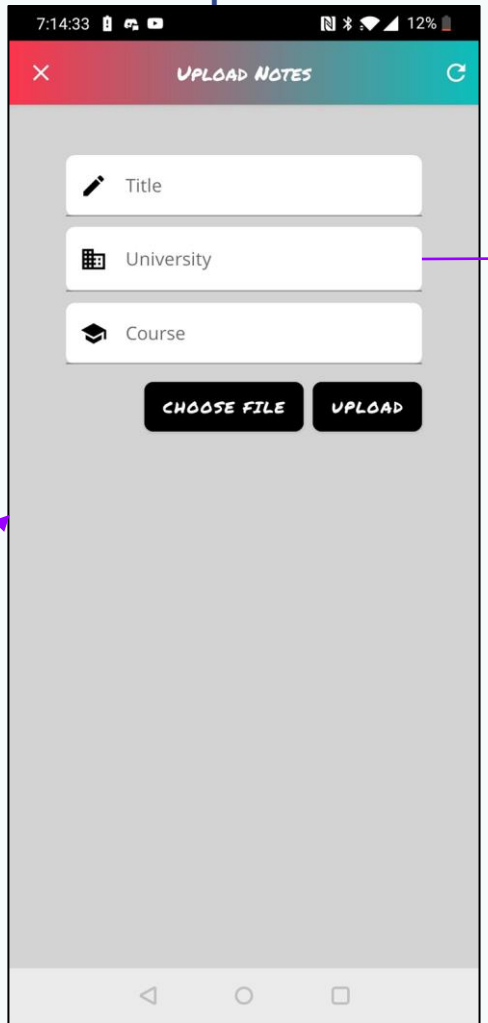
100%
HOME
FAVORITE
EMPTY
Home
Search
Upload
Groups
Settings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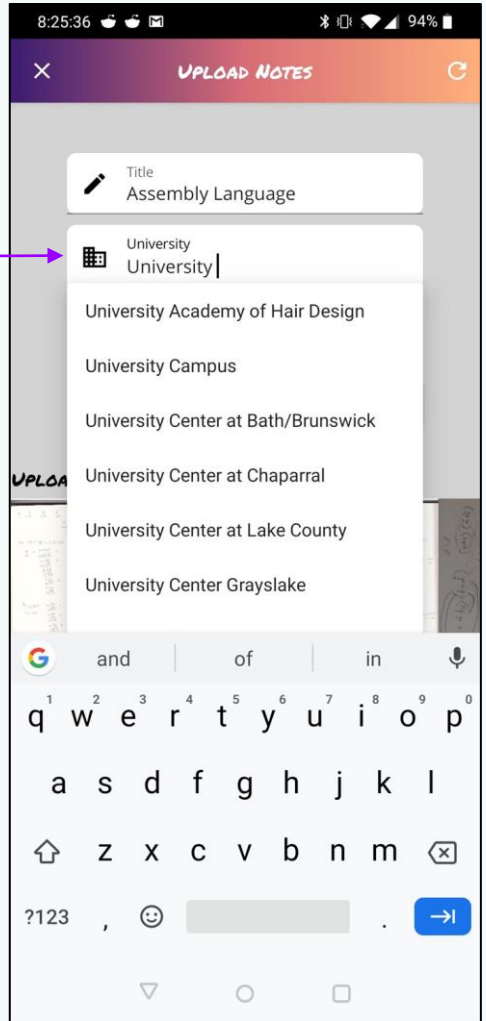
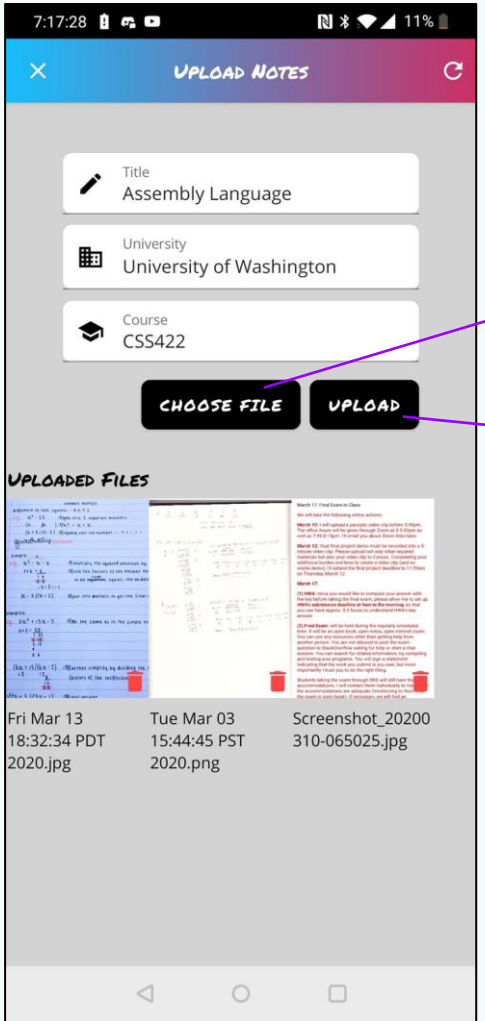
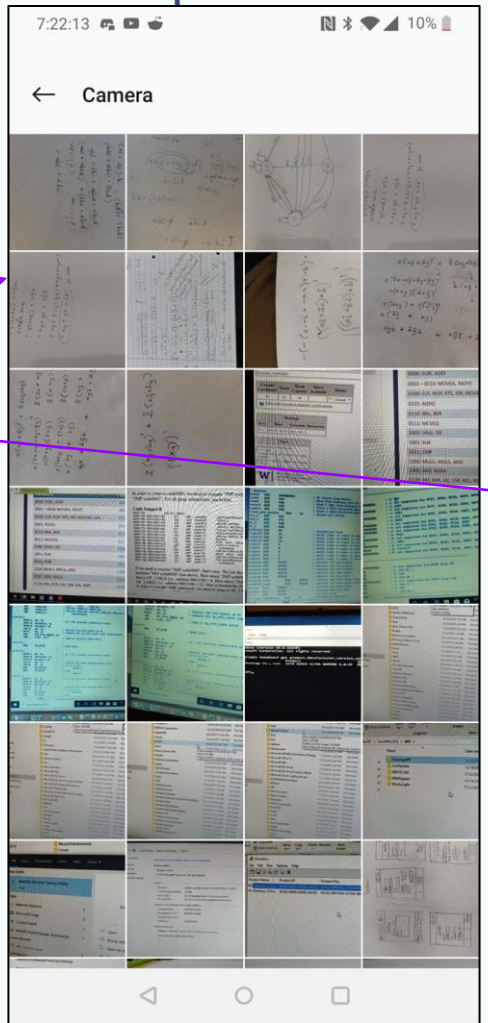
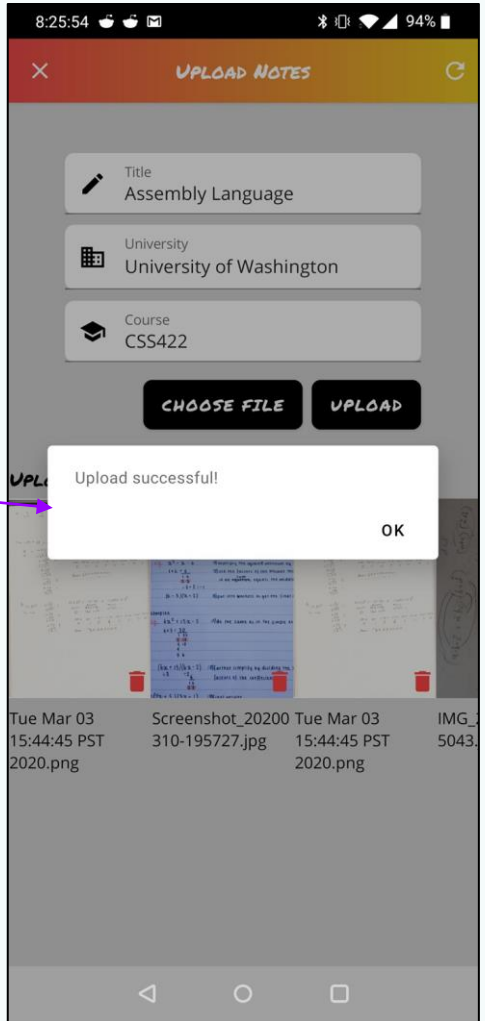
UPLOAD NOTES
Title
University
Course
CHOOSE FILE
UPLOAD


8:25:36
94%
UPLOAD NOTES
Title
Assembly Language
University
University
University Academy of Hair Design
University Campus
University Center at Bath/Brunswick
University Center at Chaparral
University Center at Lake County
University Center Grayslake
and
of
in

