Project Plan

CS 4063

Cloud 19

Forster Barnes, Stephen Burris, David Devore, Jon LeMaster, Gabe Scott

Overall Process

Cloud 19 (Team 19) will be assessing the best way to incorporate classical user approaches to sudoku into a simple to use android application. Two to three competing UI designs for the application will be prototyped with an emphasis on ease of use. After researching and testing design ideas we will be choosing a general direction and specific elements of sudoku gameplay will be added. Popular strategies for solving sudoku puzzles on paper must be researched in order to develop the tools necessary for users to apply these strategies to puzzles within the app. Front end and UI development will be prototyped using a whiteboard or pencil and paper during team meetings, refined, and then implemented in Android Studio. The back end game functionality will be programmed in Java. Back end work will begin with the basics of solving externally generated puzzles and if time allows progress toward the possibility of creating an in-house puzzle solver and generator. Both the front and back end will be designed with function scalability and difficulty adjustment in mind. All group work will be kept and controlled through a private Github repository.

The project work has been divided into the four categories of documentation, UI design and testing, back end development, and research and incorporation. As the focus of this project is on user interaction, emphasis will be placed on UI development and testing with user feedback. The team will work on these categories of development simultaneously by testing each aspect independently before adding it to the whole. All new features and elements will be evaluated by the team before beginning their work and before they are merged into the application. Finished aspects of the application will also be tested by external parties and potential users before finalizing their place.

Goals

The primary goal of the project is to assess the user experience and translate their needs into a complete application product. This will be done through team testing and polling a pool of five to twenty external participants. Secondary goals include developing familiarity with Android Studio and the application development process, learning new prototyping techniques, and practicing good version control in code development.

Roles

Mr. Barnes will lead the documentation and general project management logistics. Mr. Burris and Mr. Devore will head up the UI design and measuring user feedback. Mr. LeMaster will spearhead the back-end game development and functionality. Mr. Scott will take charge of researching sudoku strategies and incorporating them into the UI. All of these roles are intended to overlap, and each members' respective tasks will be done in collaboration with all other team members.

Tasks

The project tasks have been separated into five phases:

Initial Planning

- Project Proposal
- Project Plan
- Sudoku Strategy Research
- 2-3 Sudoku UI proposals

Observation and Discovery

- Team Brainstorming
- Target User Focus Group
- Choose a small selection of UI components for implementation and further testing

Design and Implementation

- Create a prototype front-end
- Create a basic back-end to store necessary data structures while playing a game
- Implement Core Features
- Implement secondary features form discovery
- Final implementation

Evaluation and User Feedback

- Team Testing
- User Testing

Documentation

- Document Initial Planning
- Document feature selection from Observation and Discovery
- Document User Feedback
- Document Final Implementation

Milestones

With the division of project roles, several subcategories of milestones exist. These are the initial or combined, front end, and back end milestones as listed below:

- Complete project plan.

Front End

- Create several mockup designs
- Choose UI designs with user test feedback
- Build the front end

Back End

- Create several optional features
- Choose core features with user test feedback
- Build the back end

Combined

- Wire action listeners to back end
- Beta test
- Refine design

Timetable of Milestones

Task	Start Date	Planned Finish Date	Team Member(s)
Project Proposal	1/27/20	1/31/20	All
Project Plan	1/31/20	2/14/20	All
Research Sudoku Strategies	1/31/20	2/5/20	Gabe
Choose several mockup designs	1/31/20	2/16/20	Stephen, David
Feedback on UI design gathered	2/16/20	2/21/20	Stephen, David
Github Repo Working	1/31/20	2/1/20	Jon
Continuous Testing of everyone's area	1/31/20	4/23/20	All
Front end built	2/14/20	4/10/20	Stephen, David
Create several backend optional features	1/31/20	3/30/20	Jon, Gabe
Feedback on features (back end)	3/30/20	4/2/20	Luke, Jon, Gabe
Backend features implemented	4/2/20	4/10/20	Jon
Wire action listeners to backend	4/10/10	4/16/20	Stephen, David
Documentation up to date	1/31/20	4/16/20	Luke
Final Testing	4/16/20	4/23/20	All
Begin Project Digest	3/12/20	4/23/20	All

Risks

As computer programmers, we may tend to focus on implementing as much functionality as we possibly can into our application. With this we run the risk of sacrificing the user experience if we do too much. We must focus our efforts on the user experience and ensuring that our finished product only contains the most relevant user and gameplay elements. We also need to ensure that our additions are not hard on the eyes. If our added functionality makes the screen appear too busy or overloaded, the application could become hard to look at for long periods of time. In addition, if our added features make gameplay too easy, we run the risk of removing the fun from the game. Another risk could be the loss of one of our team members due to their having dropped the class or other reasons. In order to handle this situation, we would allocate that team member's work to the other members. One of Mr. Scott's duties - along with research - is to help where help is required; This could be on the back end or the front end. So in the case of a lost team member, he would shift his primary focus to help cover that prior team member's duties. If we were to lose more than one team member, we would carefully consider what tasks have the highest priority and shift multiple people to those tasks if needed. When working with a deadline, there always exists the risk of tasks taking longer than previously anticipated. In order to mitigate this risk, our team will start as early as possible, and do our best to estimate how long a particular task will take. We must carefully consider our goal and do our best to breakdown as many tasks as we believe will be present. This will also be re-evaluated throughout the project as more tasks will likely arise as we progress. Because we are making a game, one risk with user testing is that timing data will not be feasible due to variance in skill levels between test subjects. Because of this we will have to rely on users telling us what works and does not work meaning it will be hard to capture objective data. Finally, careful research and testing needs to take place in order to ensure that the game remains fun and not too easy. If we remove the sport from the game, users will stop playing, or they might just play the game without our added functionality.

Implementation

We will primarily be using Android Studio for the building of the sudoku application. For mockups we will be using Balsamic, hand drawn images, etc. For file sharing we will be using Github. All code for new features will be written and tested in Github branches before merging back into the master. For communication we use GroupMe.

Deliverables

The primary project deliverable will be the sudoku android application. The documentation of the project as well as any project resources will be collected in a README.txt file in the Github repository. Last is the user data we document for testing various ways of presenting a sudoku board.

Training and Maintenance

For primary training, our team will need to practice with Android Studio. This might include watching tutorials and Youtube videos on how to achieve what we need to get done. It will also be important for each of us to become familiar with the Android Virtual Machine, as it comes into play when coding in android studio. Java and specifically JavaFX should be studied as much as is necessary. These skills will also cover the scope of future maintenance needs.

Evaluation

The most important criteria for measuring project success is the effective inclusion of popular sudoku strategies into a working sudoku puzzle game for android devices. The team will evaluate all design elements prior to development. User evaluation will follow core feature and UI development. The goal for user testing is to collect five to twenty potential target users and ask them a short list of questions regarding their overall experience with the application and the effectiveness of specific features.

Future Directions

This project is easily scalable. The first expansion would include an in-house puzzle generator to provide an endless selection of puzzles. After this, a seemingly endless pool of features can be added to assist users and deliver new gameplay options. Such elements include various sizes of puzzle boards, three dimensional puzzles, competitive or collaborative puzzle solving with other users, additional hint features, cosmetic changes, etc. Users of the finished product can also be provided a designated platform for suggesting new features and giving general maintenance feedback. Later expansions could include features that enable users to play shared puzzles and compare high scores on a leaderboard. These would be daily challenge puzzles that could cycle and utilize the cloud.