Fall 2023

CS 388: Android Application Development

Baruch Schieber

CS388001-Android Application Developmnt

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Course Information

Course Number: CS388

Course Title: Android Application Development

Faculty Contact Information

Instructor: Baruch Schieber

Email: sbar@njit.edu (mailto:sbar@njit.edu)

Tech Fellows:

Office Hours: Baruch Schieber Thursdays 1:30-3:30,

Tech Fellows by appointment

Grading Policy

The CodePath grading as detailed below will be weighed as 60% of the final grade. Please be advised that the contribution of the CodePath grade to your final grade cannot exceed 60%, even if you get more than 100% as your CodePath grade,

The remaining 40% of the final grade will be determined as follows:

- The final group project will be graded and will be 25% of the final grade
- You will have to submit the weekly labs. They will be reviewed and will be 10% of the final grade. The labs need to be completed in class, and your grade will be based on your throughput. If you are absent from class for a *justified* reason (approved by the Dean of Students) you will be able to complete and submit the lab within 72 hours of the scheduled lab
- Stretch features of the assignments will be 5% of the final grade. In order to get the full 5% credit

for stretch features you will need to complete the required features of *all* the assignments. If you complete at least half of the stretch features of *every* assignment you will 2% credit
- A bonus of 5% will be given for *perfect* attendance, with the exception of up to two *justified* absences (approved by the Dean of Students)
- The course has no final and midterm exams

Statement on academic integrity

Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: **http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf (http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf)** .

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at **dos@njit.edu (mailto:dos@njit.edu)**

NJIT policy requires that all midterm and final exams must be proctored, regardless of delivery mode, in order to increase academic integrity. Note that this does not apply to essay or authentic based assessments. Effective beginning Fall semester 2019, students registered for a fully online course section (e.g., online or Hyflex mode) must be given the option to take their exam in a completely online format, with appropriate proctoring.

The material below is the CodePath description of the course and any grading information below refers to the CodePath portion of the grading.

Course description

This course is a semester long project-based exploration into Android mobile app development.

In the first part of the course, students develop skills by completing coding labs and building four fully

functional app assignment projects.

In the second half of the course students will apply their skills, working together in small teams, to design and and build an original app from the ground up. The course culminates in a Demo Day event where teams will present their finished apps in a live demo.

Course Expectations

(https://courses.codepath.org/snippets/and102/syllabus#heading-prerequisites-and-eligibility) Prerequisites and eligibility

Students should...

- have completed an intermediate object oriented programming course, data structures course, or similar
- be pursuing a course of study related to computer science or software
- complete the pre-work task

(https://courses.codepath.org/snippets/and102/syllabus#heading-time-commitment) Time Commitment

- **Live session attendance:** Classes meet for two 1.5-hour session every week over the duration of the semester.
  - **NOTE:** Session frequency and duration may vary depending on college.
- **Outside of class time:** Students should plan to spend 5-10 hours outside of class working on weekly assignments and their final group project.

(https://courses.codepath.org/snippets/and102/syllabus#heading-topics-covered) Topics Covered

1. **Basics**
   1. Kotlin
   2. Android Studio
2. **Views and Activities**
   1. Constructing View Layouts (LinearLayout, RelativeLayout, ConstraintLayout)
   2. Using common views (buttons, labels, images)
   3. Using RecyclerViews
3. **Event Handling, ActionBar, and Intents**
   1. Multi-screen applications
   2. Explicit vs implicit intents
   3. Passing data between activities

4. **Networking and Persistence**
    1. Authentication
    2. Networking APIs
    3. Shared Preferences using Room
    4. Databases
5. **Fragments and Navigation**
    1. Bottom navigation menu
    2. Switching between fragments
6. **Project Management**
    1. Product Specs
    2. Wireframing

Coursework and Grading

CodePath courses focus on developing student's habits and skills in order to be successful in the tech industry. Success in industry goes beyond proficiency in technical domains; The ability to be punctual, meet project deadlines and work effectively in a collaborative team are equally important skills. The following policies around attendance and coursework submissions are meant to encourage professional behavior.

(https://courses.codepath.org/snippets/and102/syllabus#heading-coursework-weighting)

Coursework Weighting

All coursework grading and accountability is handled by CodePath. The following table outlines how each coursework section is weighted in calculating a student's final grade. See **Coursework Grading** (https://courses.codepath.org/snippets/and102/grading) for a breakdown of scores for individual coursework items.

