

# Fall 2021 ITS Quiz App

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# Project Overview

## **Initial Problem:**

*Existing ITS tools are not targeted for mobile devices or on-the-go studying*



# Project Overview

## Semester Goals:

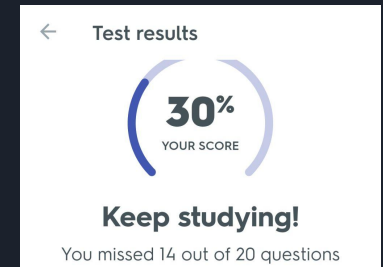
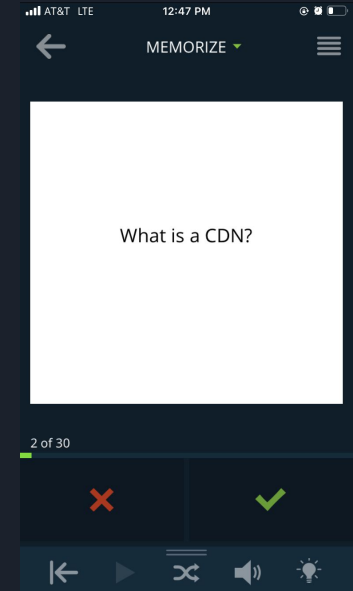
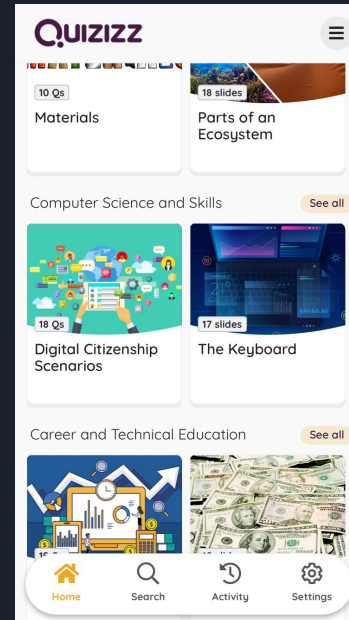
- Create a mobile quiz app geared toward ECE students
  - Provide on-the-go learning option
  - Gain mobile-app development experience
- Lay groundwork for future integration with Knowledge Tracing

## Future Goals:

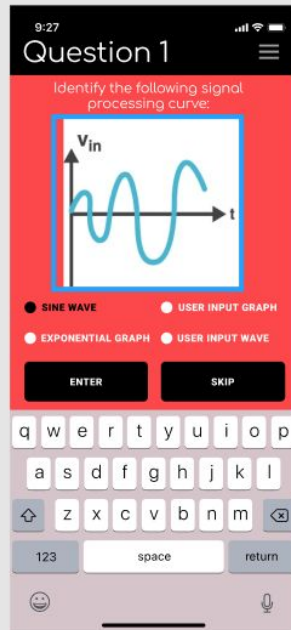
- Sharing of study resources
- Studying recommendations through ML models
- Possible integration with TutorJS/ChatBot

# User Research

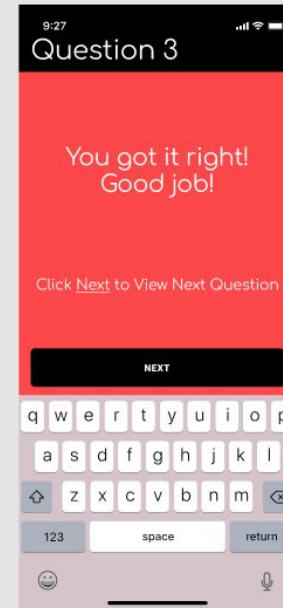
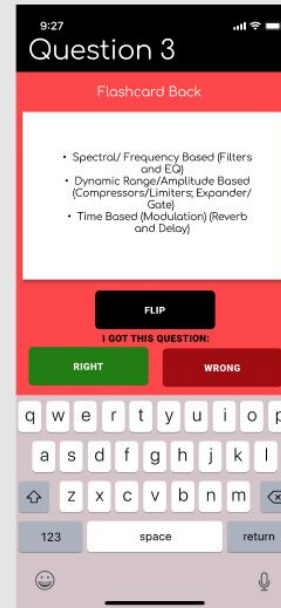
- Looked into various existing quiz applications
  - Kahoot
  - Quizizz
  - Quizlet
- Screens and Features To Include:
  - Login, Home, Browse Quizzes, Question, Results, Profile, Overall Stats
  - Navigation Bar, Display Progress Statistics
- Question Types:
  - MC
  - Short Answer
  - Flashcard



