Dungeons and Dragons Companion App

Software Engineering

ITSC-3155

Final Project Report - Group 8

December 17, 2020

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GitHub Link:

https://github.com/TheHongster/DND-DMing-Companion

Table Of Contents

1. Introduction

Our project is an application for the tabletop game DND (Dungeons and Dragons) for the DM (Dungeon Master) that will aid in running the game. It will keep track of the game's statistics and mechanics such as a "monster's" hit points and armor class as well as the player hit points and armor class. The main goal of this application is to keep track of all of the relevant statistics to the game to assure a smooth playing experience for all of the members involved in the game.

Our project will be able to create an app that covers the important mechanics of running the game as a Dungeon Master. The Dungeon Master is a person who controls the different mechanics of the game and the different outcomes for all of the other players involved. Our project that creates an app to aid this person will be very important because it will keep track of many advanced concepts that are hard to keep track of within your head.

1.1 Purpose

DND (Dungeons and Dragons) games are often complicated and disorganized, especially after several hours of playtime. There is a lot of information to keep track of, so we decided to create a system to help organize and check that information. This allows players to focus on the more enjoyable aspects of the game without being bogged down by the monotony of constantly tallying and adjusting numbers. Our app is designed to make the DND experience more accessible to players without intruding too much on what makes a tabletop role-playing game so fun.

1.2 Scope

We proposed to create an application that will allow users to track the status of multiple characters for the tabletop game DND (Dungeons and Dragons) so that the user will be able to spend less time trying to keep track of individual statistics in the game.

We have created an android phone application called Dungeons and Dragons Companion App that has been developed through Android Studio. This project is an application that allows users to add enemies and players into a list, that will be editable. Displaying the list using a recycler view. And allowing the user to view, sort, edit, and delete entries.

The Application will have the ability to:

- Add new creatures

- Keep track of creatures HP/AC.
- Delete creatures
- Sort creatures by HP/AC/Name
- Change the health of creatures through damage actions
- Display creatures in a list style

The overall objective of the application is to create a system that allows the user to input a set of data that is stored in an ArrayList, then allowing the user to interact with the data through changing fields in the ArrayList. This allows the system to take the user's inputted information and display it as a View that shows all of the creatures created by the user.

1.3 Definitions, Acronyms, and Abbreviations

- **DND:** Refers to the game Dungeons and Dragons; a tabletop game made by Wizards of the Coast.
- **HP:** Stands for hit points; it is a numerical statistic in the game to track an entity's health in the game.
- **AC:** Stands for armor class; it is a numerical statistic that represents the difficulty of "hitting" an entity within the game based on a dice roll.
- **DM:** Stands for Dungeon Master; this is the master of the game that controls how the game flows and dictates what happens in the game as well as keep track of changes to the entities within the game.
- **UI:** User interface; this is the medium in which the user can interact with our application.
- **DFD:** Detailed Flow Diagram; this is a diagram we use to list out what we need of the system we're trying to create.

1.4 References

Dungeons and Dragons Official Website - https://dnd.wizards.com/
Android Studio - https://developer.android.com/studio

Not necessarily a reference but an important documentation of our project:
Our GitHub Page: https://github.com/TheHongster/DND-DMing-Companion

No code was referenced in development and was done completely from scratch.

1.5 Overview

The application allows the user(s) to create and store entities related to their session of DND. The user(s) can modify specific values like HP or AC to help keep track of the game statistics as the game session progresses. The entities the user(s) can create contain the values Name, HP, and AC which can be set and edited at will. The user(s) can also designate the type of entity it is, (player, neutral, enemy), and the number of the entity if there's a need for several of the same entities. All of the information related to the entities are displayed in a list where any user can touch to edit the information. The application has a sort feature that can sort entities by specific categories in ascending or descending order.

2. General Description

2.1 Project Perspective

As DND players ourselves, we had a useful perspective for designing and implementing an app to be used by other players. We all have experience with the problems that arise during a game of DND, and we all have tried other software products to solve these issues. This familiarity with the game allows us to best understand what users want in an app and how it will be used. Making an app for a game we had never played would be considerably more difficult, as often occurs in business settings where the product owner is disconnected from the desires of their users.

2.2 Project Components

2.2.1 User Stories

- List Of User Stories:
    - As a Dungeons and Dragons Game Master, I want to utilize my time efficiently so I can get through a game faster.
    - As a Dungeons and Dragons Game Master, I want to be able to keep track of what's going on so I can have fun with the game without wasting time.
    - As a Dungeons and Dragons Game Master, I want to be able to track the health of all of the listed creatures so I can know the current status of all creatures.

