Sprint 1 Retrospective Review Report

1. Links

- Pivotal Tracker
- GitHub Repository
- Heroku Deployment

2. Dates of the Sprint

- **Start Date:** 1/13/2025
- **End Date:** 1/24/2025

3. Team Contribution

Name	Role	Points Completed
Sam Lightfoot	Product Owner (PO)	4
Ethan Nguyen	Scrum Master (SM)	4
Owen Schultz	Developer (Dev)	4
Casey Kung	Developer (Dev)	2
Leo Gonzalez	Developer (Dev)	3
Olivia Lee	Developer (Dev)	2

4. Sprint Goal

Students can login and view a question. Instructors can login and view a summary of student information.

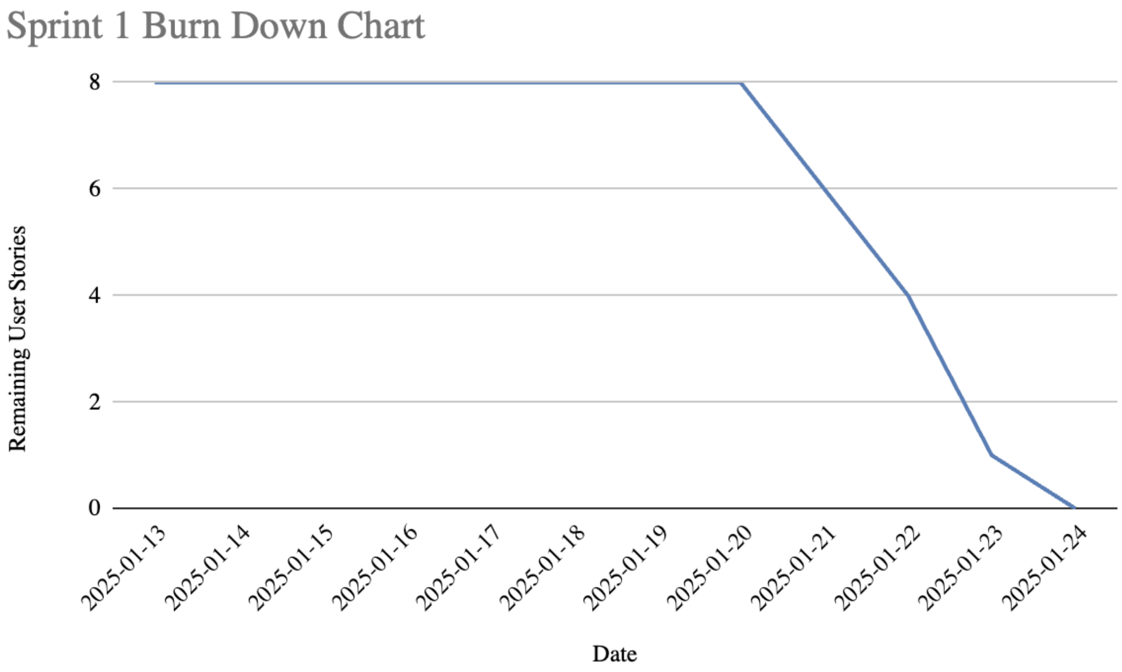
5. Sprint Achievements

We were able to develop a functional prototype of our product. Users have the ability to login with a Texas A&M email account and view their respective homepage. Students are able to select their topics and then view practice problems about said topic in order to further their understanding of the topic. Instructors are able to view their students and their progress. We were able to deploy our application and get our project workflow started in order to begin developing. We were able to fully complete our backlog and made a good amount of progress this sprint.