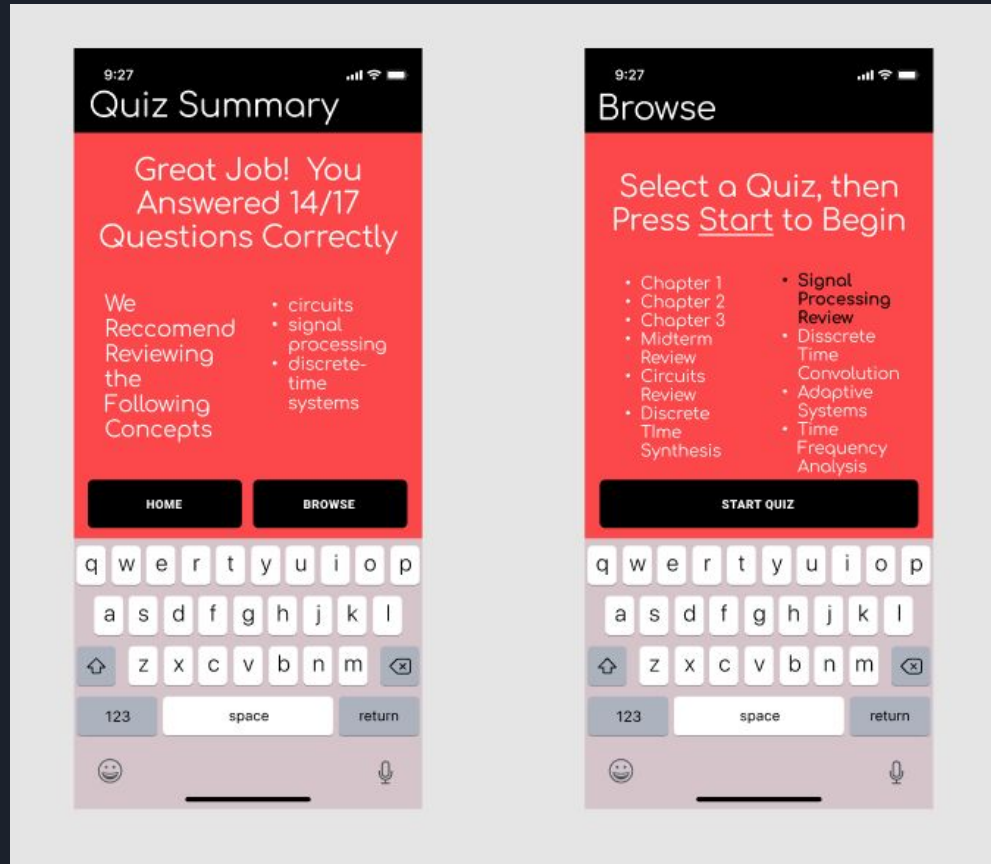
# Wireframing



# Wireframing(cont.)



# Wireframing(cont.)



# Object-Oriented Design

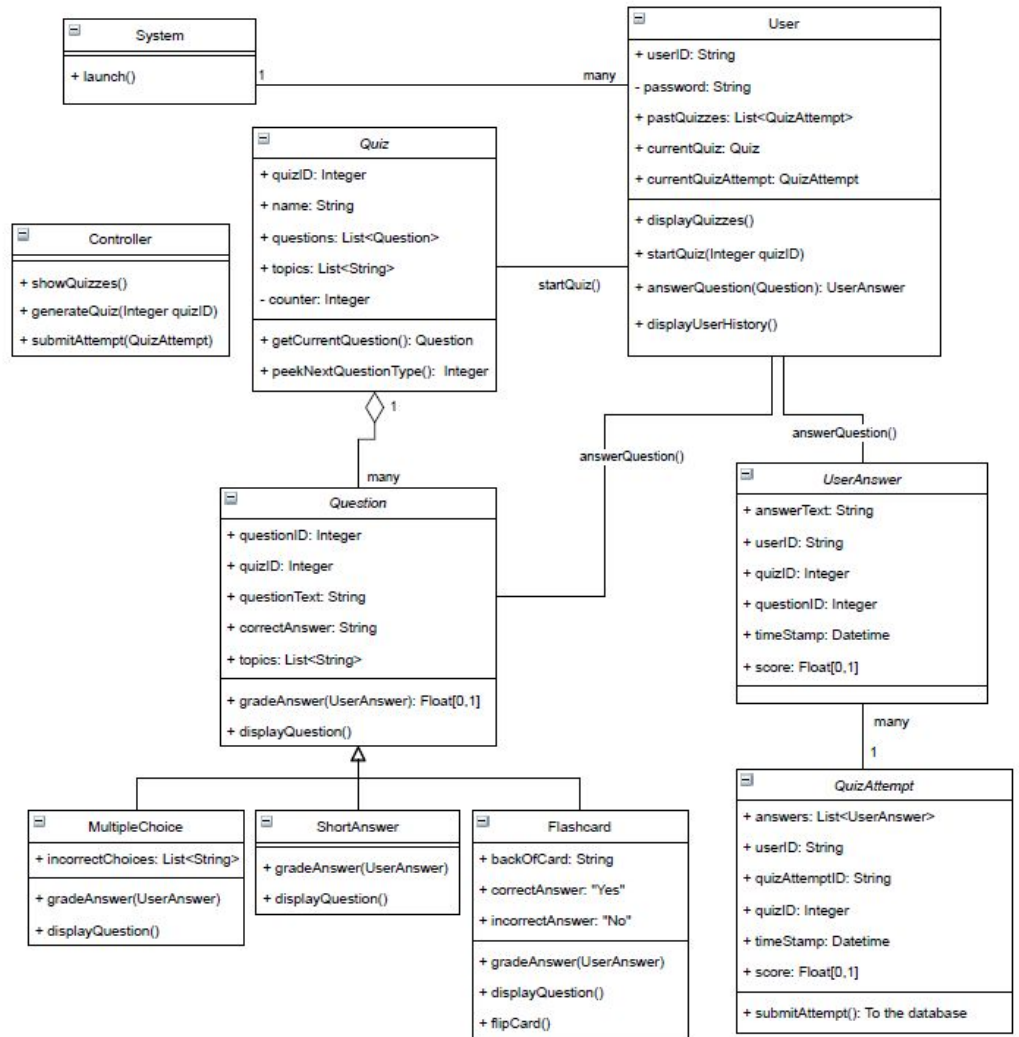
## User class

- currentQuiz
- currentQuizAttempt

## Controller class

- Retrieve list of available quizzes
- **Retrieve a quiz**
- Store and retrieve user information
- Post answers and get recommendations from KT API