- As a Dungeons and Dragons Game Master, I want to be able to see all creatures listed in Armor Class so I can quickly make rulings and decisions in the game.
- As a Dungeons and Dragons Game Master, I want to be able to subtract the health from the creature's health pool so I can know when a creature is dead.
- As a Dungeons and Dragons Game Master, I want to be able to organize/sort my creatures on the list, so that I can find specific creatures faster.
- As a Dungeons and Dragons Game Master, I want to be able to list creatures by their turn order so that I can keep combat more organized.
- As a Dungeons and Dragons Player, I want to be able to get through a game session efficiently so that I can not waste time and have more fun.
- As a Dungeons and Dragons Player, I want to be able to have information about the game session so that I can have the information readily available.
- As a Dungeons and Dragons Enthusiast, I want to be able to identify gameplay attributes so that I can improve my style of play for the game.
- As a Dungeons and Dragons Enthusiast, I want to be able to clearly observe how the game is tracked in the app so that I can better utilize my time spent playing the game.

2.3 Specific Goals/Features

Our group had several main goals in mind while designing and developing the application. There were some specific use cases that had to be included in the app for it to be able to serve its intended purpose of tracking creature health, including create/delete a creature, change creature health, and display creature list. We also knew we would need a database for storing creature information, as well as a way to get input from the user.

Outside of these core components we also wanted to add some quality of life features such as sorting and filtering creatures by their health or type, as well as color coding for quick identification of relevant information. We also had a more general design goal of keeping the app streamlined and minimalistic. Players should find the app intuitive so they can seamlessly incorporate it into their games.

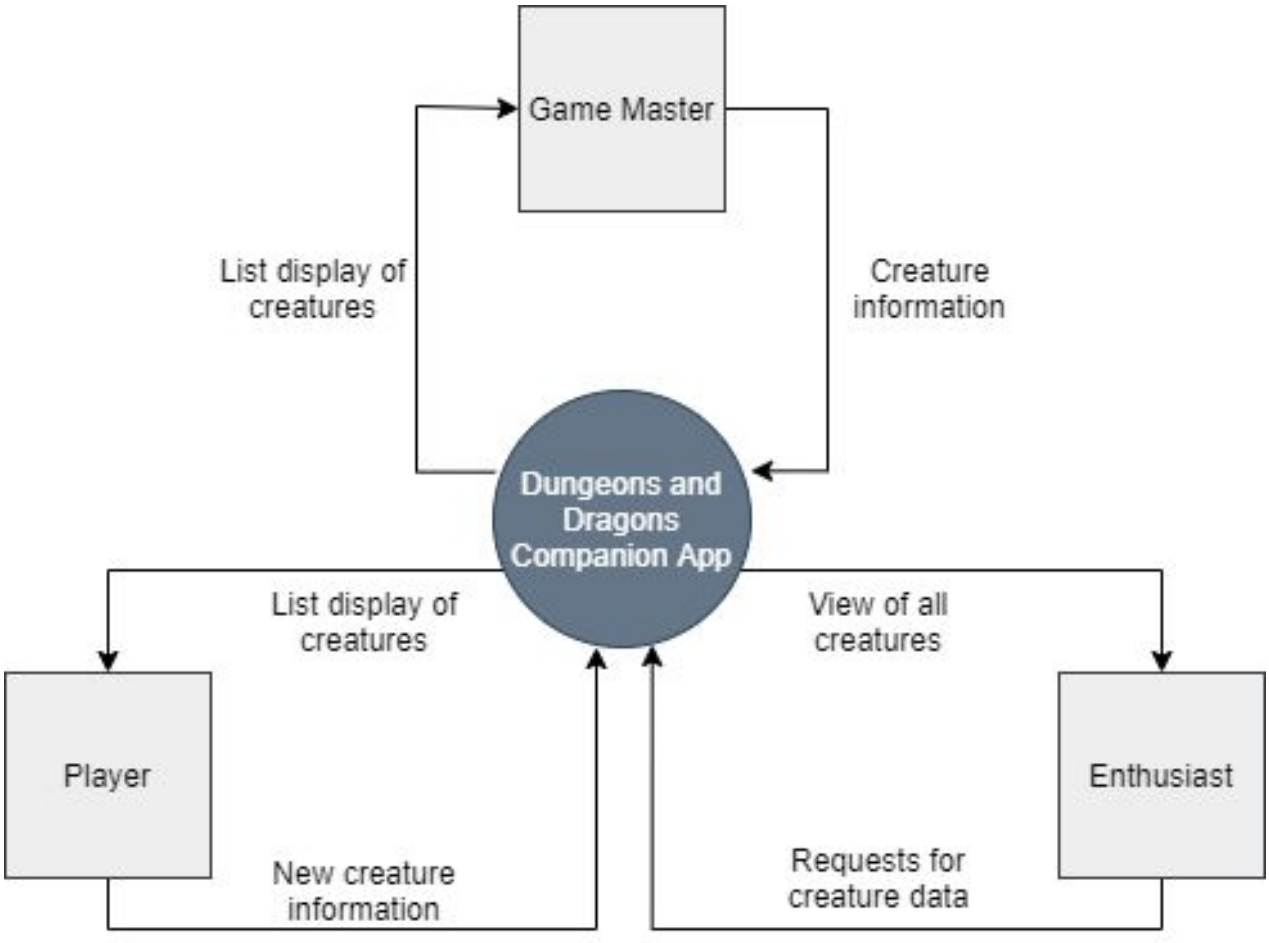
List Of System Features: (Extracted from user stories above in 2.2.1)