Upload Files







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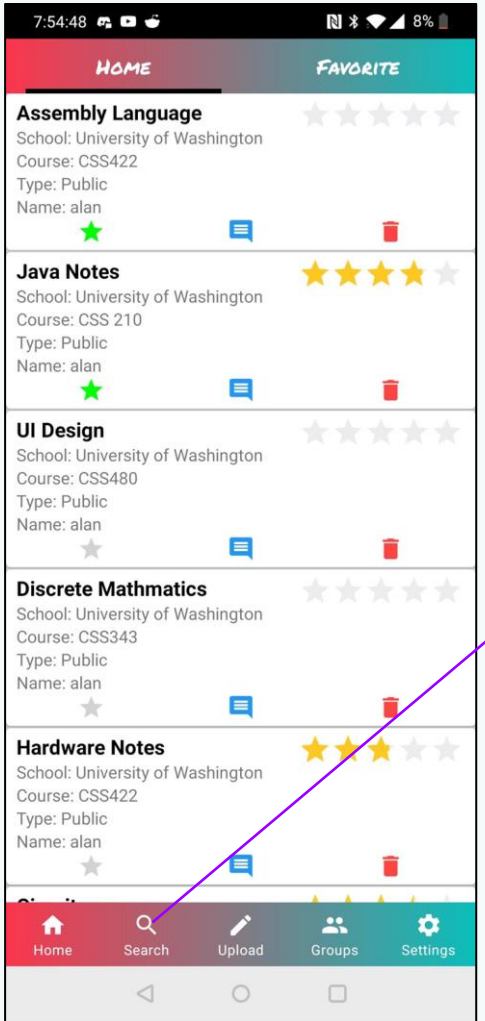
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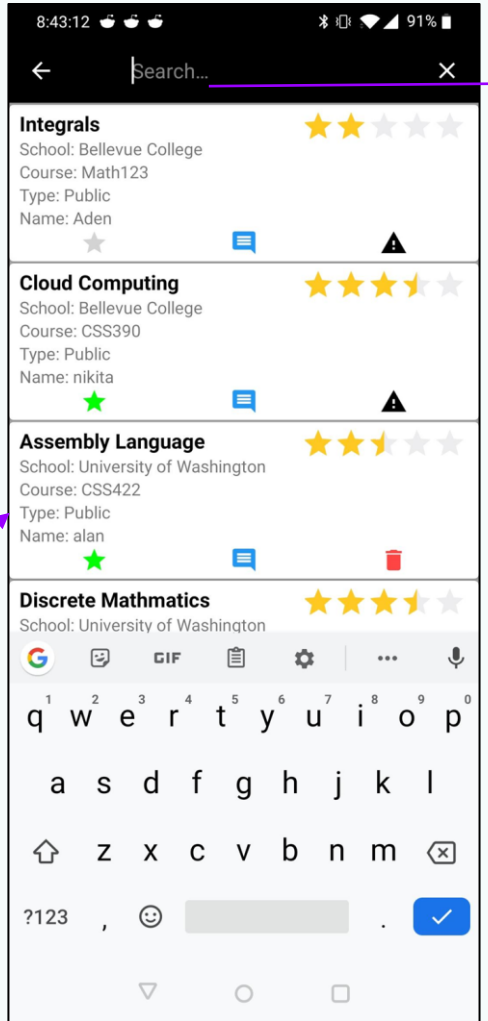
HOME
FAVORITE
Assembly Language
School: University of Washington
Course: CSS422
Type: Public
Name: alan
Java Notes
School: University of Washington
Course: CSS 210
Type: Public
Name: alan
UI Design
School: University of Washington
Course: CSS480
Type: Public
Name: alan
Discrete Mathmatics
School: University of Washington
Course: CSS343
Type: Public
Name: alan
Hardware Notes
School: University of Washington
Course: CSS422
Type: Public
Name: alan
Home
Search
Upload
Groups
Settings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91%
Search...
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Course: Math123
Type: Public
Name: Aden
Cloud Computing
School: Bellevue College
Course: CSS390
Type: Public
Name: nikita
Assembly Language
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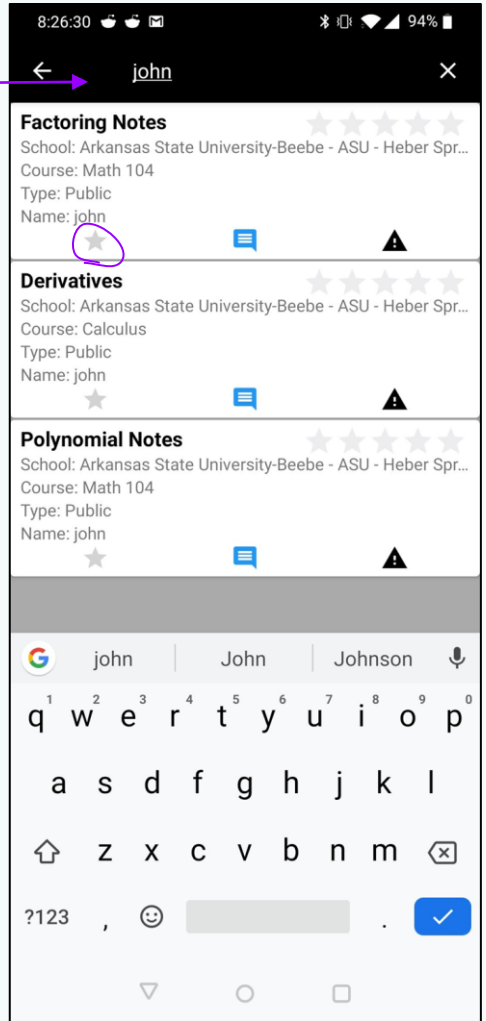
Course: CSS422
Type: Public
Name: alan
Discrete Mathmatics
School: University of Washington


8:26:30
94%
john
Factoring Notes
School: Arkansas State University-Beebe - ASU - Heber Spr...
Course: Math 104
Type: Public
Name: john
Derivatives
School: Arkansas State University-Beebe - ASU - Heber Spr...
Course: Calculus
Type: Public
Name: john
Polynomial Notes
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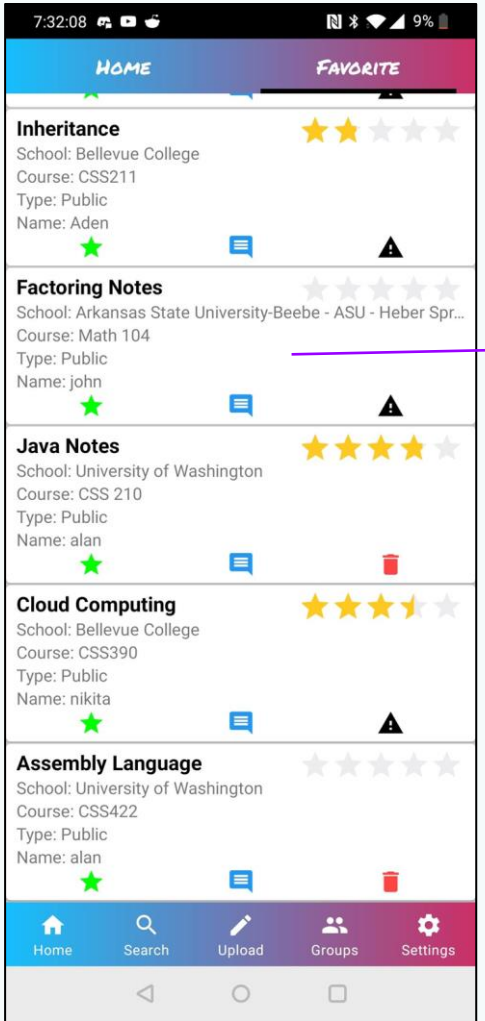
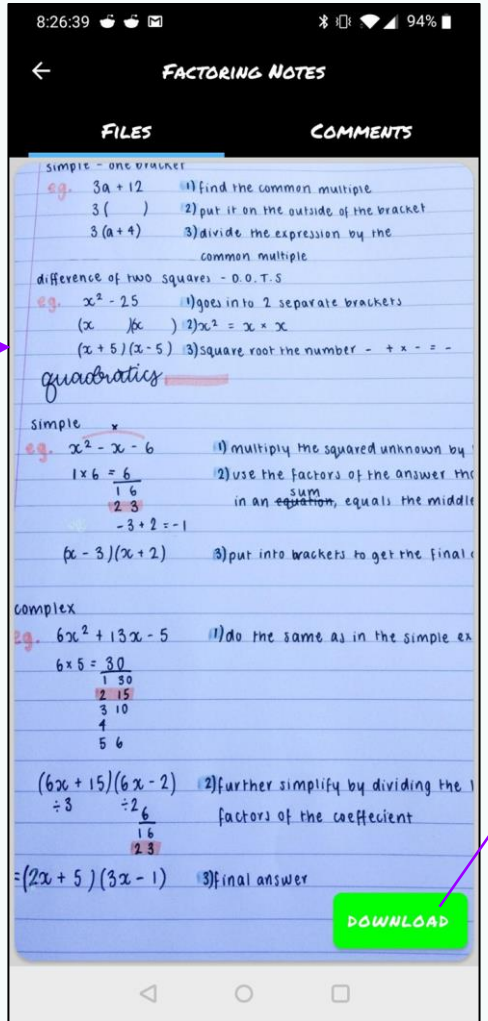
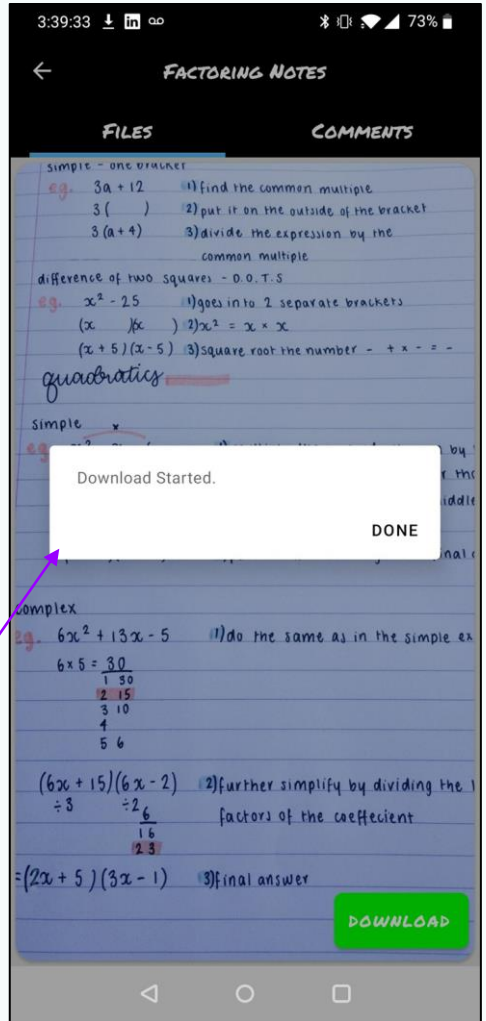
Course: Math 104
Type: Public
Name: john