## Question class with 3 subclasses







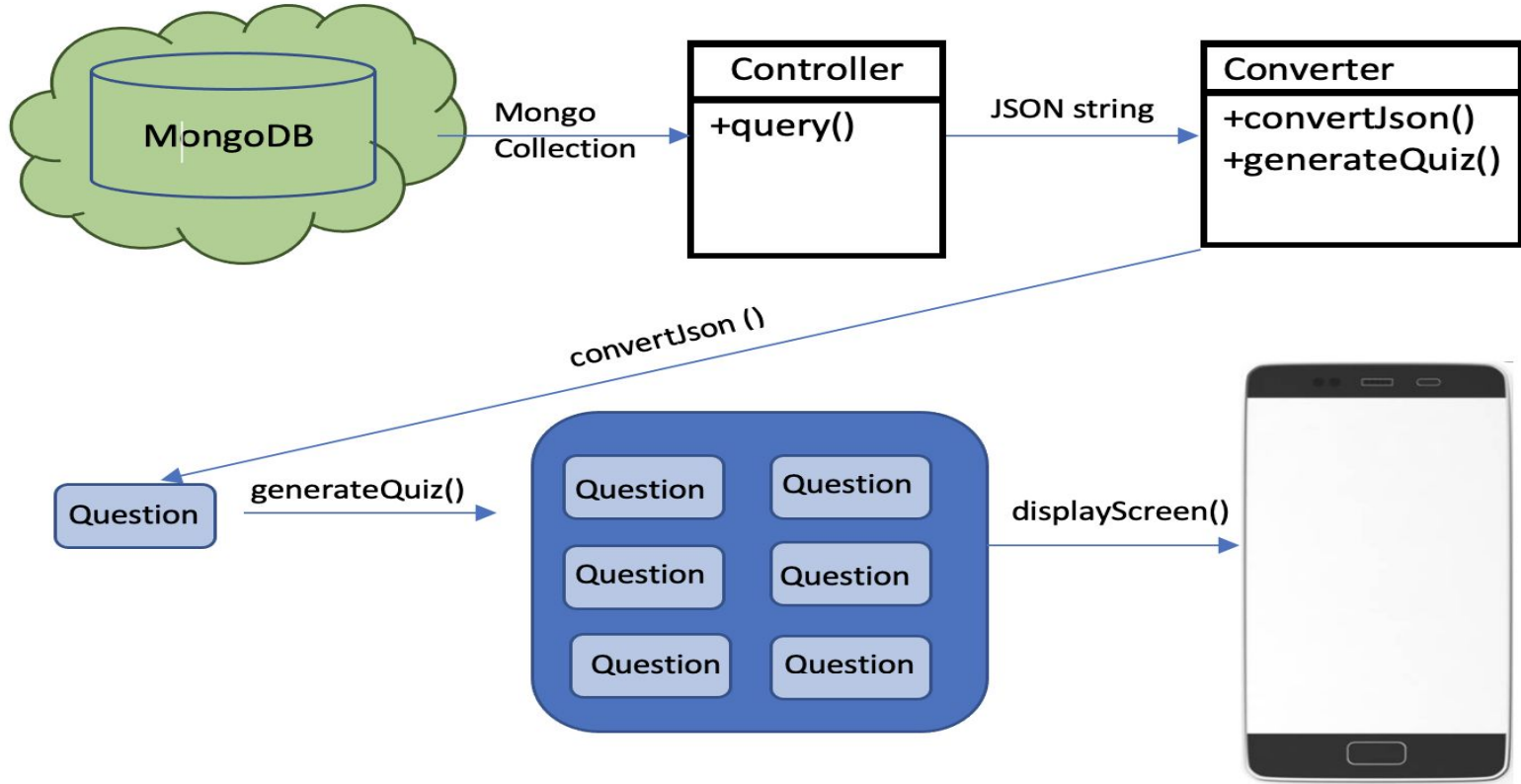
# MongoDB Database

- Currently using a MongoDB Atlas cluster to store data about the user and their performance on quizzes
- Motivation for cloud-based preference
  - Require user's data to be tied to the user's account, rather than the device itself
  - Compatibility with Knowledge Tracing Team's plans
- Setup
  - UML classes are represented as Collections
  - Each object of a class is considered a document within each Collection

# MongoDB Questions

Question							
	_id ObjectId	questionSetId String	questionText String	correctAnswer String	topics Array	quizId Int32	inco
1	61674f306318dd7b6a62507c	"flashCard"	"Amplitude modulation"	"process of multiplying a hi	[] 0 elements	0	No f
2	6167314f4f18dd7b6a62507d	"flashCard"	"Fundamental period"	"the smallest repetition int	[] 0 elements	1	No f
3	616731a74f18dd7b6a625080	"flashCard"	"Spectrogram"	"the most common time-frequ	[] 0 elements	0	No f
4	616731d84f18dd7b6a625082	"flashCard"	"Sampling rate"	"The fixed time interval bet	[] 0 elements	1	No f
5	616731fe4f18dd7b6a625083	"flashCard"	"Causal filter"	"A filter that uses only the	[] 0 elements	0	No f
6	6170ddd970bbcc8369aef503	"multipleChoice"	"The period T of a periodic :	"The values of the signal re	[] 0 elements	1	[] 2
7	6170e87c70bbcc8369aef504	"multipleChoice"	"What is a spectrum?"	"a graphical presentation of	[] 0 elements	0	[] 2
8	6170e8fb70bbcc8369aef505	"multipleChoice"	"Which is not an assumption :	"The signal has a period of :	[] 0 elements	1	[] 2
9	6170e95e70bbcc8369aef507	"multipleChoice"	"Which is not a property of :	"Invertible property"	[] 0 elements	0	[] 3
10	6170f23770bbcc8369aef508	"multipleChoice"	"Which is not a property of l	"Identity property"	[] 0 elements	1	[] 3
11	617c09fb5b372ca1ae161ae7	"shortAnswer"	"process of multiplying a hi	"Amplitude modulation"	[] 0 elements	0	No f
12	617c0a885b372ca1ae161ae9	"shortAnswer"	"the smallest repetition int	"Fundamental period"	[] 0 elements	1	No f
13	617c0aa55b372ca1ae161aea	"shortAnswer"	"the most common time-frequ	"Spectrogram"	[] 0 elements	0	No f
14	617c0ad65b372ca1ae161aeb	"shortAnswer"	"The fixed time interval bet	"Sampling rate"	[] 0 elements	1	No f