- Add creatures to list

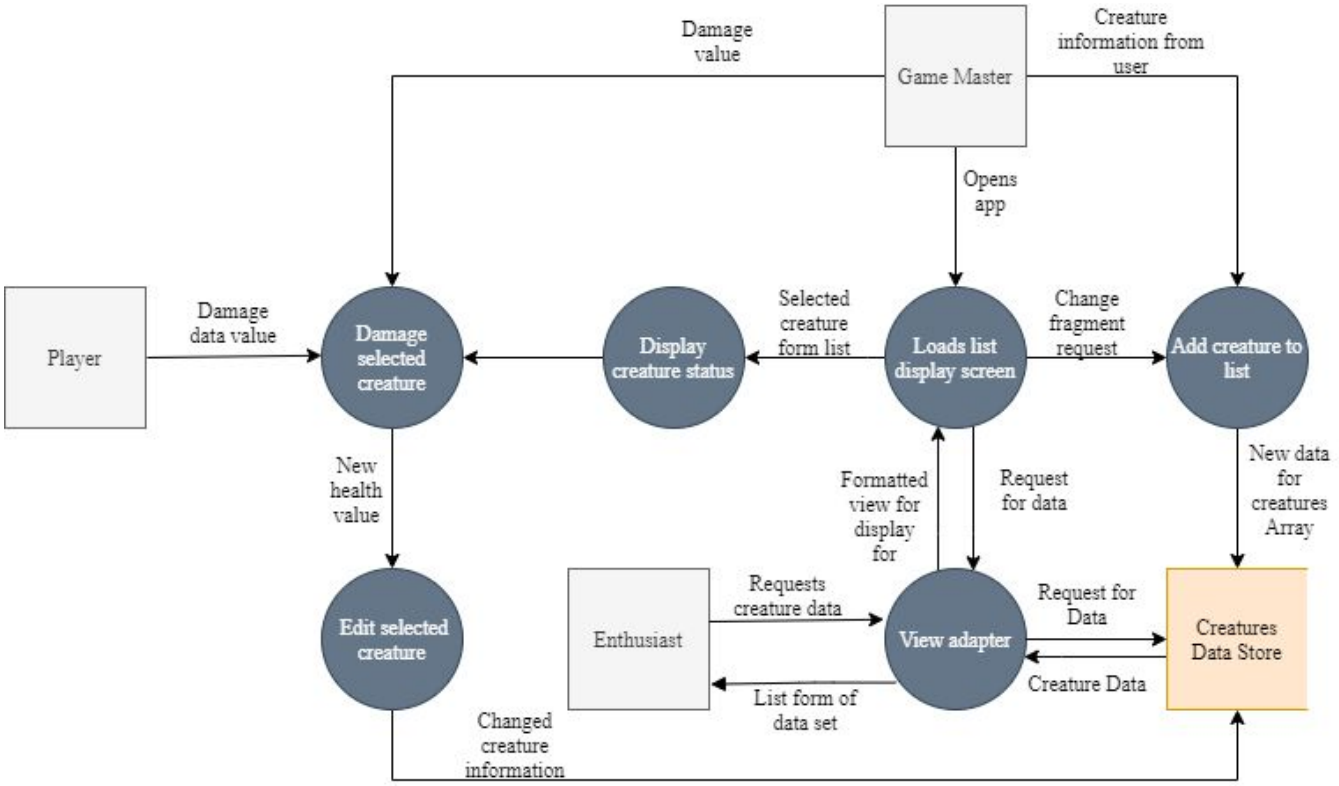
- Display all creatures in a list together
- Display creature information including name, health, and armor class
- Make calculations of health by inputting damage information into the application
- Sort by ascending/descending based on specific attributes (Will be implemented in the next Demo)
- Be able to list creatures by “turn order” (Will be implemented in the next Demo)

