Minute Math

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Purpose

According to the National Math and Science Initiative[1], Students who progress through at least Algebra II in high school are twice as likely as those who do not to complete a four-year degree. 26 nations worldwide score better than the United States in math. Science, Technology, Engineering and Math careers are growing twice as fast as other disciplines. These statistics indicate a reason to encourage kids to be more proactive about learning math. We, a group of students from the University of Texas at Dallas propose Minute Math, an android app that will teach students simple mental math abilities that will enable them to solve problems. The app will measure the student's ability to apply these abilities through games and/ or tests. Students will be able to track their progress through these games and receive feedback on how they can improve. Our goal is to release this game to the general public to allow those who want to learn to have the ability to begin testing them. They should be able to spend a minute a day and learn something new, or test concepts learned.

Project Highlights

- Help students or others of the general public learn mathematics
- Create math tutorials for users that are easy to understand build upon each other
- Create games/test that test the abilities that are taught in the tutorials
- Present dynamic feedback to users which help them improve
- Allow users to track their progress
- Design and implement in an easy to use android app

Implementation

This project will be implemented using a three-phase approach as summarized below:

Phase 1 (Core Functionality)
- Create tutorials for skills to be developed
- Design and begin implementing 2 different games/ tests to test these skills
- Create basic user interface

Phase 2 (User integration)
- Create user profile manager
- Integrate user profile with tutorial completion and games from phase 1

Phase 3 (Feedback development)
- Allow user to track over development with data
- Personalize data to user's needs
- Finalize UI/UX

Project Milestones

Milestone	Completion Date	Team Member
Finalize requirements	2/07	Alec Burmania
Design wireframes for tutorials and games	2/07	Gerard Copeland
Game #1 content completed	2/21	Justice Nwaiwu
Tutorial coded	2/21	Joe LaFreniere
End phase 1	2/22	Alec Burmania
Design user profile wireframes	2/28	Jack Wang
Implement user profile UI	3/15	Gerard Copeland
Implement user profile functionality	3/15	Joe LaFreniere
Regression test	3/22	Alec Burmania
End phase 2	3/23	Alec Burmania
Design user feedback wireframes	3/29	Gerard Copeland
Integrate user feedback into existing profile UI	4/10	Gerard Copeland
Expand tutorial/game content	4/10	Justice Nwaiwu
User testing	4/17	Jack Wang
End Phase 3 and development	4/18	Alec Burmania

Deliverables

For each of the iterations the team leader will submit a pack of deliverables to the eLearning site before the deadline. In between the deadlines members will be expected to regularly commit source code and design documents to source control. Each of the deliverable packets will contain the following:

- Android source code & XML UI markup
- APK file for install to android devices
- A changelist containing the changes made from the previous iteration
- Wireframes for the screens that were added or will be added
- UML design documents for our object-oriented approach

Why Android?

Android is a wise choice for app development as development and distribution to the Google play store is completely free. In the US, android holds a market share of approximately 51 percent, making it the largest by a small margin. Worldwide, Android holds roughly 95 percent of smartphone operating system market share[2]. It is reasonable to predict (and expected) that Android's market share will continue to rise in the US, making Android a better choice for longevity. It is also natively implemented in Java, which will benefit our object oriented approach.

Development and Change Management

The team will use Android Studio for development. And will follow an object oriented process. The version of the development platform will be constant for all developers. As such, the app will be written in Java. Testing for target will be done through the included emulator, though final implementation will be done from a physical Android device. Source for the application will be maintained in GitHub. At the end of each iteration the code will be branched for tracking purposes. Developers will leave meaningful comments in their code and will add meaningful dialog for commits to the repository. Communication is critical, and as such the team will hold weekly meetings to synchronize. All other communication will be done through email.

Open Source Philosophy

Open source works are mutually beneficial as others will have full authority to improve upon the work that we complete on this project. Doing so would help the cause of educating students. As such, we propose to release this software under the ISC license[3], which allows our software in the public domain.
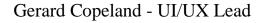
References

[1]   https://www.nms.org/

[2]   https://www.comscore.com/Insights/Market-Rankings/comScore-Reports-July-2015-US-Smartphone-Subscriber-Market-Share

[3]   https://opensource.org/licenses/ISC

Meet the Team

Alec Burmania - Team Lead

I am an electrical engineer working to complete a joint BS/MS. I have 2 years' experience doing software engineering for Lennox International, focusing on C and C++ embedded development, but also on Android development for IOT command and control for residential HVAC.

Gerard Copeland - UI/UX Lead

I have experience with object-oriented programming in Java and C++ through courses like Computer Science I, Computer Science II, and Data Structures. I also have also created a very simple grocery list app using object-oriented design techniques and Android Studio. An IT internship last summer gave me experience working in a fast-paced team environment focused on completing small software and programming projects. I will be able to use both my academic and professional experience to contribute to the team during both the design and implementation phases of the project.

Jack Wang - UI/UX

I learnt Java last semester via free online courses by myself. I finished Operating Systems course and Algorithms and Data Structures course last semester. These two courses used Java to finish all projects. And I am taking two higher level java courses in Collin College this semester. For Android development, I am learning by myself this semester via Youtube.

Joseph LaFreniere - Android Development Lead

Completed CS 2336 and CS 3345, both of which emphasize object oriented skills in Java. Prior experience in application development for Android for an employer's internal use. That experience involved UI design, code implementation in Java and XML, and usability testing.

Justice Nwaiwu - Android Development

An undergraduate student, at the University of Texas at Dallas (UTD), currently pursuing a computer science degree. Justice Nwaiwu has years of experience in the Java programming language and a few weeks of experience in the Ruby, Scala, C++, C#, and Python programming languages. Has worked on a number of solo projects in Java, and one team project in Java. Is currently working a with a UTD student game development team.