Weight	Section	Description
50%	Assignments	Weekly individual app projects
50%	Group Project App Milestones	Original app project and presentation

(https://courses.codepath.org/snippets/and102/syllabus#heading-bonus-points)

Bonus points

A student can earn bonus points on an app assignment by completing extra app features ("stretch features") beyond that which is indicated as required. Bonus points will only be applied within the given coursework section they are earned and won't increase the impact of a given section beyond

it's designated weight. For instance, no amount of bonus points will increase the impact of the *Assignments* section beyond 50% of the final grade.

(https://courses.codepath.org/snippets/and102/syllabus#heading-coursework-submissions)

Coursework Submissions

- **All coursework items** are due by their posted deadlines.
- **Three (48 hour) deadline extensions** are allowed for the individual assignments (not the group project app milestones), no questions asked. **Missed submissions automatically trigger a 48 hour extension** until they are used up -- there is no need to request extensions.
- **If a student uses all 3 deadline extensions**, all future coursework items **must** be submitted by the posted deadline. For more information on late penalties, please contact your instructor.

Attendance

CodePath courses focus on developing student's habits and skills in order to to be successful in the tech industry. Success in industry goes beyond proficiency in technical domains; The ability to be punctual, meet project deadlines and work effectively in a collaborative team are equally important skills. 5% will be deducted from the final grade of any student who misses more than 2 meetings without prior permission from either the TFs or me.

Additional Grade Incentives

- Students receive an additional bonus on their grade if they complete all their assignments:
  - **+5%** bonus for all complete submissions (meaning they submitted something for all assignments or labs or group milestones, but incurred at least 1 late submission)
  - **+10%** bonus for no late/missing/incomplete submissions

(https://courses.codepath.org/snippets/and102/syllabus#heading-completing-the-course)

Completing the Course

(https://courses.codepath.org/snippets/and102/syllabus#heading-codepath-requirements-for-course-completion) CodePath Requirements for Course Completion

CodePath holds all professional and college students to the same high bar of quality coursework and professionalism. In order to be considered CodePath alumni and receive recognition for successful completion of the course from CodePath, **students must complete the course with a final CodePath grade of 60% or above**.

Students meeting the above requirements will:

1. Receive a (digital) CodePath certificate of completion.
2. Be considered CodePath alumni and gain access to alumni networks.
3. Gain full access to the CodePath career center and be eligible for mentorship opportunities with CodePath professional alumni.

(https://courses.codepath.org/snippets/and102/syllabus#heading-grade-reports)

Grade Reports

Students will have access to their CodePath grades through the learning portal.

The NJIT professor will have full discretion and the final decision for any grades a student receives in the course. Students should defer to NJIT for specific add/drop, course withdrawal and grading policies.

- CodePath will provide the NJIT professor with all grades and student data from the course.
- The final grade given to a student is decided by the NJIT professor and is independent of the final grade determined by CodePath.

(https://courses.codepath.org/snippets/and102/syllabus#heading-other-policies)

(https://courses.codepath.org/snippets/and102/syllabus#heading-student-privacy) Student Privacy

CodePath adheres to best practices and complies with all regulations regarding student information and data privacy as outlined by FERPA.

- Private student information and assessment data will only be shared with relevant team members within the CodePath organization and the professor of record for the participating college.
- Students who wish to have their data shared with any 3rd parties must grant CodePath explicit consent of such data sharing.
- Public facing leaderboards, such as Cybersecurity Capture the Flag Competitions, will use aliases and not contain student identifiable information.

(https://courses.codepath.org/snippets/and102/syllabus#heading-device-requirements)

Device Requirements

- **You must have access to a system with the ability to download and run Android studio (https://developer.android.com/studio#downloads) .**
- **Operating System**

  - Mac® OS X® 10.10 (Yosemite) or higher, up to 10.14 (macOS Mojave)
  - Microsoft® Windows® 7/8/10 (64-bit)
  - Linux GNOME or KDE desktop (NU C Library (glibc) 2.19 or later)
- **RAM:** 8 GB RAM minimum, 16 GB RAM recommended

> For Windows: open Settings > System > About, the RAM information should be on the bottom of the page. For Mac: click on the Apple logo at the top left-hand corner, then click "About this Mac."