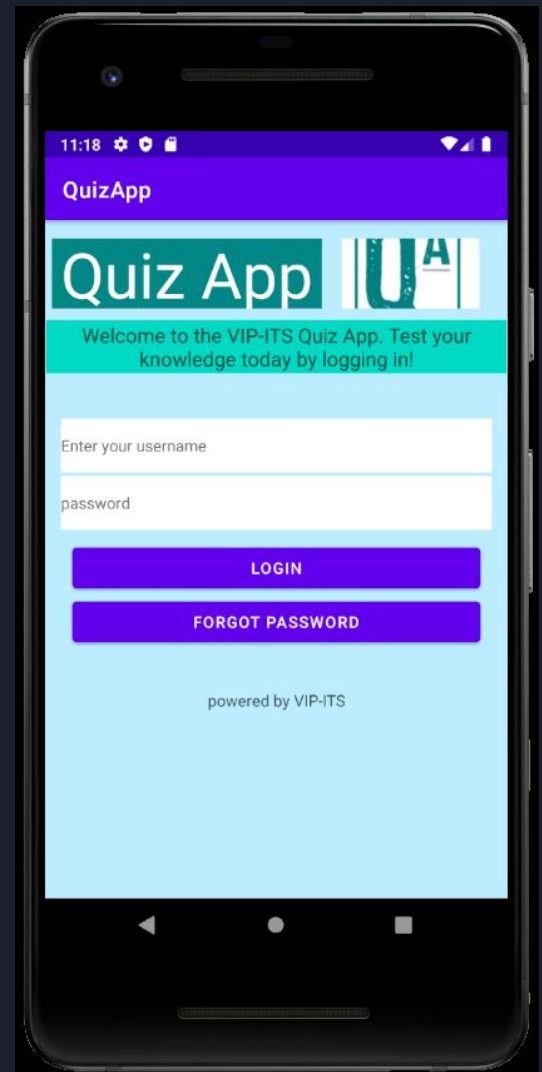
# Database + Backend Data Flow





# User Walkthrough With UML

Brief walkthrough of User Story

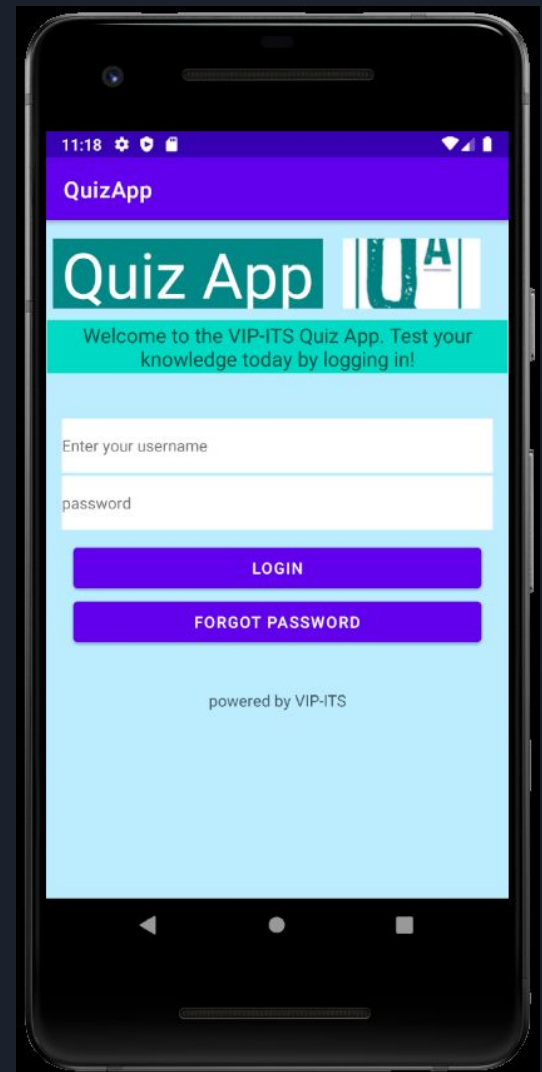
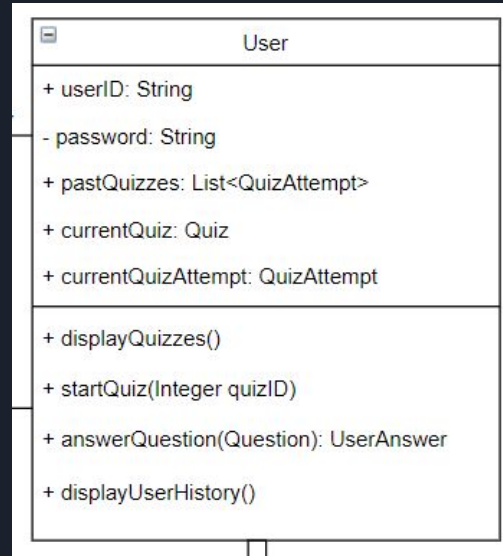
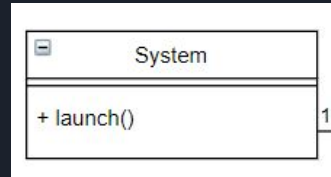


# Login Screen

A User (Alice) launches Quiz App

Since she is not logged in yet, the app redirects her to Login screen

User object is instantiated when she logs in



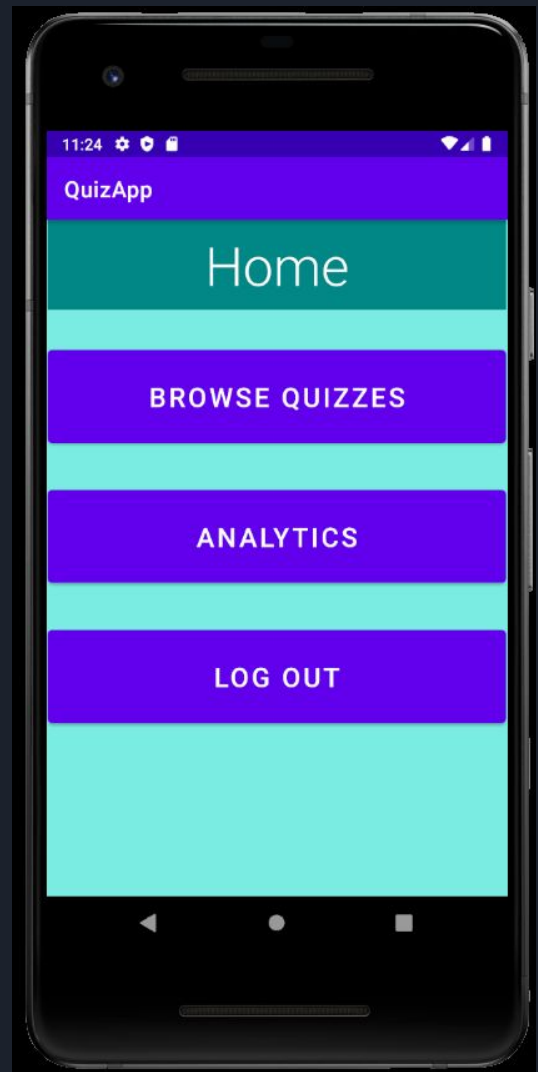


# Home Screen

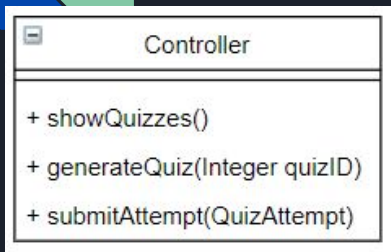
After logging in, Alice is brought to the Home screen