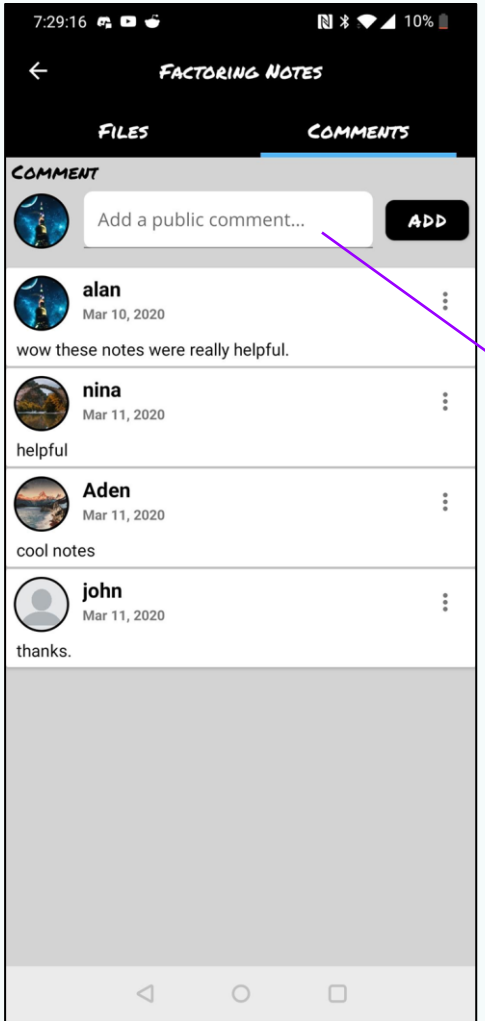
Inner Note Files View

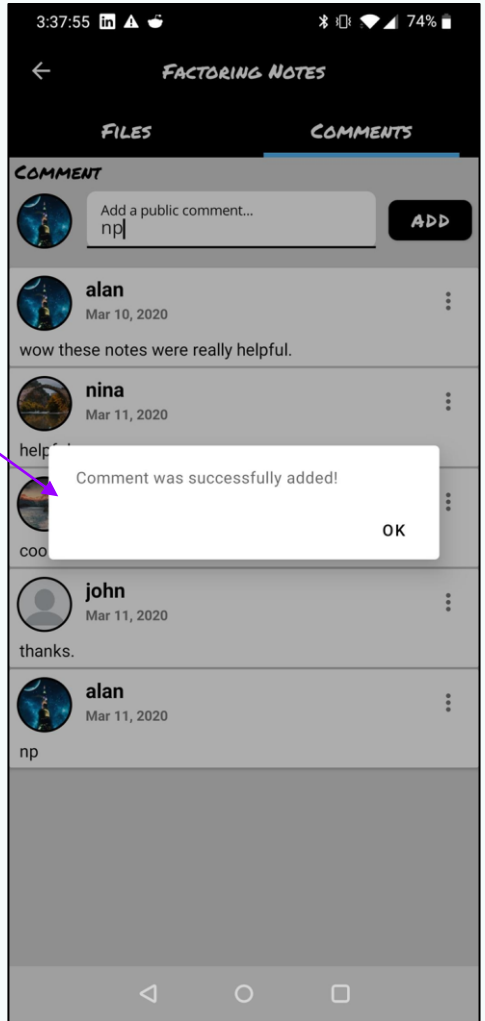


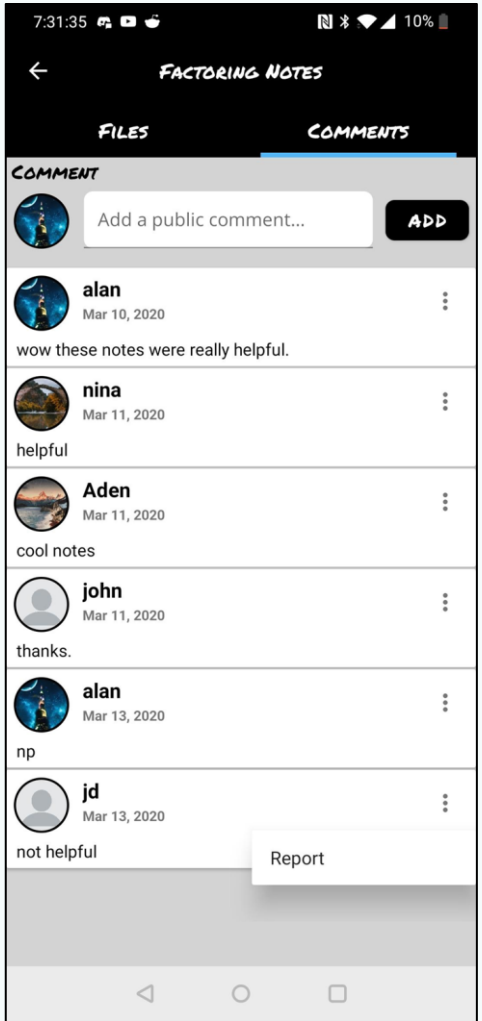




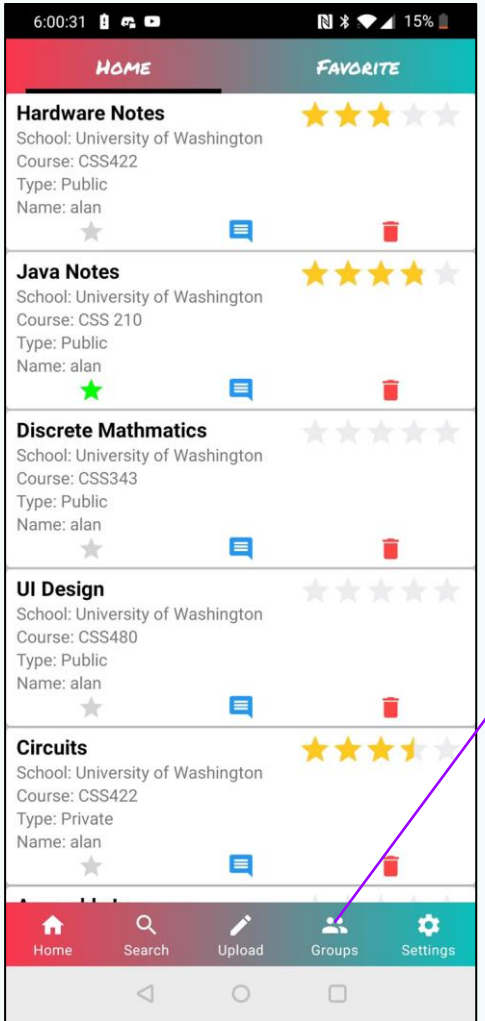
Inner Note Comments View

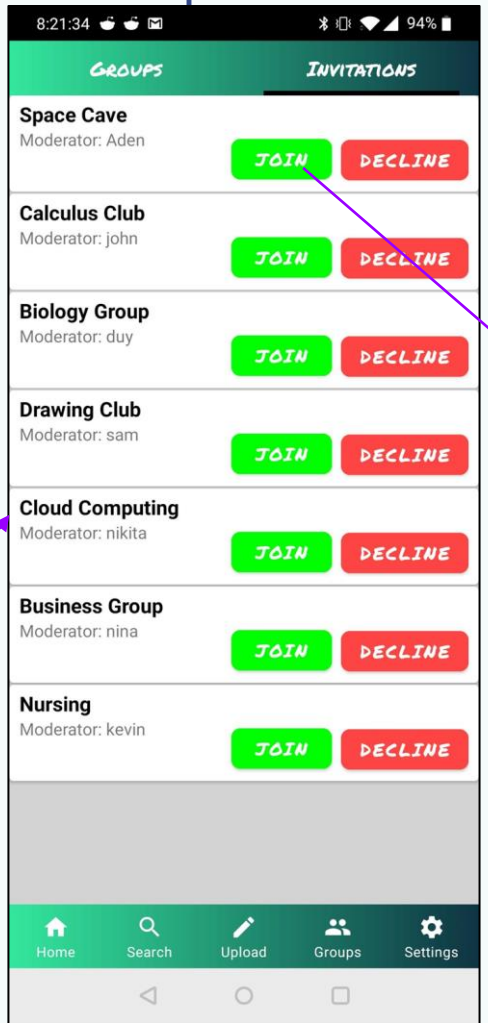


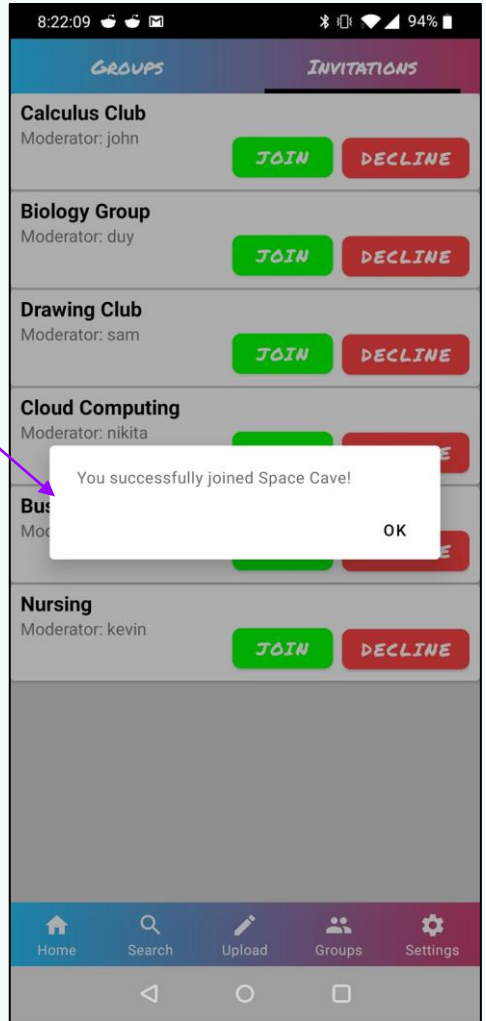




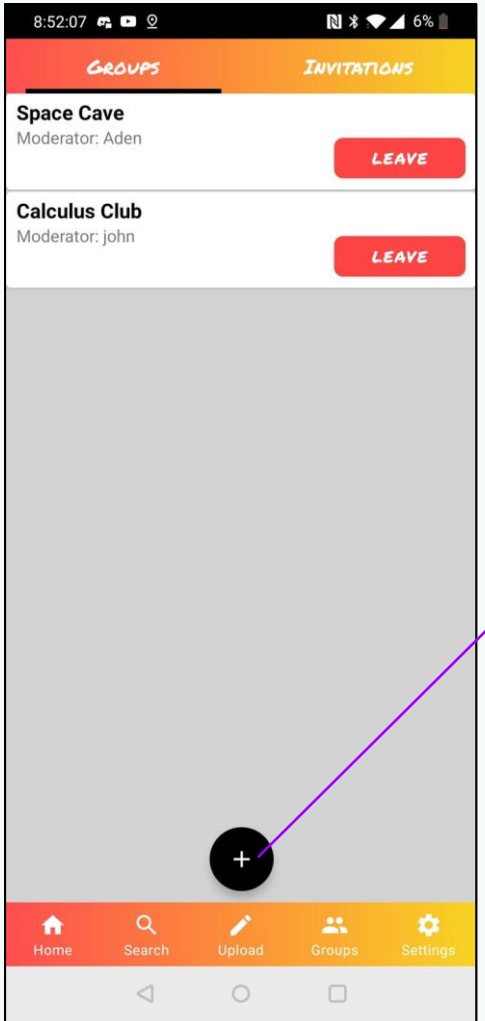
Group Invitations

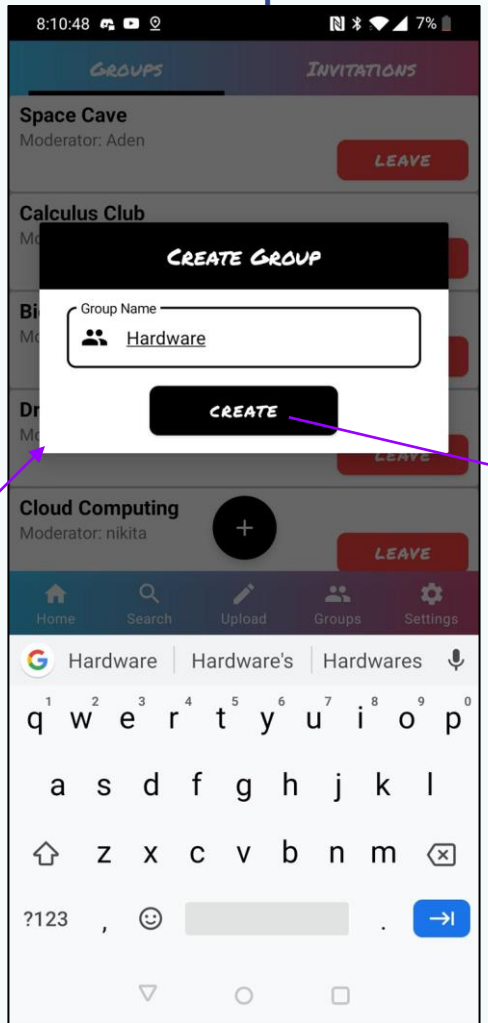