- **Hard Drive Free Space:** At least 10 GB of available disk space

(https://courses.codepath.org/snippets/and102/syllabus#heading-support-channels)

Support Channels:

- Get support from professionals, TAs and other students by posting technical questions on our **Discussions System** or the Slack channel.
- support.codepath.org (https://support.codepath.org)
  - Browse our ever expanding FAQ based on topic or search by keyword
  - For general inquiries, send us a message to support@codepath.org (mailto:support@codepath.org)

Course Format

This course teaches Android development in a project-based format over a 14-week period. Each week builds on the skills and knowledge from the previous week.

Each 1-week unit will consist of:

- **3 Hours of In-Class Time**, consisting of:
  - **Interactive Lecture.** An instructor-led discussion of this week's topics, assignments, and how they relate to real-world Android App Development.
    Estimated time: 30-60 minutes (synchronous)
  - **Labs.** In weekly class sessions, students will follow guides to learn new concepts through hands-on programming, collaboratively building apps.
    Estimated time: 60-90 minutes (synchronous)
- **Weekly Project.**
  - *Estimated time: 5-10 hours (asynchronous)*

- For weeks 1-6, a mobile app specification is assigned to each student as an individual project. This is the student's chance to demonstrate what they have learned that week!
- For weeks 7-14, students will be divided into teams of 3-4 students to scope, design and build a larger project applying everything they've learned in the course. Groups will:
  - share apps with classmates during week 10
  - showcase their apps on *demo day* during week 14
- Read more about the **course-wide group project (https://courses.codepath.org/courses/and102/pages/group_project)** .

Throughout the course, students will have access to:

- **Code Review.** We will briefly review each app and provide feedback on their code.
- **Online Support.** Students can post questions and get support through our Discussions System.
- **Github-based Online Learning Portal.** Students will have access to a custom learning portal with videos, code samples, and comprehensive documentation library.

(https://courses.codepath.org/snippets/and102/overview_14week#heading-unit-overview)

Unit Overview

Unit	Coursework	Content Description
1	**Lab:** Tap Counter Game **Project:** Wordle Game	• Kotlin and Android Studio • Constructing View Layouts • UI Interaction
2	**Lab:** Gmail Clone **Project:** Wishlist App	• RecyclerView • Debugging in Android Studio
3	**Lab:** NYT Book Search **Project:** Flixster+ Part 1: Movies	• Using APIs • Loading images with Glide
4	**Lab:** NYT Article Browser **Project:** Flixster+ Part 2: Your Design	• Advanced RecyclerView • Paging • Passing Data with Intents
5	**Lab:** Data Persistence (TBA) **Project:** BitFit Part 1	• Data Persistence • Room • Shared Preferences

Unit	Coursework	Content Description
6	**Lab:** NYT Combined App **Project:** BitFit Part 2	• Fragments • Navigation
7	**Lab:** Group Project Planning **Group Project:** Sprint 1 - Design	• Product Specs • Wireframing
8	**Group Project:** Sprint 2 - Design	
9	**Group Project:** Sprint 3 - Development	
10	**Group Project:** Sprint 4 - Development **Class Activity:** App Demos	• Giving and taking feedback
11	**Group Project:** Sprint 5 - Development	
12	**Group Project:** Sprint 6 - Testing	
13	**Group Project:** Sprint 7 - Testing	
14	**Demo Day!!!** 📱	• Voting for Best App Categories

(https://courses.codepath.org/snippets/and102/overview_14week#heading-projects)

Unit Schedule

Unit	Session Date	Coursework	Deadline
Unit 0	Tuesday, September 5th at 4:00pm EDT Thursday, September 7th at 4:00pm EDT		
Unit 1	Tuesday, September 12th at 4:00pm EDT Thursday, September 14th at 4:00pm EDT	Assignment 1	Monday, September 18th at 11:59pm EDT
Unit 2	Tuesday, September 19th at 4:00pm EDT Thursday, September 21st at 4:00pm EDT	Assignment 2	Monday, September 25th at 11:59pm EDT
Unit 3	Tuesday, September 26th at 4:00pm EDT Thursday, September 28th at 4:00pm EDT	Assignment 3	Monday, October 2nd at 11:59pm EDT