She can select Browse Quizzes, Analytics, or Log Out

She clicks on Browse Quizzes



# Browse Quizzes Screen

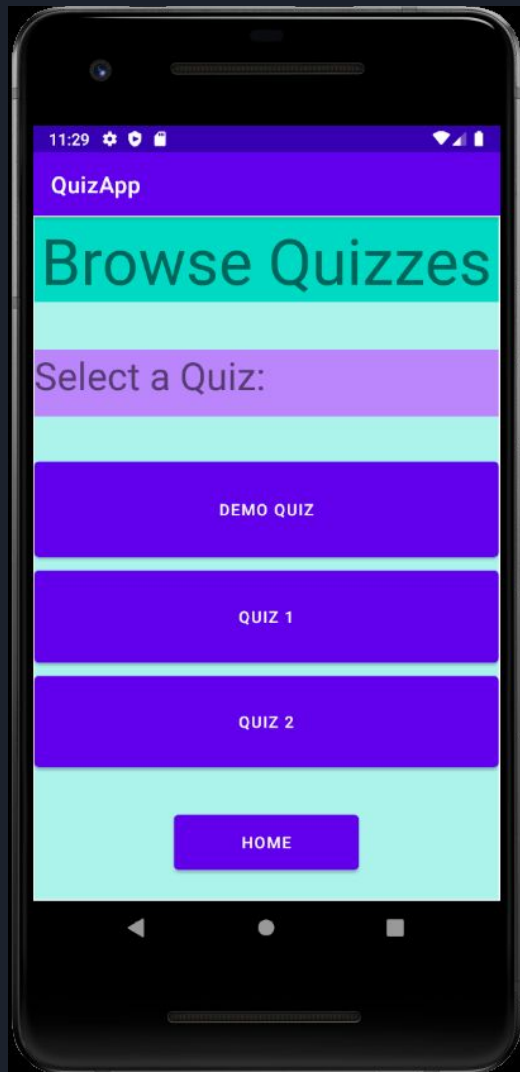
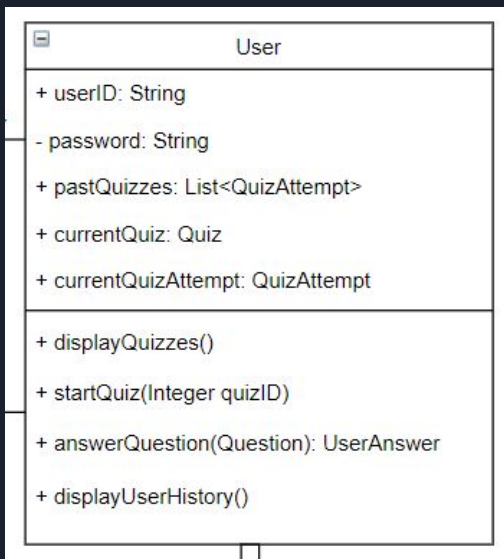
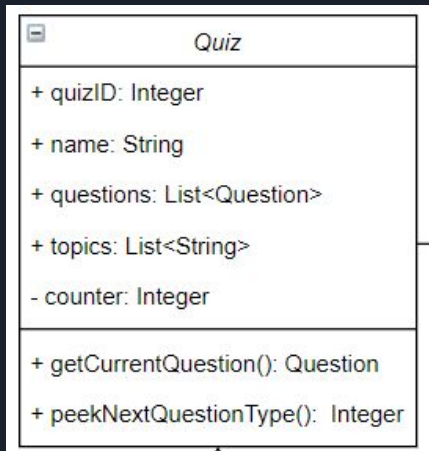


Alice is brought to the Browse Quizzes screen

The Controller class populates a list of available quizzes

When Alice clicks on a quiz, the Controller class loads the quiz from the MongoDB into a new Quiz object that is set as the User's currentQuiz