6. Sprint Backlog Items and Status

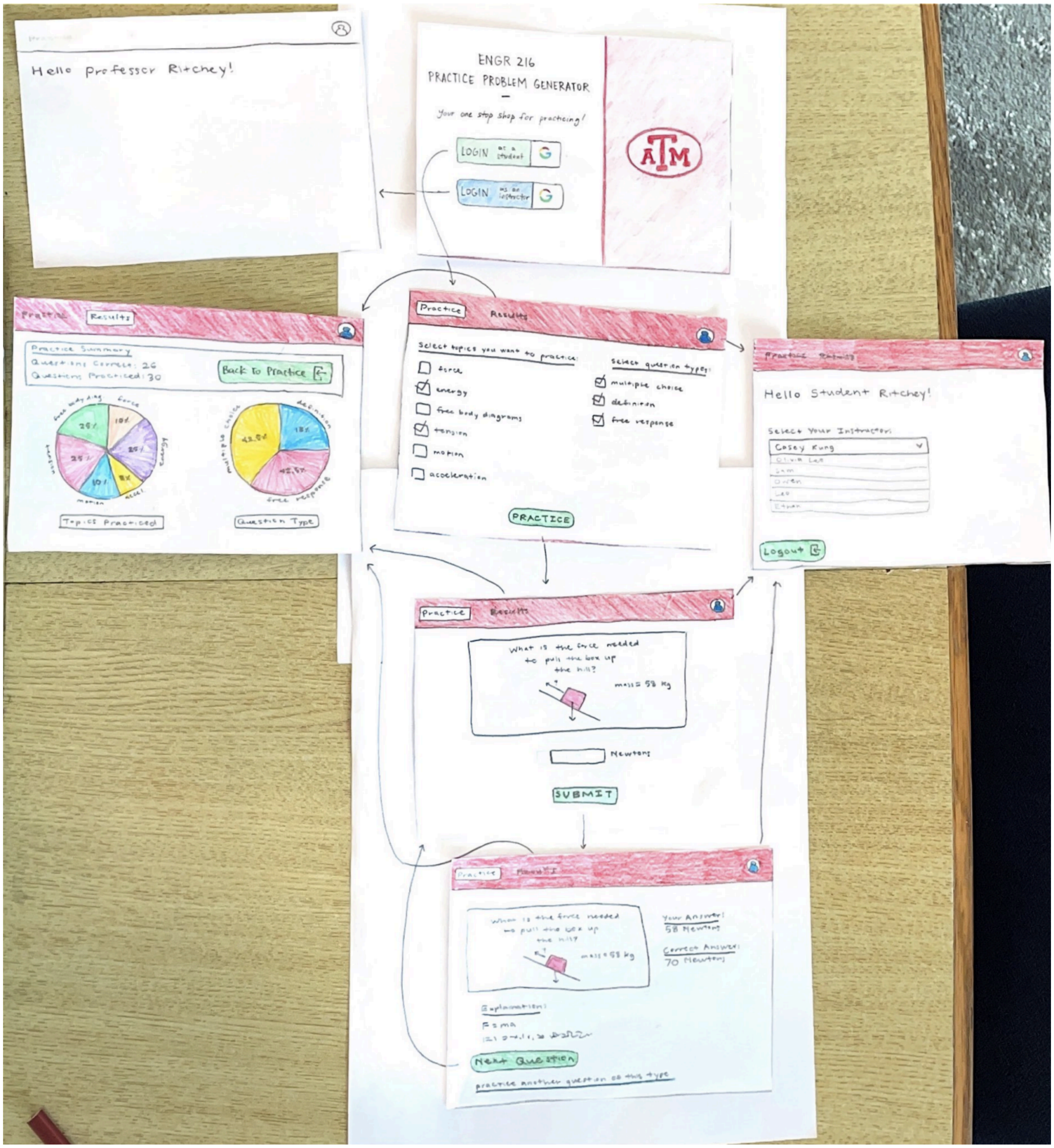
Backlog Item	Status	Notes
Login as Student	Completed	No changes
Login as Instructor	Completed	No changes
Logout	Completed	No changes
Select Problem Category	Completed	No changes
Question Type Selection	Completed	No changes
Submit Solution Attempt	Completed	Added a results page that shows submission results
Select Instructor	Completed	Added a text field in profile view to show which instructor was selected after student submits
Receive Randomly Generated Problems	Completed	No changes