2.4 Important Diagrams

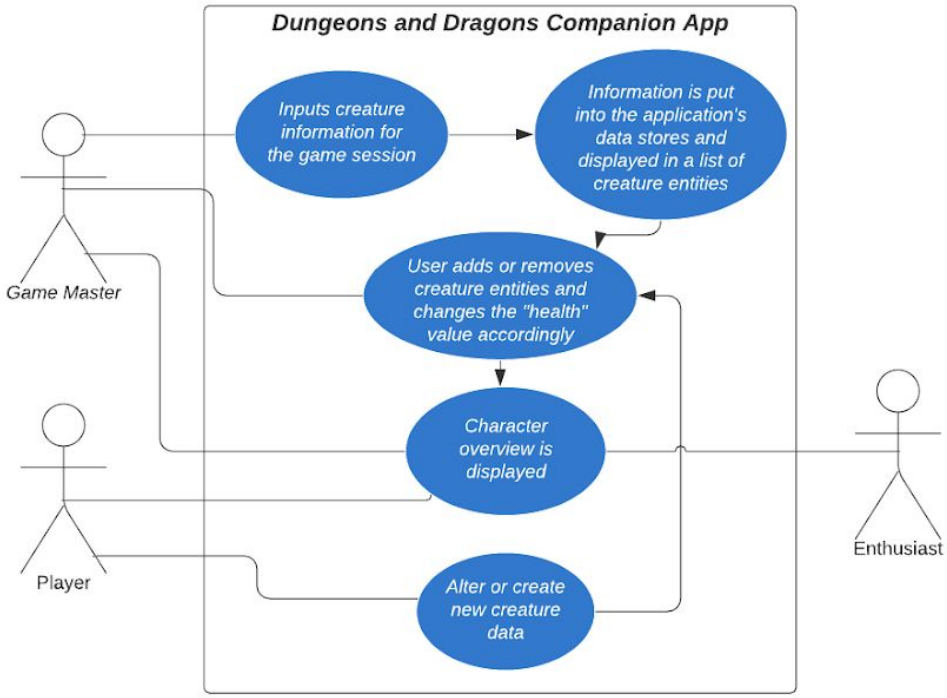
2.4.1 Context Diagram



2.4.2 Data Flow Diagram



2.4.3 Use Case Diagram



3. Effort

Task	Estimated Time of Research	Actual Time of Research	Estimated Coding Effort	Actual Coding Effort
User Stories	~1h	1h	n/a	n/a
Context Diagram	~1h30m	1h	n/a	n/a
DFD	~1h30m	2h	n/a	n/a
Use Case Diagrams	~1h30m	1h30m	n/a	n/a
Develop Demo	~1h30m	1h	~5h	5h30m
Record and Edit Demonstration video.	~1h30m	3h30m	n/a	n/a
Screenshot app functionality	~30m	30m	n/a	n/a
Develop Final version	~1h30m	1h	~2h	5h

All additions to the projects code and README file can be viewed on our GitHub. As we developed the app we made numerous commits to show our projects process as it was developed.

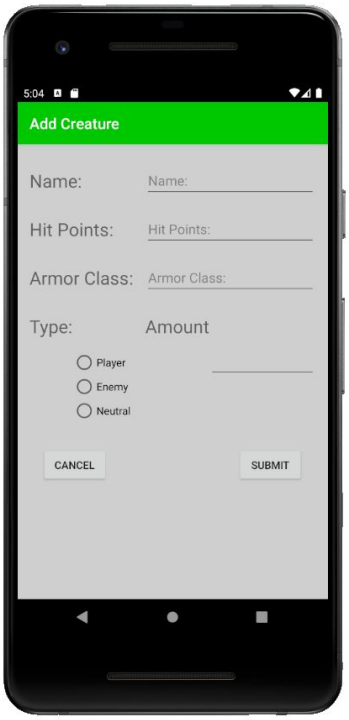
(Note: There were many README file commits made in the development of the project as we continued to improve it to show a good overview of the project)
The commits to the code for the application can also be seen on the GitHub

GitHub Link: **https://github.com/TheHongster/DND-DMing-Companion**

4. Programs Developed

4.1 User Interfaces Screenshots

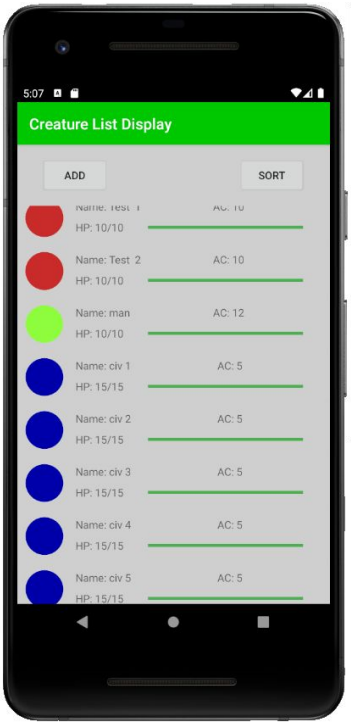
	
Description: This is the new opening screen for the app added after request for a it from testers	Description: This is the creature list display with no creatures held in the Arraylist