Alice is taken to the first Question in the Quiz

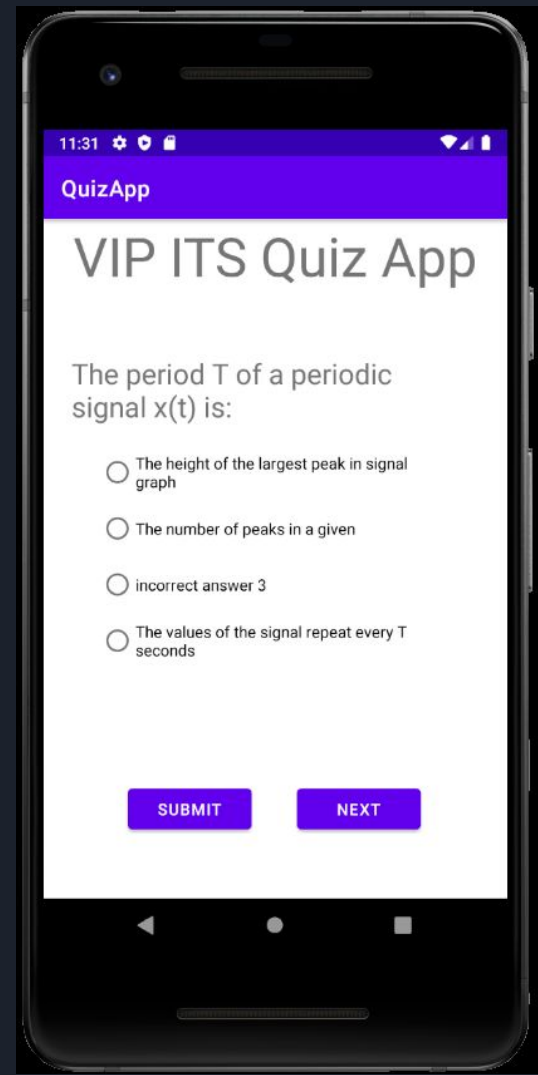
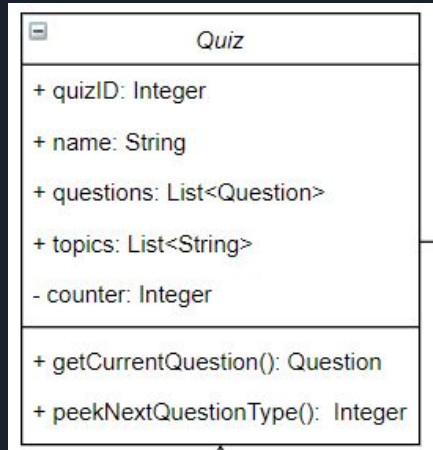
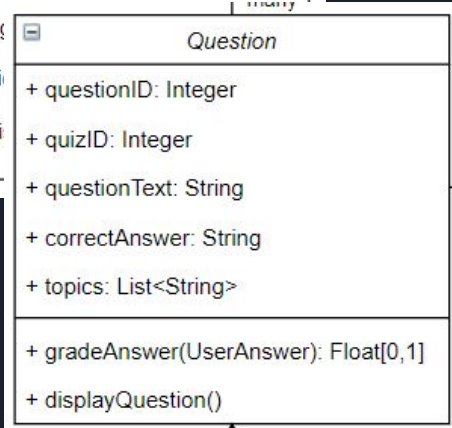
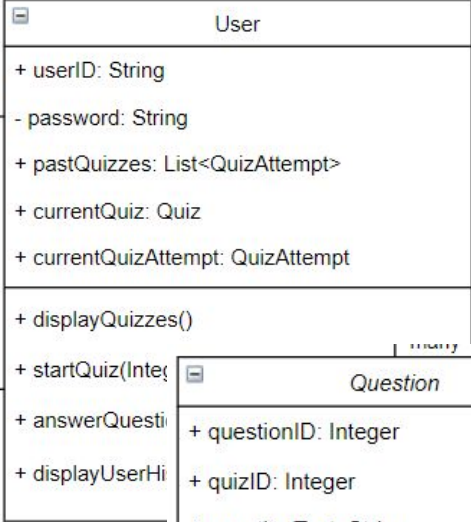


# MC Question Screen

Alice is brought to the first Question, which is a Multiple Choice Question

When she clicks Submit, a new UserAnswer object is populated and appended to the currentQuizAttempt

When she clicks Next, the currentQuiz calls peekNextQuestionType() and Alice is brought to the next Question

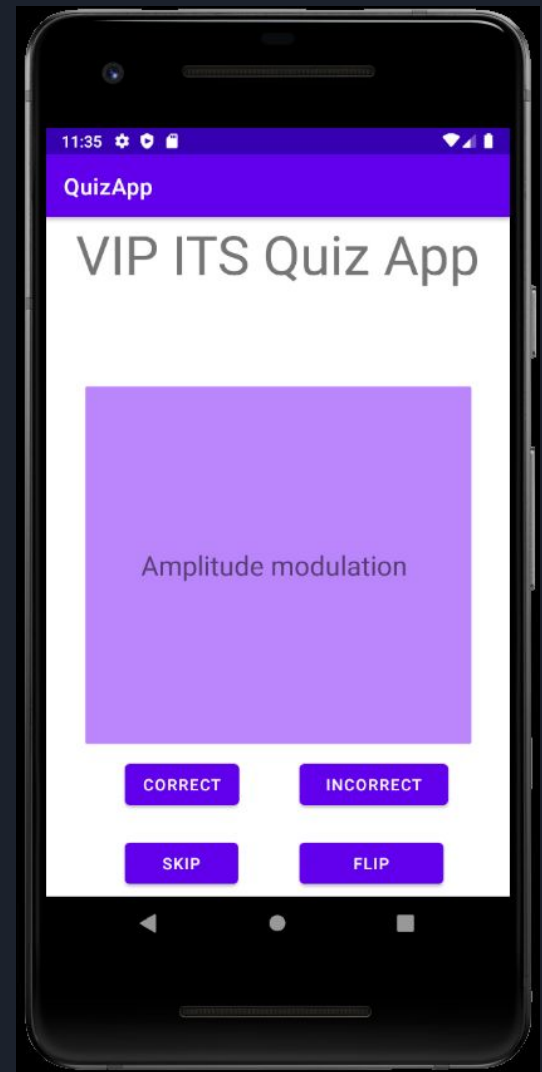
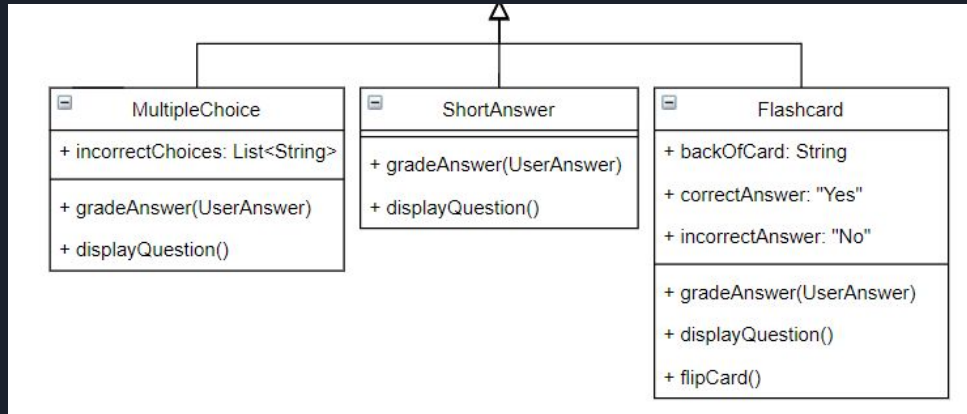




