Mathenian: Functional Requirements

1. Users must be able to access the application through a smartphone.
2. Users must be able to select a lesson from a hierarchy of mathematical concepts.
   1. Topics covered include:
      1. Arithmetic
      2. Algebra
      3. Geometry
      4. Set Theory
      5. Limit Theory
      6. Differential Calculus
      7. Integral Calculus
      8. Probability
      9. Statistics
   2. A lesson has 4 levels of mastery. Mastery tiers will consist of:
      1. Bronze
      2. Silver
      3. Gold
      4. Diamond
   3. A lesson requires 100% Bronze mastery before the next lesson in the hierarchy is unlocked.
      1. Mastery will be shown by a colored overlay of the topic’s tile.
      2. A user can still open a lesson after 100% Diamond mastery.
      3. The hierarchy is found in Appendix A.
3. The application will provide lessons to help users practice mathematical concepts.
   1. Each topic will have an introductory lesson that covers the basic concepts of that topic.
   2. Each topic will have 10 questions about the topic for the user to answer.
      1. Numerical values in questions will be randomly generated.
      2. Question templates will be stored within a database and randomly selected.
      3. The questions will be easy enough to answer without the use of a calculator.
   3. The lesson will display a progress bar to show the user their current completion of a lesson. Lessons are not timed.
      1. The progress bar will be split into 10 boxes, one for each question.
      2. A box will be marked green if the user answers the question correctly.
      3. A box will be marked red if the user answers the question incorrectly.
   4. A lesson will NOT provide the following:
      1. Space for scratch work.
      2. A built-in calculator.
   5. A user can quit a lesson at any point. The lesson will not count towards completion.
      1. If a user force closes the app, the lesson is not saved.
      2. If a user switches apps and returns with the app still running, the lesson remains.
      3. If a user wants to access a different lesson, they must quit the current lesson first.
4. Users must be able to test out of a lesson if wanted. Tests are not timed.
   1. The test will consist of 25 questions.
   2. A user must answer at least 23 of the 25 questions correctly.
   3. The test will display a progress bar to show the user their current completion of a lesson.
      1. The progress bar will be split into 25 boxes, one for each question.
      2. A box will be marked green if the user answers the question correctly.
      3. A box will be marked red if the user answers the question incorrectly.
5. Users must be able to have accounts.
   1. A user can create an account. Information required to create an account will consist of:
      1. First Name
      2. Last Name
      3. Username
      4. Email Address
      5. Password
   2. Information for accounts will be encrypted and stored in a database.
   3. A user can login after an account has been created.
      1. A user can enter in their username on the login screen.
      2. A user can enter in their password on the login screen.
      3. The application will verify credentials by comparing values after encryption.
   4. A user can recover their account if lost.
      1. The application will send an email to the user’s email address.
      2. The user can reset their password from the email.
   5. A user can logout of the application.
6. The application will track user specific statistics and overall statistics.
   1. User specific statistics will consist of:
      1. ‘Number of questions completed daily’ line graph.
      2. ‘Daily streak’ counter.
      3. ‘Total number of questions answered correctly’ counter.
   2. User specific statistics will be displayed on the user’s profile page.
      1. The profile page is accessed from the lesson hierarchy page in a sidebar.
      2. The profile page includes all information about a user.
   3. Overall statistics will consist of:
      1. ‘Average number of correct answers in a lesson’ counter.
      2. ‘Percentile of users who have reached this lesson’ counter.
   4. Overall statistics will be displayed within each specific lesson.
      1. Each lesson will have a small tile in the upper right corner that opens an overlay for the statistics for a specific lesson of a specific mastery.
   5. Statistics will be updated after each lesson.
   6. Statistics will not update if a user quits a lesson.
7. Users must be able to change the theme of the application.
   1. The themes provided for the user will consist of:
      1. Light Theme – For day usage.
      2. Dark Theme – For night usage.