7. Burndown Chart

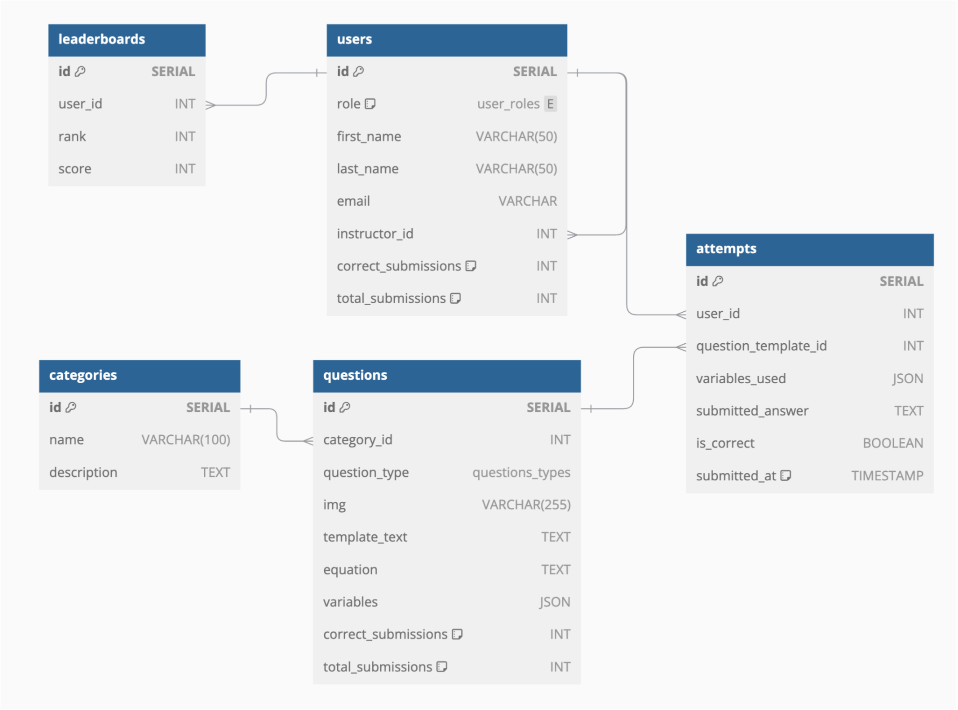


- **Notes:** In this sprint, we faced challenges with project setup and initiating everyone's user stories. Moving forward, we aim to improve communication and collaboration.

8. Design Diagrams



- **Notes:** A change we made from the Lo-Fi prototype was that we added a student homepage on login before you get to the select a question page. The reason we decided to change this was because a student may not want to immediately practice when they login, they may want to view their report card or use other functionality if we add it in the future.



leaderboards	
id 🔑	SERIAL
user_id	INT
rank	INT
score	INT

users	
id 🔑	SERIAL
role	user_roles E
first_name	VARCHAR(50)
last_name	VARCHAR(50)
email	VARCHAR
instructor_id	INT
correct_submissions	INT
total_submissions	INT

attempts	
id 🔑	SERIAL
user_id	INT
question_template_id	INT
variables_used	JSON
submitted_answer	TEXT
is_correct	BOOLEAN
submitted_at	TIMESTAMP

categories	
id 🔑	SERIAL
name	VARCHAR(100)
description	TEXT

questions	
id 🔑	SERIAL
category_id	INT
question_type	questions_types
img	VARCHAR(255)
template_text	TEXT
equation	TEXT
variables	JSON
correct_submissions	INT
total_submissions	INT

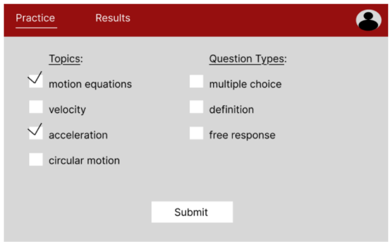
- **Notes:** We added a separate database for question type so that was also dynamic, and renamed categories to topics.