# Flashcard Question Screen

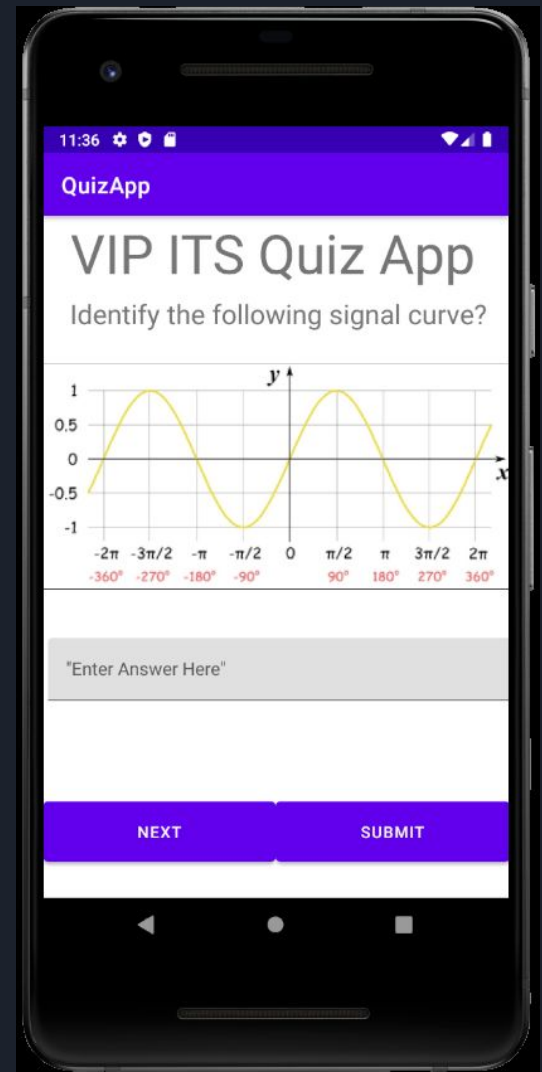
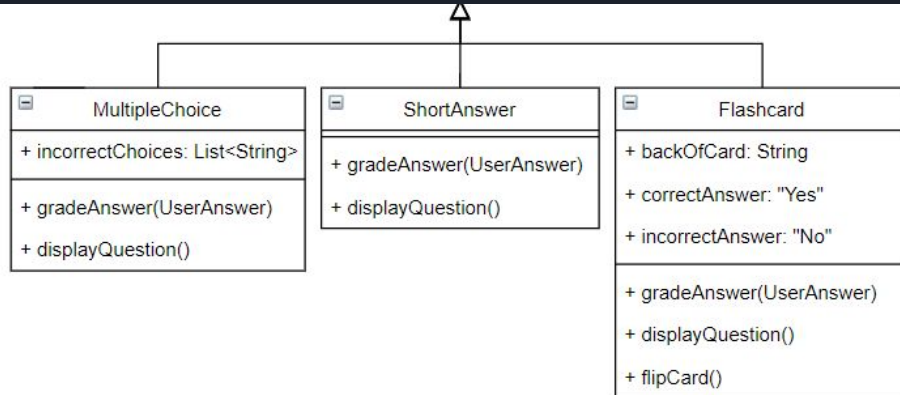
Alice proceeds through the quiz, possibly encountering Flashcard questions and Short Answer questions in addition to Multiple Choice questions

This is an example of the front of a Flashcard



# Short Answer Question Screen

This is an example of a Short Answer Question



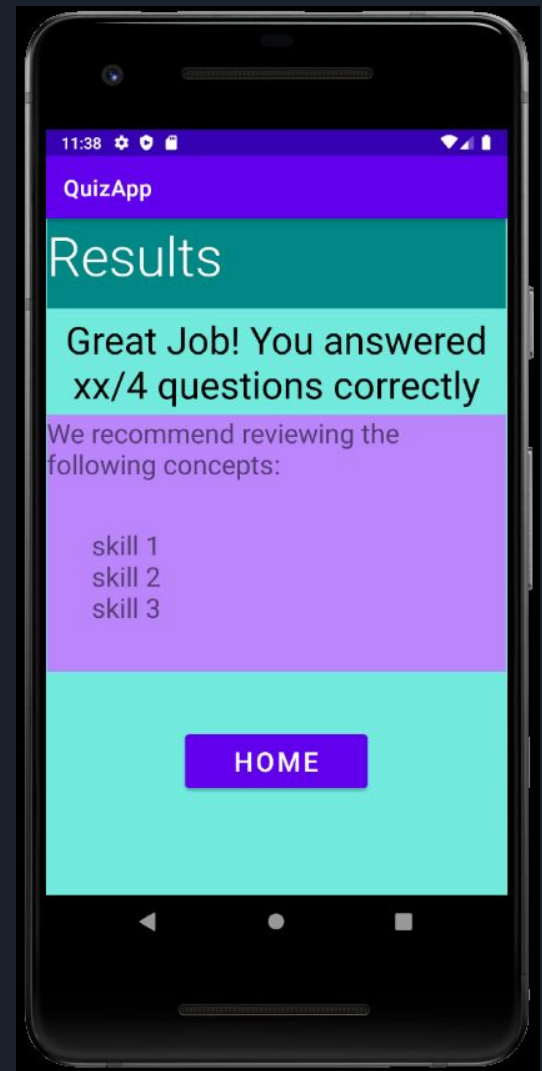
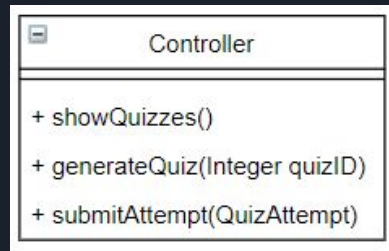
# Results Screen

At the end of the Quiz, Alice is shown the results of her QuizAttempt

The Controller class interfaces with the knowledge tracing model through API calls that submit Alice's scores and get recommendations of topics she should study next

The Controller class also interfaces with the MongoDB backend to store Alice's results