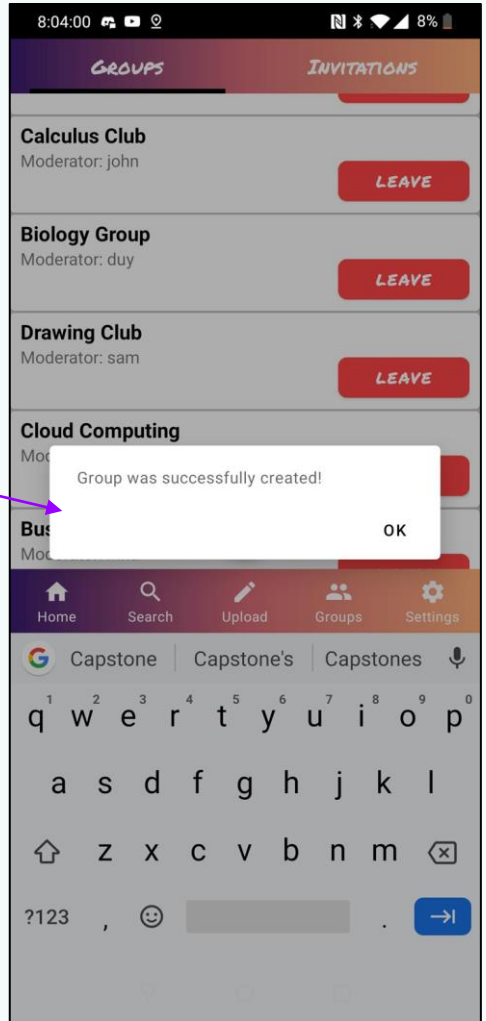




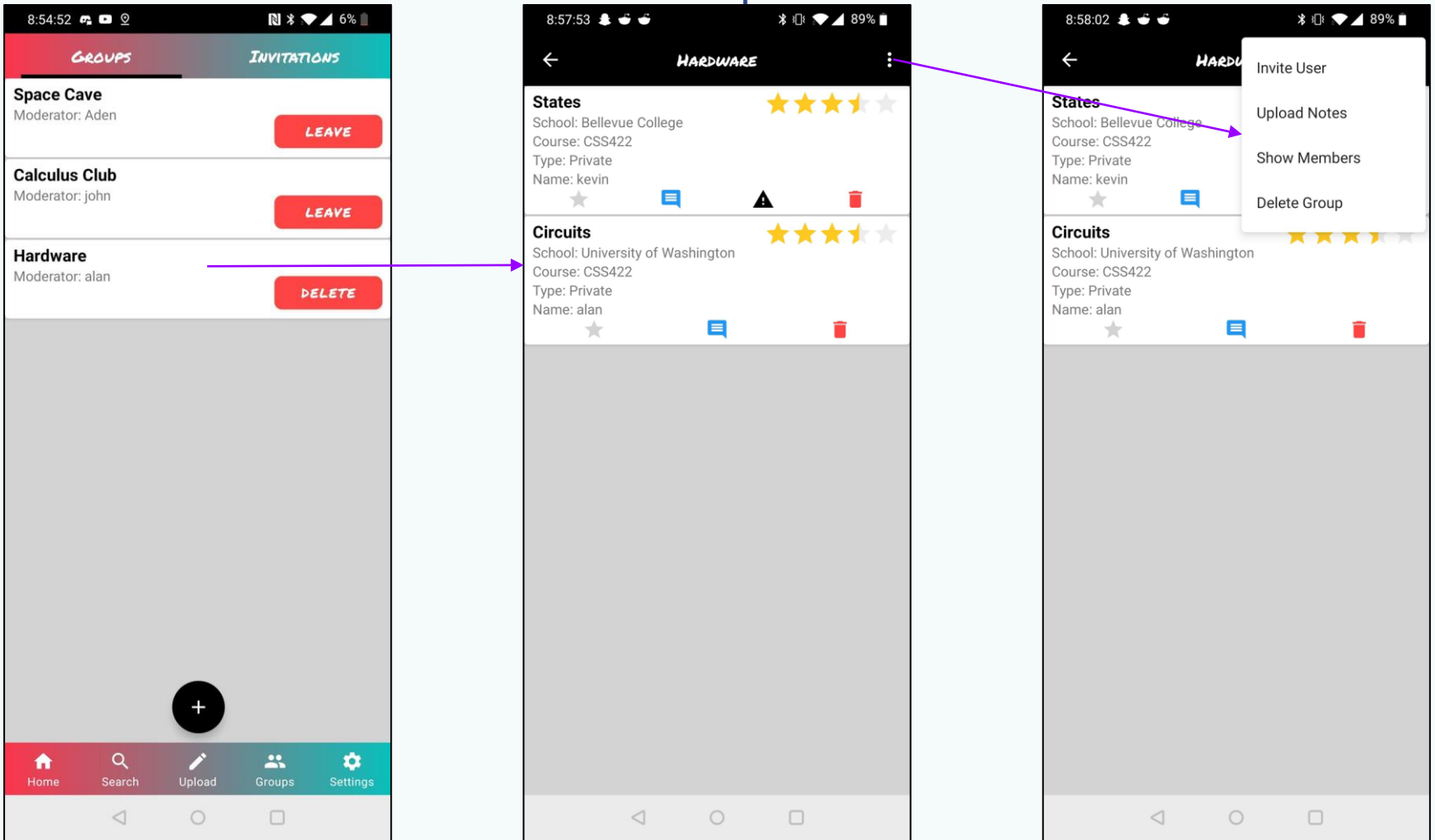
Group


8:52:07
6%
GROUPS
INVITATIONS
Space Cave
Moderator: Aden
LEAVE
Calculus Club
Moderator: john
LEAVE
Home
Search
Upload
Groups
Settings

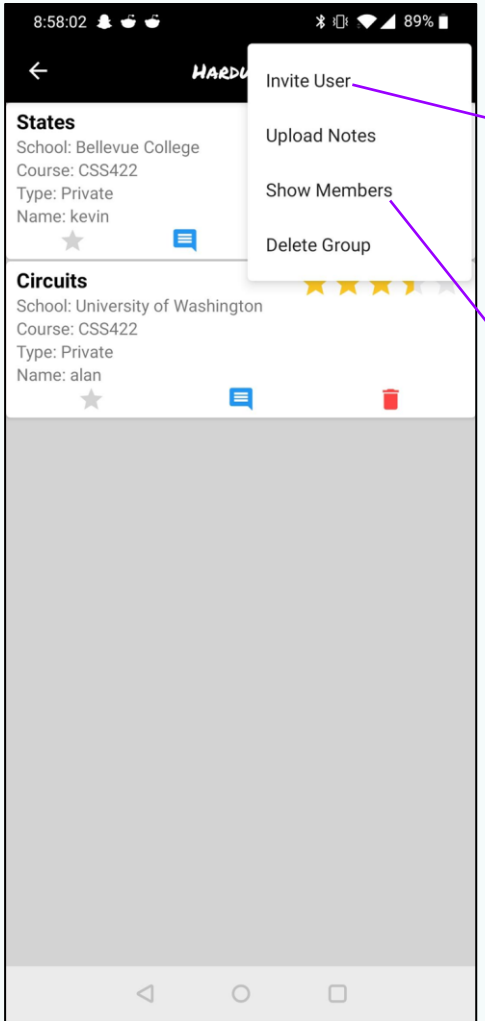

8:10:48
7%
GROUPS
INVITATIONS
Space Cave
Moderator: Aden
LEAVE
Calculus Club
CREATE GROUP
Group Name
Hardware
CREATE