Unit 4	Tuesday, October 3rd at 4:00pm EDT Thursday, October 5th at 4:00pm EDT	Assignment 4	Monday, October 9th at 11:59pm EDT
Unit 5	Tuesday, October 10th at 4:00pm EDT Thursday, October 12th at 4:00pm EDT	Assignment 5	Monday, October 16th at 11:59pm EDT
Unit 6	Tuesday, October 17th at 4:00pm EDT Thursday, October 19th at 4:00pm EDT	Assignment 6	Monday, October 23rd at 11:59pm EDT
Unit 7	Tuesday, October 24th at 4:00pm EDT Thursday, October 26th at 4:00pm EDT	Group Project Milestone 1	Monday, November 6th at 11:59pm EDT
Unit 8	Tuesday, October 31st at 4:00pm EDT Thursday, November 2nd at 4:00pm EDT		
Unit 9	Tuesday, November 7th at 4:00pm EDT Thursday, November 9th at 4:00pm EDT	Group Project Milestone 2	Monday, November 20th at 11:59pm EDT
Unit 10	Tuesday, November 14th at 4:00pm EDT Thursday, November 16th at 4:00pm EDT		

Unit 11	Tuesday, November 21st at 4:00pm EDT	Group Project Milestone 3	Monday, December 4th at 11:59pm EDT
Unit 12	Tuesday, November 28st at 4:00pm EDT Thursday, November 30th at 4:00pm EDT		
Unit 13	Tuesday, December 5th at 4:00pm EDT Thursday, December 7th at 4:00pm EDT Tuesday, December 12th at 4:00pm EDT	Group Presentation	Monday, December 11th at 11:59pm EDT
	Demo day		**TBD**

Projects

Each week, students will build an Android app in order to apply the concepts they have learned. Weekly apps will take around 5-10 hours outside of class session times to complete.

Homework assignments are due at 11:59pm local time 1 day before the first session of the following week. (Specific due dates will be posted on your course's project page.)

Click the titles below to view details on each Project:

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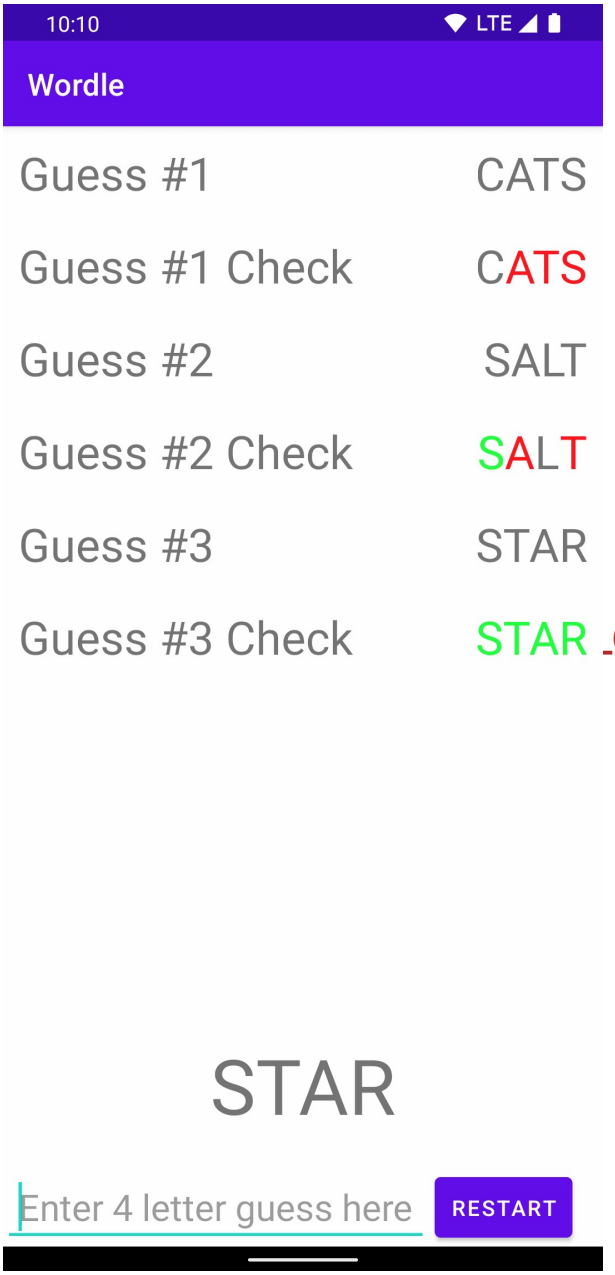
▾ Wordle