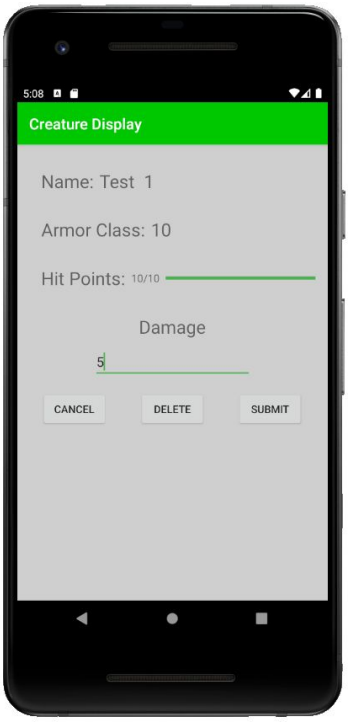


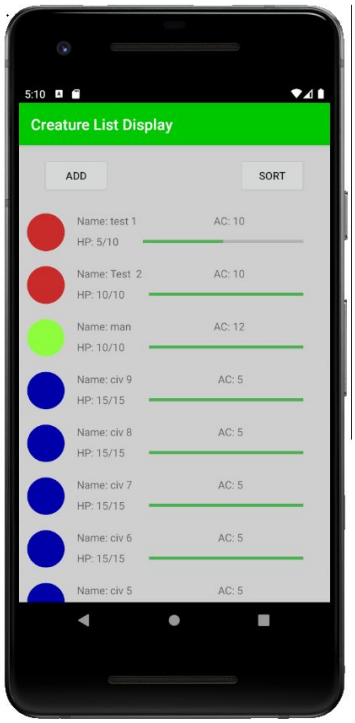
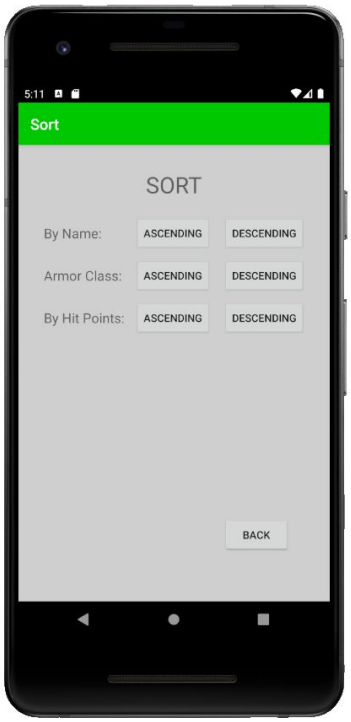
Description: this is the add screen. This is where the user can add new creatures

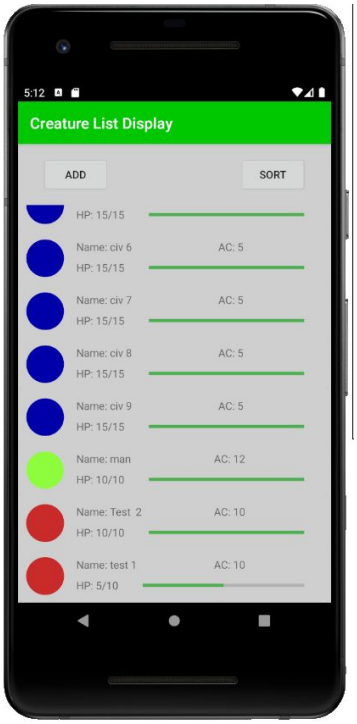
S

Description: This is the creature list display with 2 creatures held in the Arraylist that were added by the last add.