Cloud Computing
Moderator: nikita
LEAVE
Home
Search
Upload
Groups
Settings
Hardware
Hardware's
Hardwares

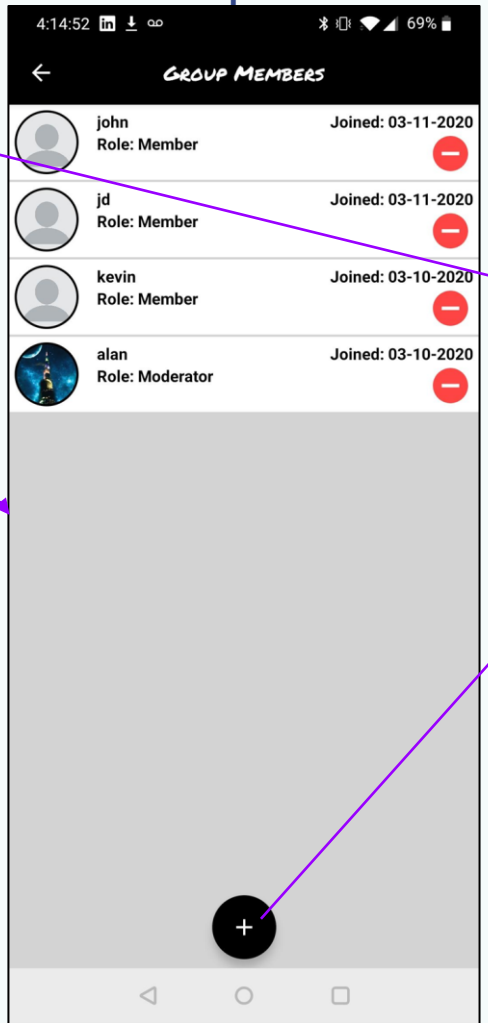

8:04:00
8%
GROUPS
INVITATIONS
Calculus Club
Moderator: john
LEAVE
Biology Group
Moderator: duy
LEAVE
Drawing Club
Moderator: sam
LEAVE
Cloud Computing
Group was successfully created!
OK
Home
Search
Upload
Groups
Settings
Capstone
Capstone's
Capstones