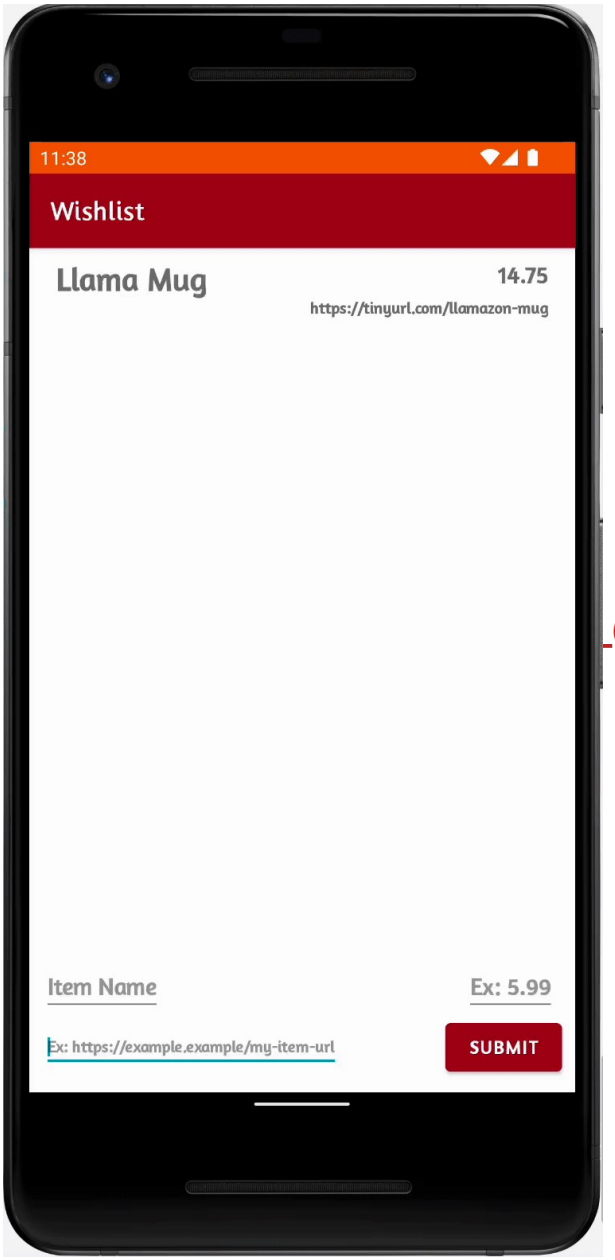
Based on the popular NYT word game, students will create a playable game app. For extra credit, students will have the option to add themed word lists or multi-language support.



(https://courses.codepath.org/course_images/and102/project_1/Wordle2.png)

▾ Wishlist App

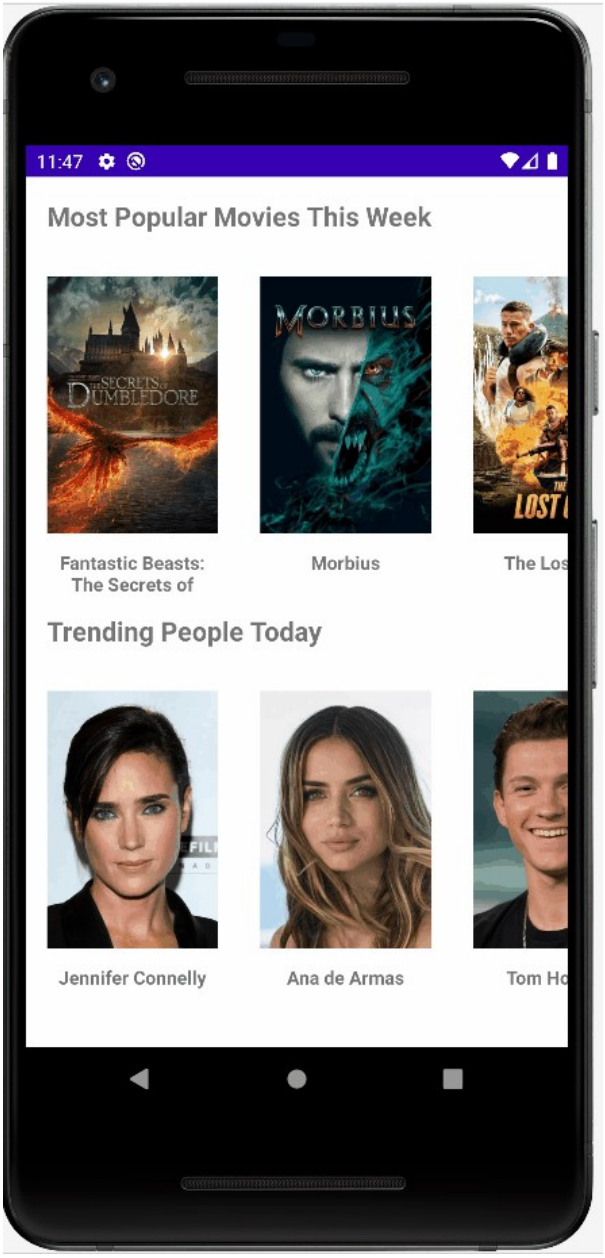
A wishlist app that allows students to list items to buy and efficiently display them using a RecyclerView.