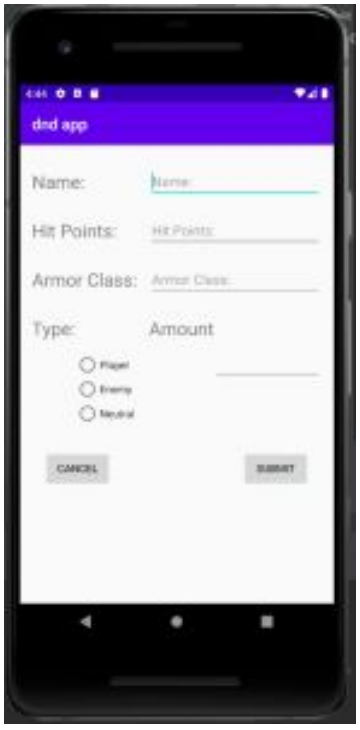


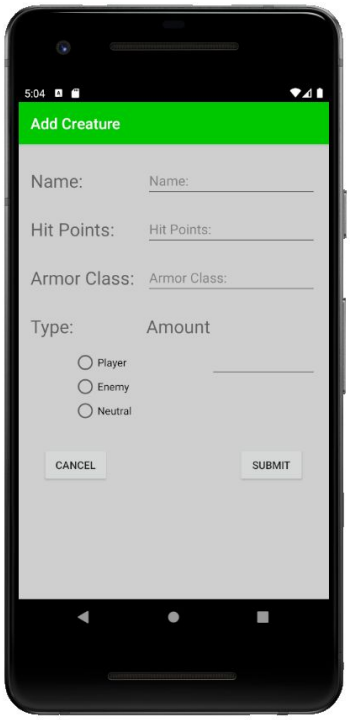
Description: This is the creature list display with more values to be used for future tests	Description: this is the creature display showing one monster's stats. As well as showing the damage function
	
Description: this shows the damaged monster in the list	Description: this shows the sorting selections

	
Description: this shows the sort's results	Description: part 2 of sort results

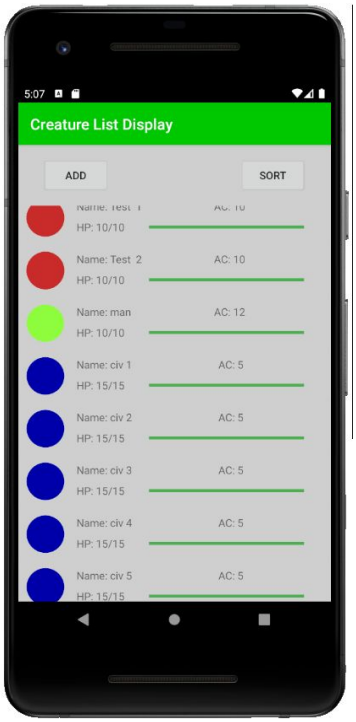
4.2 User Interface Comparison

Old	New (After Continued Development)
	

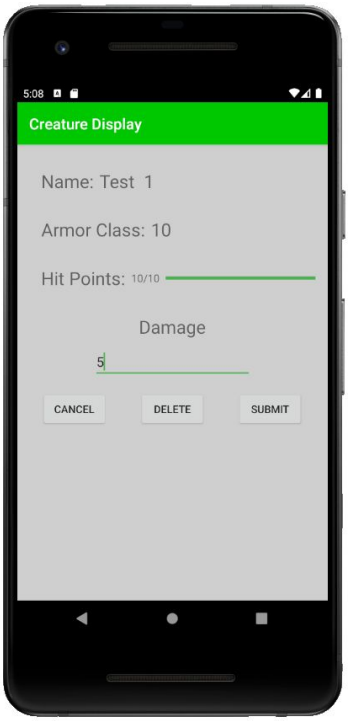

dnd app
Name:
Hit Points:
Armor Class:
Type:
Amount
CANCEL
SUBMIT


5:04
Add Creature
Name:
Hit Points:
Armor Class:
Type:
Amount
Player
Enemy
Neutral
CANCEL
SUBMIT

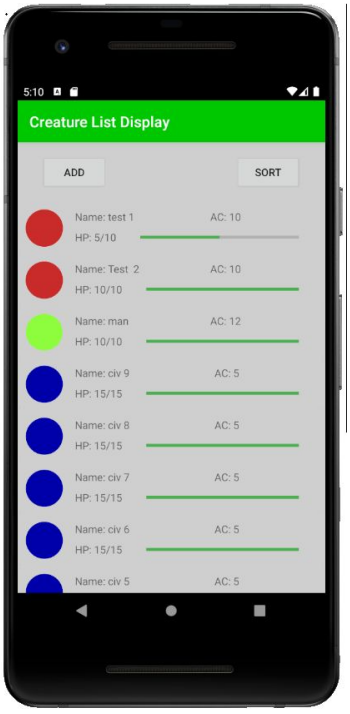

dnd app
ADD


5:07
Creature List Display
ADD
SORT
HP: 10/10
Name: Test 2
AC: 10
HP: 10/10
Name: man
AC: 12
HP: 10/10
Name: civ 1
AC: 5
HP: 15/15
Name: civ 2
AC: 5
HP: 15/15
Name: civ 3
AC: 5
HP: 15/15
Name: civ 4
AC: 5
HP: 15/15
Name: civ 5
AC: 5
HP: 15/15