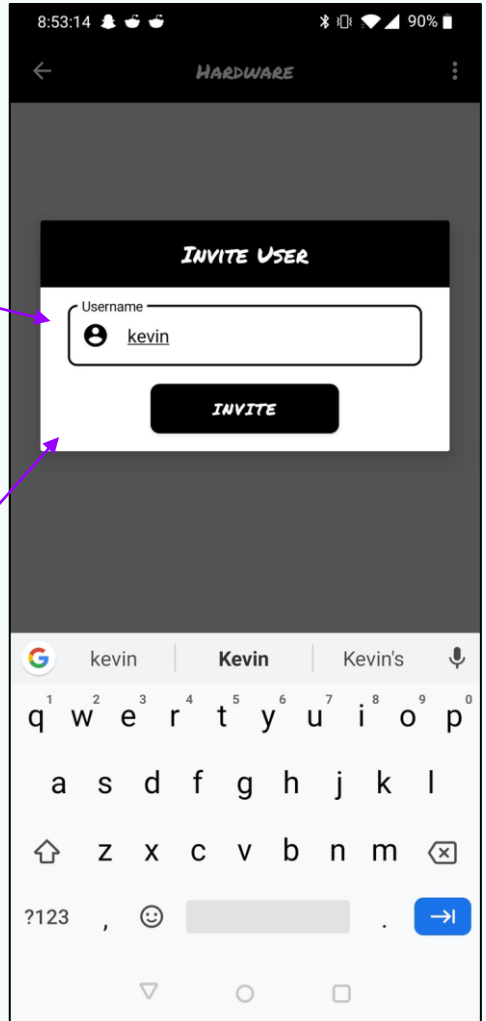
Inner Group View



Inner Group Menu







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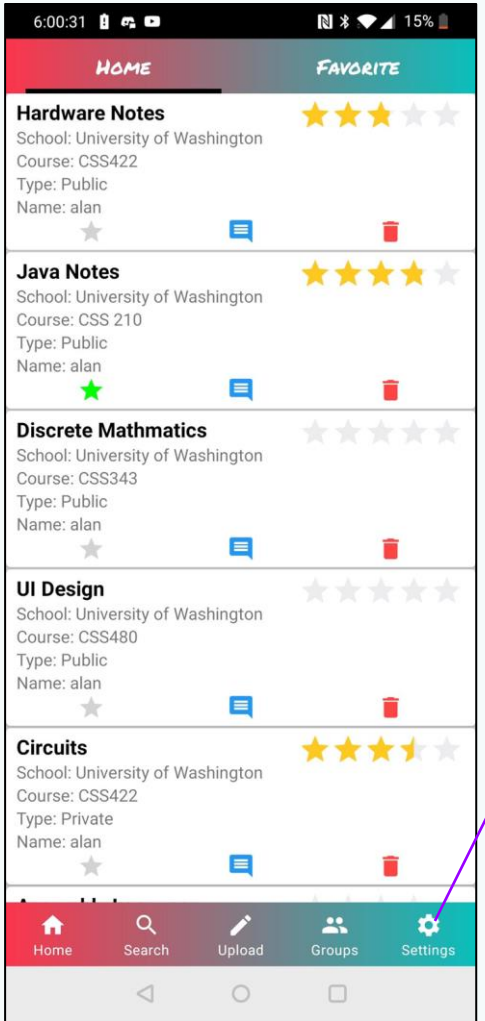
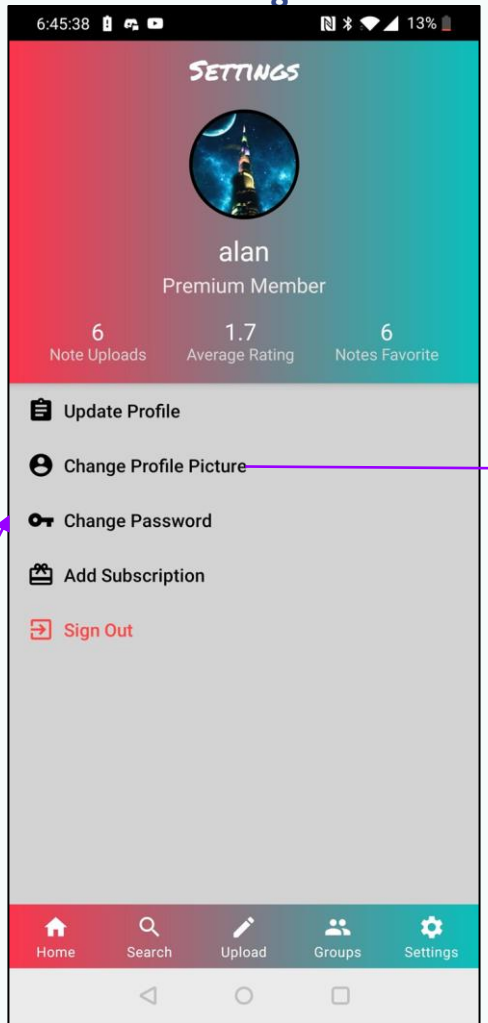
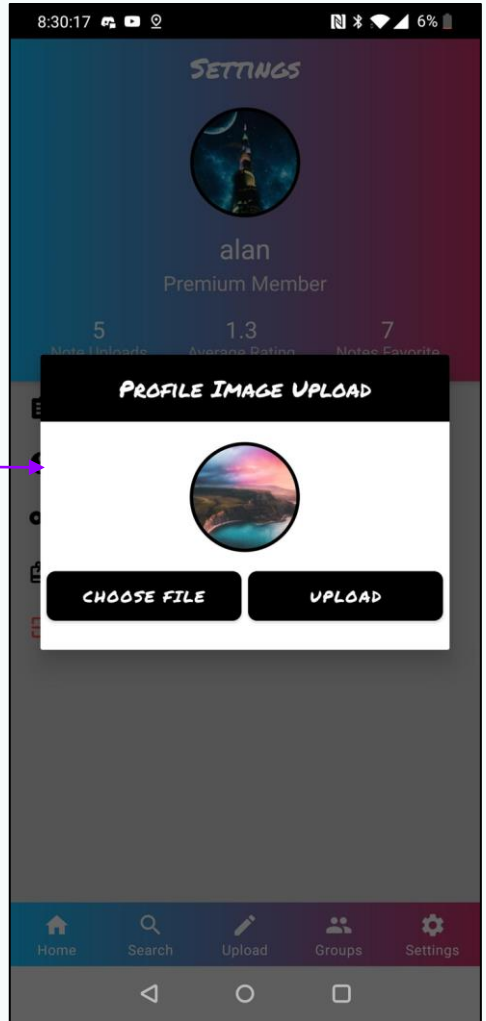

6:00:31
15%
HOME
FAVORITE
Hardware Notes
School: University of Washington
Course: CSS422
Type: Public
Name: alan
Java Notes
School: University of Washington
Course: CSS 210
Type: Public
Name: alan
Discrete Mathmatics
School: University of Washington
Course: CSS343
Type: Public
Name: alan
UI Design
School: University of Washington
Course: CSS480
Type: Public
Name: alan
Circuits
School: University of Washington
Course: CSS422
Type: Private
Name: alan
Home
Search
Upload
Groups
Settings


6:45:38
13%
SETTINGS
alan
Premium Member
6
Note Uploads
1.7
Average Rating
6
Notes Favorite
Update Profile
Change Profile Picture
Change Password
Add Subscription
Sign Out
Home
Search
Upload
Groups
Settings


8:30:17
6%
SETTINGS
alan
Premium Member
PROFILE IMAGE UPLOAD
CHOOSE FILE
UPLOAD
Home
Search
Upload
Groups
Settings

Back-End Development

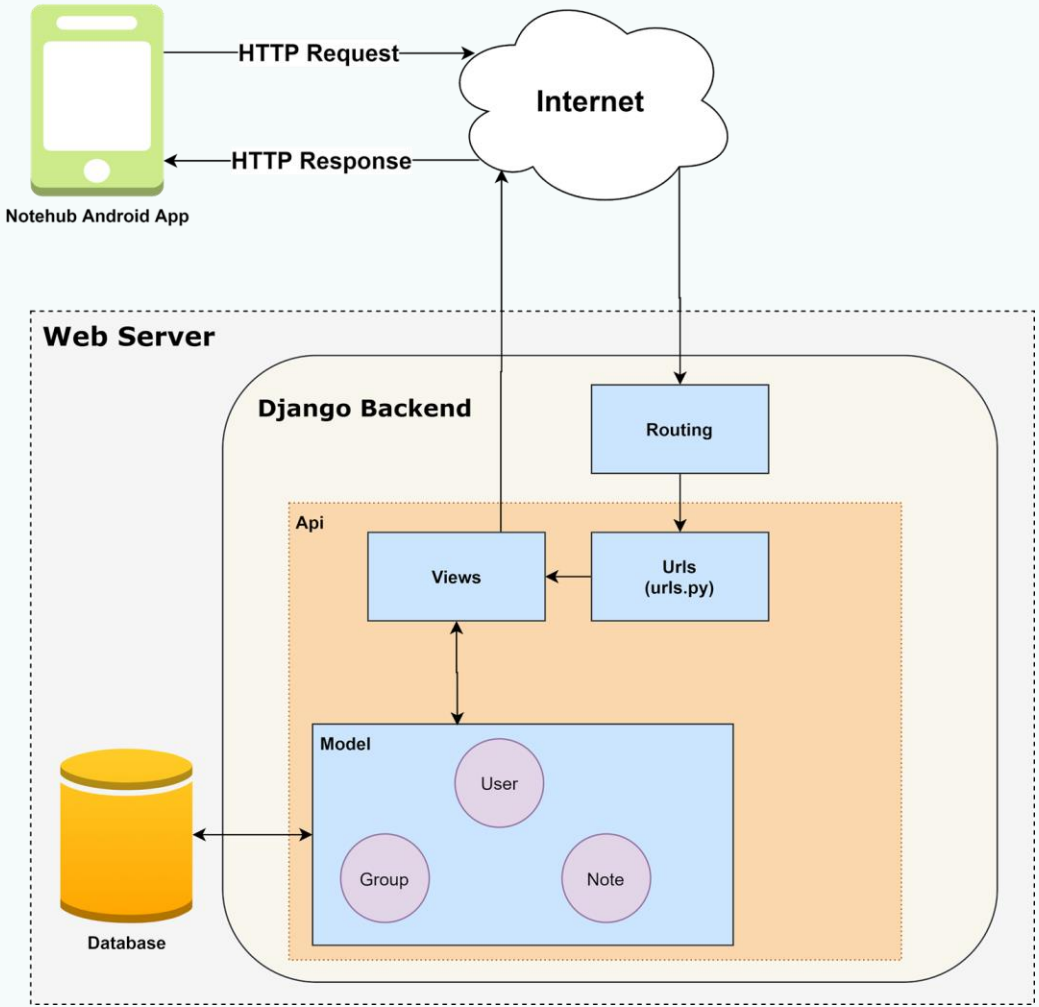
04

Back-End Architecture

django

Architecture

- App sends HTTP Requests to back-end server
- Back-end server receives the request and performs the appropriate action
- Back-end server sends response to the application



HTTP Request Methods

- GET
- POST
- PUT
- PATCH
- DELETE

GET Request Example

```
GET /api/notes/ HTTP/1.1
Host: ec2-18-144-135-4.us-west-
1.compute.amazonaws.com
```

POST Request Example

```
POST /api/notes/ HTTP/1.1
Host: ec2-18-144-135-4.us-west-
1.compute.amazonaws.com
Content-Type: application/json
Authentication: Token 1234
Content-Length: 62

{"title":"CSS 350 CH 5","university":"57", "course":"CSS 350"}
```