Select Problem Category

As a student

So that I can practice problems relevant to a specific topic

I want to choose a specific category or topic from ENGR 216



Topics:

☑ motion equations
□ velocity
☑ acceleration
□ circular motion

Question Types:

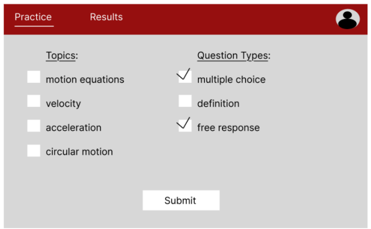
□ multiple choice
□ definition
□ free response

Question Type Selection

As a student,

So that I can focus in different areas of a unit,

I want to choose the type(s) of questions I get. (definition, multiple choice, free response)



Topics:

□ motion equations
□ velocity
□ acceleration
□ circular motion

Question Types:

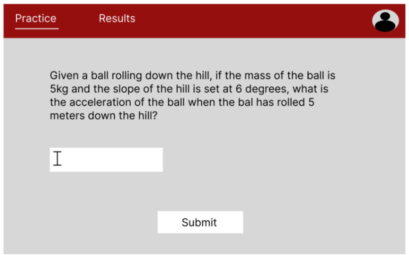
☑ multiple choice
□ definition
☑ free response

Receive Randomly Generated Problems

As a student,

so that I can practice problems relevant to the selected concept,

I want to be shown a randomly generated example problem after selecting a category.



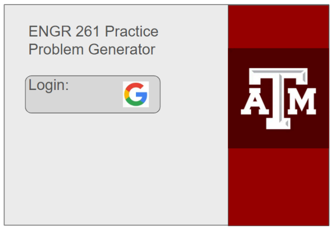
Given a ball rolling down the hill, if the mass of the ball is 5kg and the slope of the hill is set at 6 degrees, what is the acceleration of the ball when the bal has rolled 5 meters down the hill?

Login as Student

As a student,

so that I can access the student homepage,

I want to log in using my @Tamu Google account.


ENGR 261 Practice Problem Generator

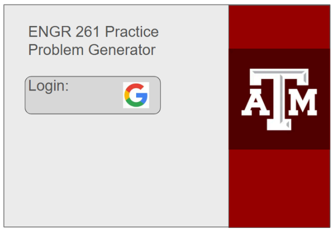
Login:

Login as Instructor

As an instructor,

so that I can access the instructor homepage,

I want to log in using my @Tamu Google account.

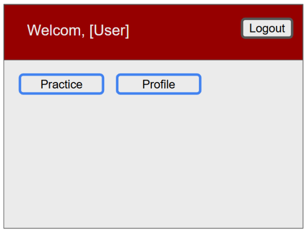


Logout

As a user,

so that I can finish using the platform,

I want to log out of my account.



9. Documentation of Changes

- **Changes to Design:**
    - Submission
        - In our original mock up, we had the idea of having submission results on the same page as the randomly generated problem. We changed this design to show the submission confirmation and results on a new page.
- **Changes to Cucumber Tests:**
    - **Submission Attempt**
        - I reworded the submission attempt feature in order to account for getting to the problem page, redirecting to the results page, and checking the flash message for correct or incorrect submission attempts.
    - **RANDOM STORIES**
        - We reworded many of the original cucumber tests we had under our stories in order to better represent the tests we were doing
        - I had to reword the story in order to fully implement the story requirements. This story had a correct story, just some intermediate steps were missing. I had to add explicit steps in order to simulate generating a question and what happens on that page.
        - I also added a new scenario to test for randomized values for the generated question. I could have expanded the previous scenario to add this, but this would have made the scenario have too many steps.

10. Evaluations of Code and Test Quality

Smells

- DuplicateMethodCall
    - This was found in our OAuth implementation. The steps to fix this are to combine the function call into a single call and then set the attributes correspondingly
    - This was also found in our Problems Controller. To fix this we would need to store the value called by the function and then use this to manipulate data instead of calling the function each time.
- NilCheck

    - In the Problems Controller there is a check for nil. The way to fix this is to raise an error when nil is detected in the function call
- HighComplexity
    - In the application controller RSpec file one of the tests is too convoluted and needs to be broken up into multiple tests

Style Offenses

- Style issues were addressed with rubocop, there were no issues that could not be fixed either by “rubocop -a” or reading the offenses and manually fixing them.