If Alice clicks Home, she can go back to the Home Screen

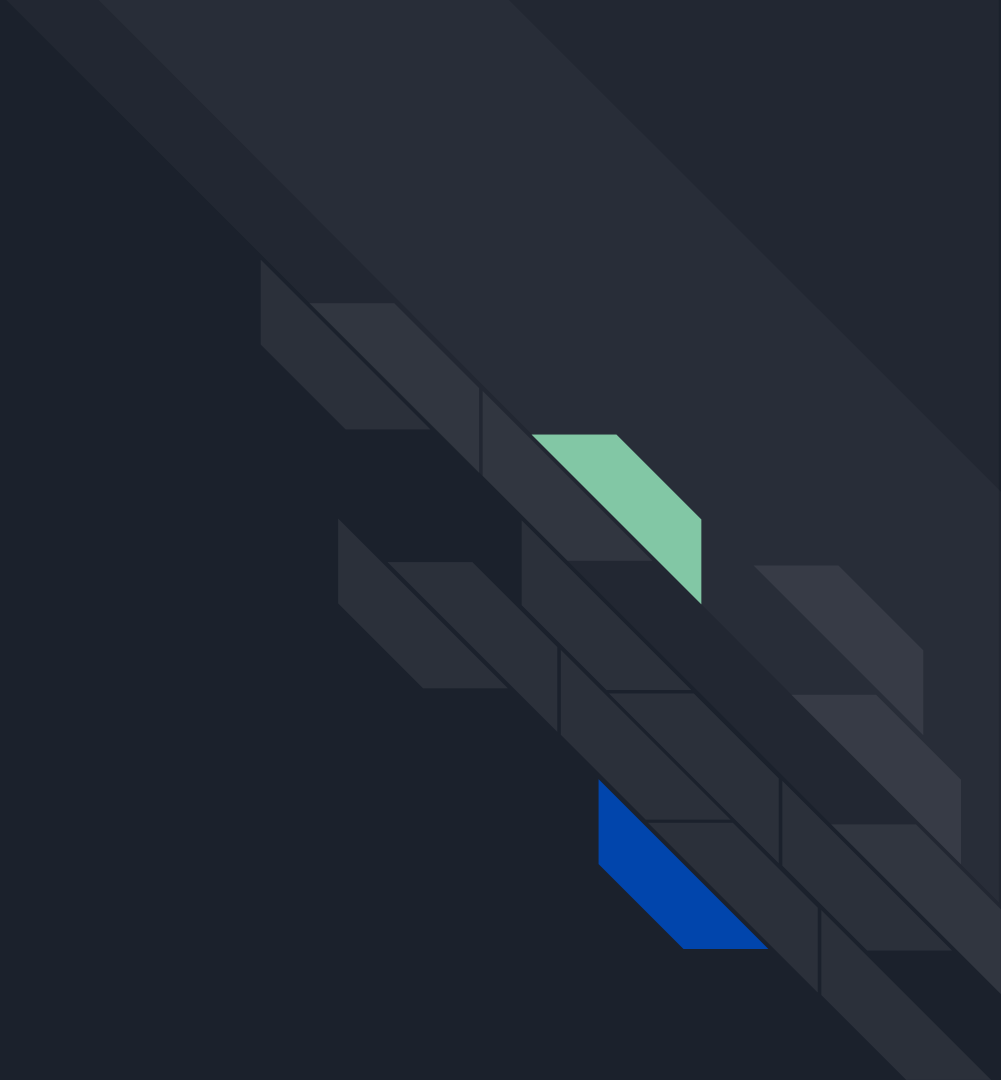




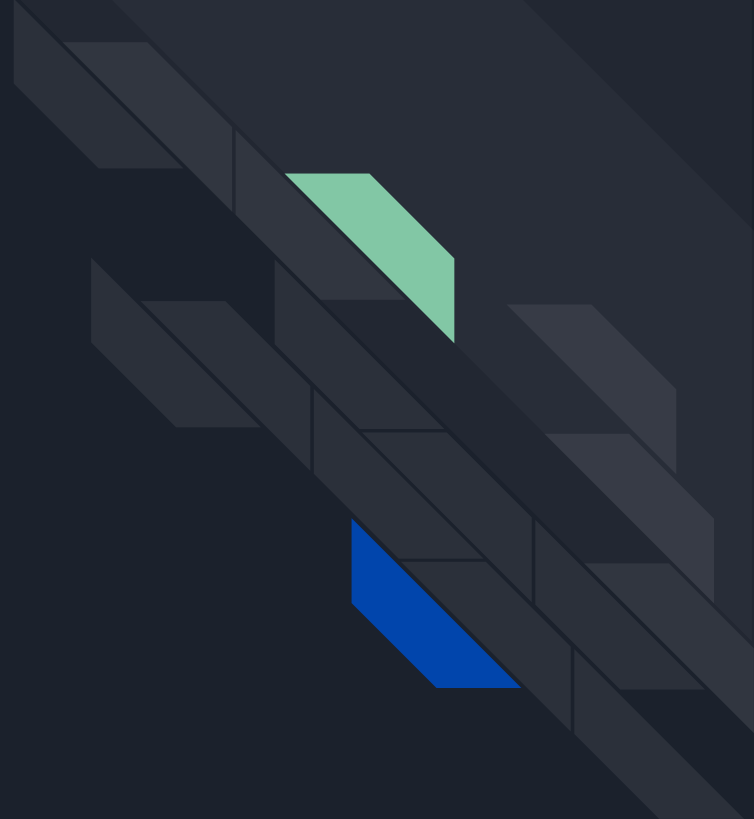
# Future Work

- App changes
  - Login functionality (may be done via Single Sign On)
  - Search functionality on the Browse Quizzes screen
  - Populating UserAnswer objects and scoring the answers
  - Completing live connection to MongoDB backend for quiz retrieval and submission
  - Creating an Analytics page
- Integration with knowledge tracing (KT) model
  - Send results to the KT model and retrieve recommendations via API calls
  - For now we plan to recommend specific topics based on probabilities returned by KT
  - Future work could include recommending quizzes with those topics, or generating quizzes based on topics

Demo



Thank you



Questions