(https://courses.codepath.org/course_images/and102/project_2/Wishlist-Stretch.gif)

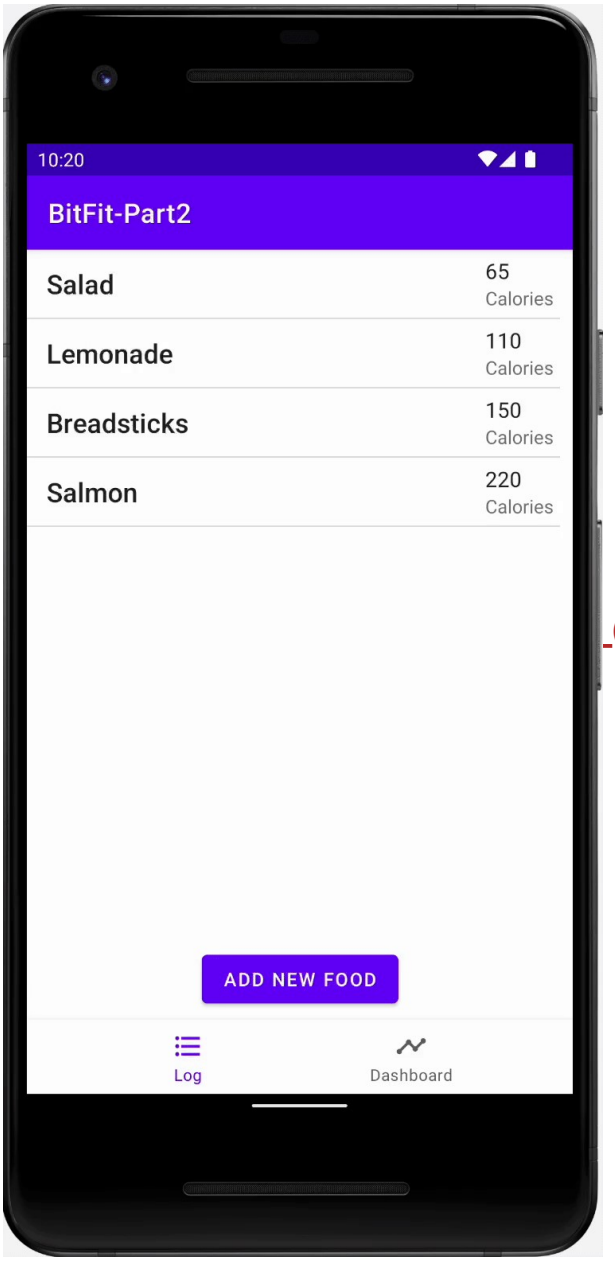
▾ Flixster+

A custom media browsing app, such as IMDB or Rotten Tomatoes, that pulls and displays live data from the MovieDB API. Students will choose what data their app displays.



▾ BitFit

A custom health-tracker app built from the ground up, using Room for data persistence between sessions.



(https://courses.codepath.org/course_images/and102/project_6/bitfit2-required.gif)

(https://courses.codepath.org/snippets/and102/overview_14week#heading-labs) Labs

In the weekly labs, students are guided through building apps to introduce new concepts in a hands-on environment, and reinforce previous concepts they have learned. Students will be encouraged to collaborate using a Pair Programming approach.

Lab Apps:

- Idle Tap Game: An app that counts the times a user taps on the screen. Inspired by games like Cookie Clicker.
- Gmail clone: An app that simulates a client for browsing a list of emails.

- NY Times Lab series: A series of labs using the NY Times API to build out a functional book and article browsing app.