REST API

REST: *RE*presentational *S*tate *T*ransfer

Resource: is an abstraction of information

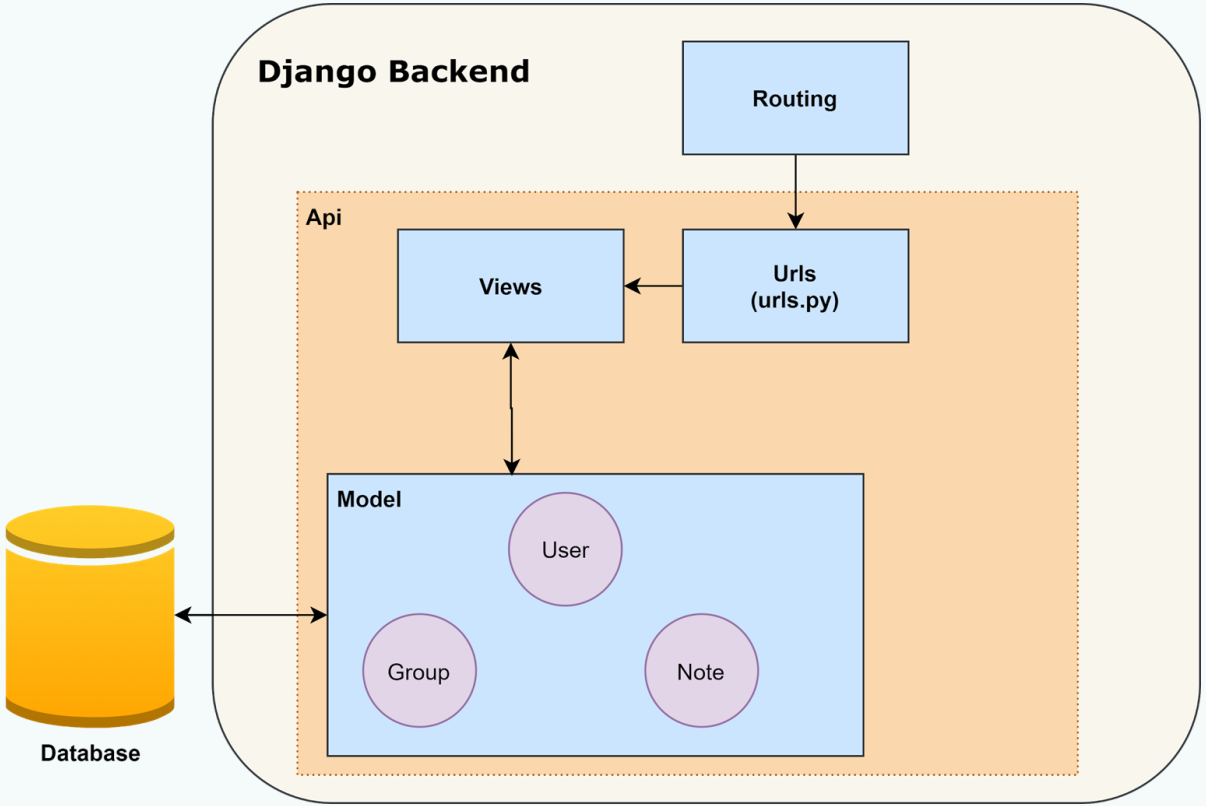
Resource Method: used to perform a desired action.

Endpoint: URL that is requested

5 Guiding Constraints:

1. Client-server architecture
2. Statelessness
3. Cacheability
4. Layered system
5. Uniform interface

GET /api/notes/



API Endpoints (urls.py)

Urls
(urls.py)

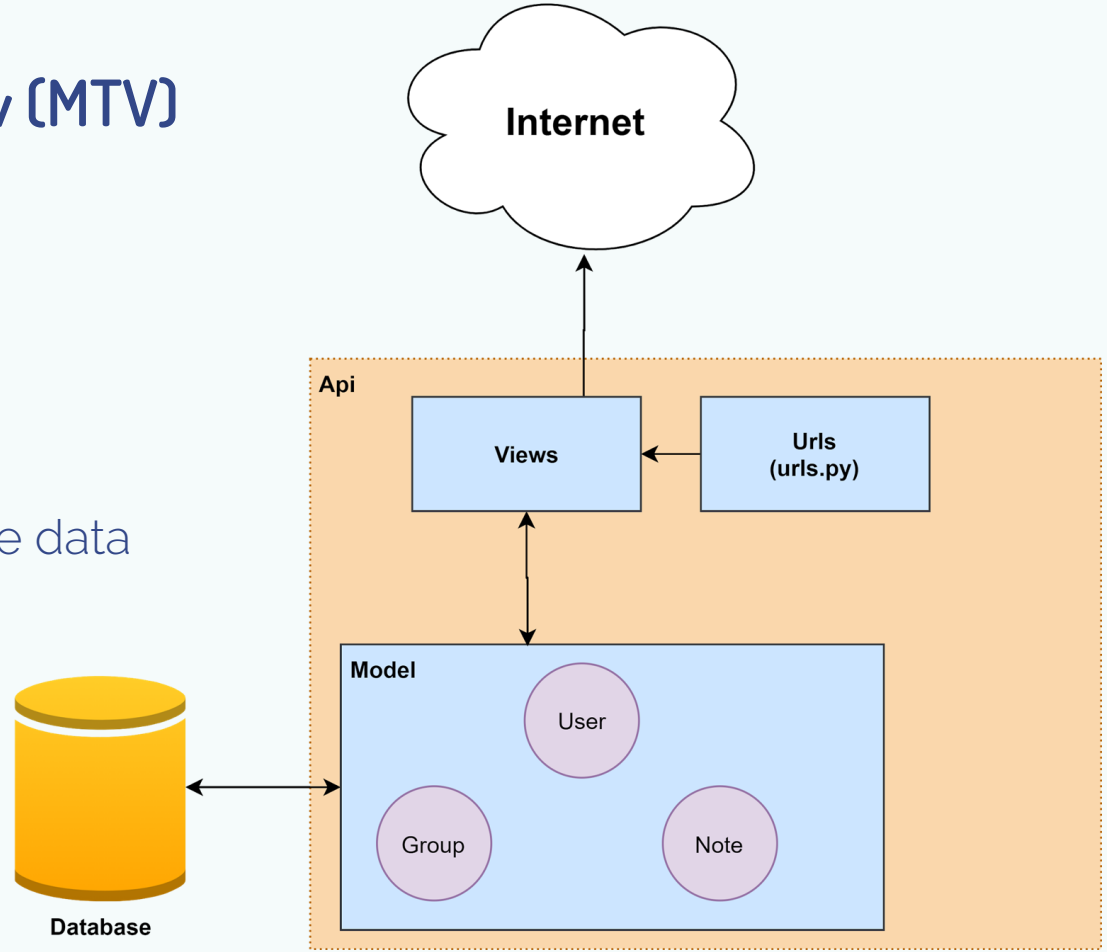
- login/
- user/
- users/
- notes/
- universities/
- groups/
- notes/<int:note_id>/files/
- notes/<int:note_id>/ratings/
- notes/<int:note_id>/comments/
- notes/<int:note_id>/favorites/
- notes/<int:note_id>/report/

Model, Template, and View (MTV)

Model: Describes the data

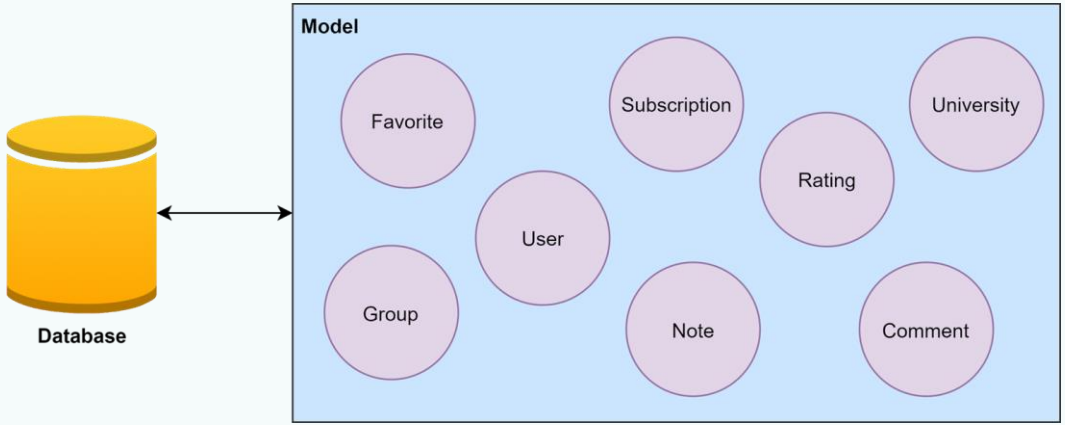
View: Describes which data is presented

Templates: Describes how the data is presented



Object-relational mapping

- Allows the use of an object-oriented paradigm to make queries.
- Object attributes are mapped to table fields
- Allows the use of objects to interact with the database



Response

- HTTP responses can contain information as JSON
- JSON represents data objects as readable text
- Android application able to convert JSON into objects.


```
{
    "id": 1,
    "author_username": "alan",
    "title": "Hardware Notes",
    "university_name": "University of Washington",
    "course": "CSS422",
    "avg_rating": 2.75,
    "has_rated": false,
    "is_author": false,
    "is_moderator": false,
    "created_at": "2020-03-11T02:53:51.152025Z",
    "updated_at": "2020-03-11T02:54:05.599743Z"
}
```

Usability Testing

Metrics: SUS, SEQ, & Completion
Student Feedback

05

Usability Testing

Setup:

- 17 volunteer testers
- Test consists of 10 tasks
- During the test, three different metrics will be measured

Usability Metrics:

- Completion Rate
- Task Level Satisfaction
- Test Level Satisfaction

Tasks

Each task must be completed in less than 60 seconds:

- Create account
- Sign out of account
- Upload note
- Delete note
- Create group
- Invite user to group
- Download note
- Comment on note
- Favorite and Report Note
- Add subscription

Completion Rate

- Success or Failure of each task is recorded
- Calculated by dividing number of tasks completed by total tasks
- Goal is for average completion rate to be **78%** or greater

$$\text{Completion Rate} = \frac{\text{Successful Tasks}}{\text{Total Tasks}} \cdot 100\%$$

	Create Account	Sign out	Upload Note	Delete Note	Create Group	Invite User	Download	Comment	Favorite & Report	Subscription	Total
Avg Completion Rate	82.35%	100.00%	94.12%	100.00%	82.35%	100.00%	88.24%	100.00%	100.00%	100.00%	94.71%

Task Level Satisfaction

- Measured using a Single Ease Question (SEQ)
- 1-7 rating scale
- Given after every task
- Goal is for average SEQ score of **5.5** or greater

Overall, this task was?