Coverage

- Cucumber
    - 14 scenarios (14 passed)
    - 93 steps (93 passed)
    - Line Coverage: 95.54% (150 / 157)
- Rspec
    - 51 examples, 0 failures
    - Line Coverage: 100.0% (157 / 157)
- **Details:** with our efforts to write effective tests we our code is passing all tests and our application functions as expected.

11. Customer Meeting

- **Meeting Date:** 02/03/2025
- **Meeting Time:** 3:00 PM
- **Meeting Place:** Zoom
- **Summary:** We will discuss the current iteration of our deployed branch, going over all stories that have been completed, as well as how it can improve. We will also discuss the question templates and the style of questions wanted (ie. multiple choice, free response)

12. BDD & TDD

CUCUMBER TESTS

```
Feature: Selecting topics and question types
    Scenario: User selects topics and question types in the problem form
        Given I am logged in with a valid tamu email
        And I visit the practice problems page
        When I select the topics "Velocity" and "Acceleration"
        And I select the question types "Definition" and "Free Response"
        And I submit the form
        Then I should be redirected to the problem generation page
```

And I should see "Velocity" and "Acceleration"
And I should see "Definition" and "Free Response"

Feature: Login as Instructor
As an instructor,
so that I can access the instructor homepage,
I want to log in using my @Tamu Google account.

Scenario: Login as instructor with valid tamu email
Given I am on the welcome page
And I have an instructor account
And I click "Login with Google"
Then I will be on the Instructor Homepage

Scenario: Login as instructor with invalid credentials
Given I am on the welcome page
When I have an invalid instructor account
And I click "Login with Google"
Then I should be on the welcome page
And I should see a message "Please login with an @tamu email"

Feature: Login as Student
As a student,
so that I can access the student homepage,
I want to log in using my @Tamu Google account.

Scenario: Login with valid @tamu Google account
Given I am on the welcome page
When I have a valid @tamu Google account
And I click "Login with Google"
Then I will be on the Student homepage

Scenario: Login with non @tamu Google account
Given I am on the welcome page
When I have a non-tamu Google account
And I click "Login with Google"
Then I should be on the welcome page
And I should see a message "Please login with an @tamu email"

Scenario: Try to access the student homepage while not being logged in
Given I am not logged in
When I try to go to the student homepage
Then I should be on the welcome page
And I should see a message "You must be logged in to access this section."

```
Feature: Logout
        As a user,
        so that I can finish using the platform,
        I want to log out of my account.


        Scenario: Logout from student homepage
        Given I am logged in as a student
        And I am on the student homepage
        When I click "Logout"
        Then I will be on the welcome page
        And I should see a message "You are logged out."

        Scenario: Logout from student homepage
        Given I am logged in as an instructor
        And I am on the instructor homepage
        When I click "Logout"
        Then I will be on the welcome page
        And I should see a message "You are logged out."

Feature: Practice Problem Generation
  As a student,
  so that I can practice problems relevant to the selected concept,
  I want to be shown a randomly generated example problem after selecting a category.

  Background:
        Given a predefined question exists

  Scenario: Unique questions within a set of problems
        Given I am logged in with a valid tamu email
        And I visit the practice problems page
        And I select topic "Velocity"
        And I select question type "Free Response"
        And I press "Submit"
        Then I should be on the problem generation page
        And I should see a randomly selected problem
        And I should see an input field to submit my answer

  Scenario: Displaying problem with randomized values
        Given I am logged in with a valid tamu email
        And I visit the practice problems page
        And I select topic "Velocity"
        And I select question type "Free Response"
```

```
      And I press "Submit"
      Then I should be on the problem generation page
      Given a problem with variables "u", "a", and "t"
      When the problem is displayed
      Then the values for "u", "a", and "t" should be randomly generated
      And the question text should include these values

Feature: Submit Solution Attempt
  As a student,
  so that I can test my understanding,
  I want to submit my attempt at solving a problem as a computed numeric value.

  Background:
    Given a predefined question exists
    And I am logged in with a valid tamu email
    And I visit the practice problems page
    And I select topic "Velocity"
    And I select question type "Free Response"
    And I press "Submit"
    Then I should be on the problem generation page

  Scenario: Student submits correct answer
    And I input the correct solution
    When I click "Submit"
    Then I should be redirected to a results page
    And I should see "Correct!"

  Scenario: Student submits incorrect answer
    And I input an incorrect solution
    When I click "Submit"
    Then I should be redirected to a results page
    And I should see "Incorrect!"

Feature: Select Instructor
      As a student,
      so that I protect information about my practice problems from my instructor,
      I want to be able to choose whether to opt into identifying my instructor.

      Scenario: A student selects their instructor
      Given I am logged in as a student
      And I am on the profile view
      When I click the dropdown menu of CSCE 216 instructors
      And I select my instructor
      And I click the 'Save Instructor' button
```