dnd app
Name: test
Armor Class: 10
Hit Points:
Damage
5
CANCEL
SUBMIT


Creature Display
Name: Test 1
Armor Class: 10
Hit Points: 10/10
Damage
5
CANCEL
DELETE
SUBMIT


dnd app
ADD


Creature List Display
ADD
SORT
Name: test 1
AC: 10
HP: 5/10
Name: Test 2
AC: 10
HP: 10/10
Name: man
AC: 12
HP: 10/10
Name: civ 9
AC: 5
HP: 15/15
Name: civ 8
AC: 5
HP: 15/15
Name: civ 7
AC: 5
HP: 15/15
Name: civ 6
AC: 5
HP: 15/15
Name: civ 5
AC: 5

5. Discussions And Conclusion

Before beginning work on our project we had already completed several models of the system which allowed us to accurately estimate the time and effort required. We decided which features were required and which could be added later as time permitted, so we felt confident that we would be able to implement the core requirements of our product. Fortunately our planning paid off and our predictions were mostly correct, giving us time to add quality of life features such as color coding and sorting the creature list. We also were able to spend time refining the layout and color scheme of the overall application. Determining the UI design took longer than expected as it was important for us that the app remained as minimalistic and easy-to-use as possible.

Our project was created using Android Studio, which only one of our groups members had experience with, but it also used Java which we had all used in previous classes. This meant that getting started with the development environment took some time as we accustomed ourselves to Android Studio, but we learned quickly from our more experienced group member. Pair programming turned out to be an invaluable tool in developing and debugging the project, with one person writing the code while others would review it in real time.

We had minimal issues during development, but did run into formatting issues when displaying the database, as well as some logic errors related to the sorting functionality. Some features of Android Studio were unreliable such as the built-in ‘push to GitHub’ feature which caused problems until we decided to push updates manually using Git Bash. There was some uncertainty in our group on how to go about creating the diagrams needed for our project, but we quickly sought clarification from our assigned teacher’s assistant.

5.1 Final Presentation/Demo

Link to video: Final Presentation/Demo Video
UPDATE THIS LINK WITH FINAL VIDEO!!

A. Appendix

The Appendix includes subsequent appendices that contain documentation important to the overall project. The appendices begin on the next page.

A.1 Use Case 001 - Add Creature to List

DND Companion App

Author (s): __Group 8____ **Date: 12/01/2020**

Version: 1.0

USE CASE NAME:	Add Creature to List	**USE CASE TYPE** Business Requirements: □ System Analysis: □
USE CASE ID:	001	
PRIORITY:	High	
SOURCE:	Application Owner	
PRIMARY BUSINESS ACTOR	Developer	
PRIMARY SYSTEM ACTOR	Dungeon Master	
OTHER PARTICIPATING ACTORS:	Player	
OTHER INTERESTED STAKEHOLDERS:	• Wizards of the Coast	
DESCRIPTION:	The dungeon master can add a creature and fill out the relevant information before adding it to the list of tracked creatures.	
PRE-CONDITION:		
TRIGGER:		
TYPICAL COURSE OF EVENTS:	**Actor Action**	**System Response**
	Step 1: Tap the add button on the first page	**Step 2**: Sends users to the create creatures page
	Step 3: Enters the Creatures information	
	Step 4: User selects submit	**Step 5**: Adds creature to the list of existing creatures
		Step 6: Sends the user to the display page with the updated list
ALTERNATE COURSES:	**Alt Step 4:** User selects cancel instead of submitting	
	Alt Step 5: User is returned to the creature list	
CONCLUSION:		
POST-CONDITION:		
BUSINESS RULES		
IMPLEMENTATION CONSTRAINTS AND SPECIFICATIONS		
ASSUMPTIONS:		
OPEN ISSUES:		

A.2 Use Case 002 - Damage Selected Creature

DND Companion App

Author (s): ___Group 8_____ **Date:** 12/01/2020

Version: 1.0

USE CASE NAME:	Damage Selected Creature	**USE CASE TYPE** Business Requirements: □ System Analysis: □
USE CASE ID:	002	
PRIORITY:	High	
SOURCE:	Application Owner	
PRIMARY BUSINESS ACTOR	Developer	
PRIMARY SYSTEM ACTOR	Dungeon Master	
OTHER PARTICIPATING ACTORS:	• Players	
OTHER INTERESTED STAKEHOLDERS:	• Wizards of the Coast	
DESCRIPTION:	The user can deduct health from a creature.	
PRE-CONDITION:		
TRIGGER:		
TYPICAL COURSE OF EVENTS:	**Actor Action**	**System Response**
	Step 1: Select creature from list	**Step 2**: Open display page for selected creature
	Step 3: User enters amount to damage to deal to creature	
	Step 4: Hit the submit button	**Step 5:** Edits the creatures information
		Step 6: Sends the user to the display page with the updated list
ALTERNATE COURSES:	**Alt Step 4:** User selects cancel instead of submitting	
	Alt Step 5: User is returned to the creature list	
CONCLUSION:		
POST-CONDITION:		
BUSINESS RULES		
IMPLEMENTATION CONSTRAINTS AND SPECIFICATIONS		
ASSUMPTIONS:		
OPEN ISSUES:		