Very Difficult 1 2 3 4 5 6 7 *Very Easy*

	Create Account	Sign out	Upload Note	Delete Note	Create Group	Invite User	Download	Comment	Favorite & Report	Subscription
Avg SEQ Score	6.5	6.6	5.4	6.4	5.4	6.2	5.9	6.3	6.2	6.6

Test Level Satisfaction

- Measured using a System Usability Scale (SUS)
- 10 questions
- 1-5 rating scale
- Given at the end of the test
- Goal is for average SEQ score of **68** or greater
- Ended with an average SEQ score of **74**

Notehub System Usability Scale

I would like to use this app frequently.
Strongly Disagree 1 2 3 4 5 *Strongly Agree*

I found this app to be complex.
Strongly Disagree 1 2 3 4 5 *Strongly Agree*

I believe that this app is easy to use.
Strongly Disagree 1 2 3 4 5 *Strongly Agree*

I believe that I would need technical support to use the app.
Strongly Disagree 1 2 3 4 5 *Strongly Agree*

I found that the various features of the app was easy to find.
Strongly Disagree 1 2 3 4 5 *Strongly Agree*

I think that the app is frequently inconsistent.
Strongly Disagree 1 2 3 4 5 *Strongly Agree*

I can see most people learning to use this app quickly.
Strongly Disagree 1 2 3 4 5 *Strongly Agree*

I found that the app would frequently perform unexpected actions.
Strongly Disagree 1 2 3 4 5 *Strongly Agree*

I feel confident using the app.
Strongly Disagree 1 2 3 4 5 *Strongly Agree*

I needed to learn a lot of things before I could use the app.
Strongly Disagree 1 2 3 4 5 *Strongly Agree*

Students Feedback

"I would separate the settings into sections."

—Aden Shukuroff

"Only show the delete icon for other users' notes."

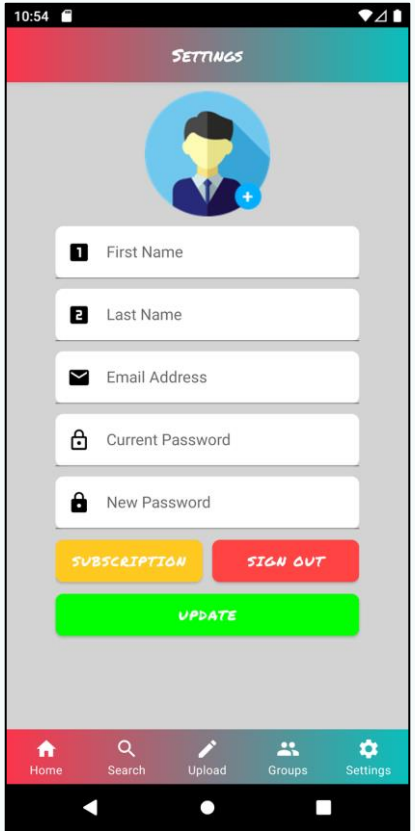
—Aaron Vega

"The upload page should show all the note files."

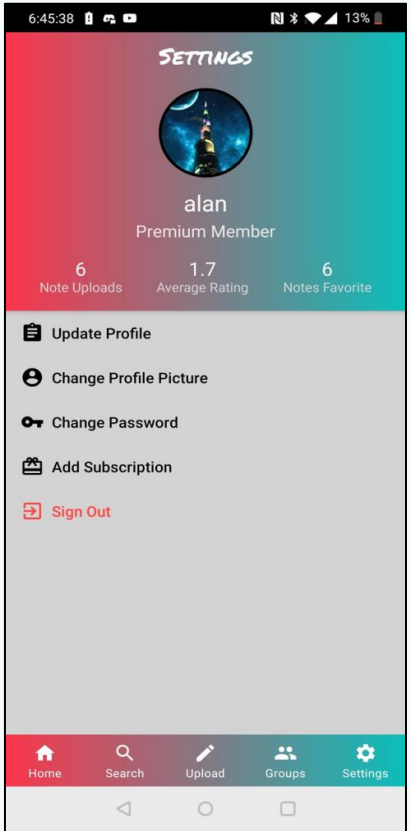
—Nina Nguyen

Implemented Students Feedback

Before



After



06

Experience

Helpful Courses &
Knowledge Gained

Helpful Courses

- CSS 342 & 343: Data Structures and Algorithms
- CSS 360: Software Engineering
- CSS 370: Analysis and Design
- CSS 432: Computer Networking
- CSS 475: Database Systems
- CSS 480: Principles of Human-Computer Interaction

Knowledge Gained

Alan:

- Android Studio IDE
- Call APIs
- Android application

JD:

- Back-end using Django
- Deploy a backend on a AWS server
- Apache

THANKS

Do you have any questions?

CREDITS: This presentation template was created by Slidesgo, including icons by Flaticon, and infographics & images by Freepik

NoteHub: Android & Django Development

Presenters: JD Mauthe, Alan Luu **Faculty Advisor:** Yusuf Pisan **Sponsors:** Aaron Vega, Aden Shukuroff **Date: March 10th, 2020**

Background

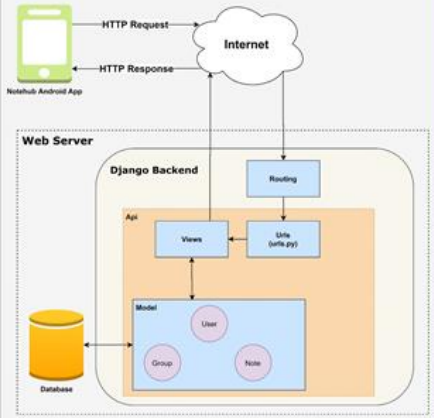
Within the USA there exists over 5,000 colleges and universities. There were over 19.7 million students enrolled in postsecondary institutions during fall 2017. Currently there exist few tools that allow these millions of students to share and find notes created during there enrollment.

Goal

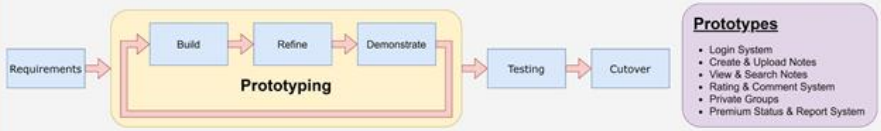
To create a user-friendly android app that provides a platform for users to share notes from the courses they have taken in college and a backend server to support the app. The app should have the following features:

- Upload notes
- Search notes by title, author, university, and course
- Keep a list of favorite notes
- Create private study groups
- Rate other users notes
- Comment on uploaded notes
- Download notes for offline use

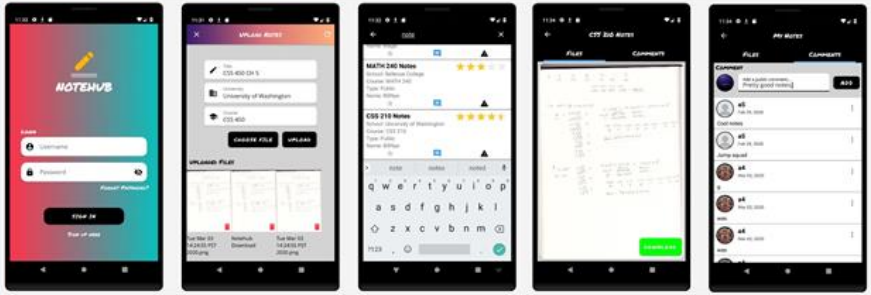
Architecture



Rapid Application Development



Results



Usability Testing

A total of 17 volunteer users took usability tests. This test consist of 10 tasks to be done within the android app. The following was measured during these tests:

- **Completion Rate:** The percentage of tasks that was successfully completed
- **Single Ease Question:** A 7-point rating scale for the difficulty of each task.
- **System Usability Scale:** A questionnaire with 5-point rating scales for how much the user agrees with the question.

	Average SEQ Score	Average SUS Score	Average Completion Rate
Goal	5.5	68	78%
Result	6.15	74.26	94.70%

Technology & Tools

Conclusion

This project accomplish the following:

- Creation of an android app with all required features
- Deployment of Django backend server on AWS server
- Conducted usability testing and met all usability goals