Then the selected instructor will be opted in to view my practice problem results

Scenario: A student does not select an instructor
Given I am logged in as a student
And I am on the profile view
When I do not select an instructor from the dropdown menu of CSCE 216 instructors
And I do not click 'Submit'
Then my instructor will not be opted in to view my practice problem results

RSPEC TESTS

ApplicationController

```
  #current_user
        when session[:user_id] is present and valid
        returns the user associated with the session user_id
        when session[:user_id] is present but invalid
        returns nil when no user exists with the session user_id
        when session[:user_id] is not present
        returns nil
  #logged_in?
        when current_user is present
        returns true
        when current_user is nil
        returns false
  #require_login
        when user is logged in
        allows the action to proceed
        when user is not logged in
        redirects to the welcome page with an alert
```

InstructorHomeController

```
  GET #index
        when the user is an instructor
        returns a successful response
        renders the index template
        assigns the current_user as @instructor
        when the user is not an instructor
        redirects to the root path
        sets an alert message
        when the user is not signed in
        redirects to the sign-in page
```

ProblemsController

```
  POST #create
          when submitting topics and types
          saves the selected topics and question types in session
          handles empty selections
  #generate_random_values
          generates random values for all variables
  #format_template_text
          formats the template text with given values
  #evaluate_equation
          evaluates the equation with given values
          returns nil when equation has invalid syntax
          returns nil when values are empty
          returns nil when equation is empty
          handles missing variables
          handles division by zero
  GET #problem_generation
          when generating problems with selected topics and types
          fetches the correct topics and question types based on session
          retrieves a valid question
          when no questions are found
          redirects back to the problem form page
  POST #submit_answer
          when submitting a correct answer
          redirects to the results page with correct data
          when submitting an incorrect answer
          redirects to the results page with correct data

    GET #result
          renders the results page with the correct variables

SessionsController
  GET #logout
          resets the session and redirects to welcome_path with a notice
  GET #omniauth
          when UID and provider are present
          with a valid @tamu.edu email
Doe
          creates a new user and logs them in if they do not exist
Doe
          logs in an existing user without creating a new one
          with an invalid email domain
          redirects to welcome_path with an alert
          when UID or provider is missing
          redirects to welcome_path with an alert
```

```
            when there is an error saving the user
            redirects to welcome_path with an alert

StudentHomeController
  GET #index
            assigns @current_user to the current user
            assigns @profile_path to the user profile path
            assigns @logout_path to the logout path
            responds successfully with an HTTP 200 status code
            renders the index template

UsersController
  GET #show
            when the user exists
            assigns the requested user to @current_user
            returns a successful response
            when the user does not exist
            raises an ActiveRecord::RecordNotFound error
  #full_name
            returns the concatenated full name
            handles nil first_name
            handles nil last_name
            handles both first_name and last_name being nil
  POST #save_instructor
            when a valid instructor is selected
            updates the current_user with the selected instructor
            when an invalid instructor ID is given
            does not update the user and sets an error flash message

WelcomeController
  GET #index
            when the user is logged in
            redirects to student_home_path with a notice
            when the user is not logged in
            does not redirect and renders the index template
```