A.3 Use Case 003 - Display Creatures Screen

DND Companion App

Author (s): ___Group 8_____ **Date:** 12/01/2020

Version: 1.0

USE CASE NAME:	Display Creatures Screen	**USE CASE TYPE** Business Requirements: □ System Analysis: □
USE CASE ID:	003	
PRIORITY:	High	
SOURCE:	Application Owner	
PRIMARY BUSINESS ACTOR	Developer	
PRIMARY SYSTEM ACTOR	Dungeon Master	
OTHER PARTICIPATING ACTORS:	• Players, Enthusiast	
OTHER INTERESTED STAKEHOLDERS:	• Wizards of the Coast	
DESCRIPTION:	The application will load all of the creatures in the current list though the display creatures screen.	
PRE-CONDITION:		
TRIGGER:	Loads the main page	
TYPICAL COURSE OF EVENTS:	**Actor Action**	**System Response**
	Step 1: load main page	**Step 2:** gathers all information
		Step 3: sends information to adapter
		Step 4: adapts information to an appropriate view
		Step 5: returns view
ALTERNATE COURSES:	**Alt Step 2:** no information, returns blank view.	
CONCLUSION:		
POST-CONDITION:		
BUSINESS RULES		
IMPLEMENTATION CONSTRAINTS AND SPECIFICATIONS		
ASSUMPTIONS:		
OPEN ISSUES:		

A.4 Use Case 004 - Edit Selected Creature

DND Companion App

Author (s): ___Group 8_____ **Date:** 12/01/2020

Version: 1.0

USE CASE NAME:	Edit Selected Creature	**USE CASE TYPE** Business Requirements: □ System Analysis: □
USE CASE ID:	004	
PRIORITY:	Medium	
SOURCE:	Application Owner	
PRIMARY BUSINESS ACTOR	Developer	
PRIMARY SYSTEM ACTOR	Dungeon Master	
OTHER PARTICIPATING ACTORS:	Players	
OTHER INTERESTED STAKEHOLDERS:	Wizards of the Coast	
DESCRIPTION:	The user can edit the information of a creature through this feature and the app will reflect those changes in the UI.	
PRE-CONDITION:		
TRIGGER:		
TYPICAL COURSE OF EVENTS:	**Actor Action**	**System Response**
	Step 1: Select creature from list	**Step 2**: Open display page for selected creature
	Step 3: User enters new creature information	
	Step 4: Hit the submit button	**Step 5:** Edits the creatures information
		Step 6: Sends the user to the display page with the updated list
ALTERNATE COURSES:	**Alt Step 4:** User selects cancel instead of submitting	
	Alt Step 5: User is returned to the creature list	
CONCLUSION:		
POST-CONDITION:		
BUSINESS RULES		
IMPLEMENTATION CONSTRAINTS AND SPECIFICATIONS		
ASSUMPTIONS:		
OPEN ISSUES:		

A.5 Use Case 005 - Remove Creatures

DND Companion App

Author (s): Group 8 **Date: 12/01/2020**

Version: 1.0

USE CASE NAME:			**USE CASE TYPE**
USE CASE ID:	005		Business Requirements: □
PRIORITY:	High		System Analysis: □
SOURCE:	Application Owner		
PRIMARY BUSINESS ACTOR	Developer		
PRIMARY SYSTEM ACTOR	Dungeon Master		
OTHER PARTICIPATING ACTORS:			
OTHER INTERESTED STAKEHOLDERS:			
DESCRIPTION:	Removes a creature from the list of creatures and reflects those changes within the application.		
PRE-CONDITION:			
TRIGGER:			
TYPICAL COURSE OF EVENTS:	**Actor Action**	**System Response**	
	Step 1: Select creature from list	**Step 2**: Open display page for selected creature	
	Step 3: User hits the delete button		
	Step 4: Hit the submit button	**Step 5:** removes the creatures information	
		Step 6: Sends the user to the display page with the updated list	
ALTERNATE COURSES:	**Alt Step 4:** User selects cancel instead of submitting		
	Alt Step 5: User is returned to the creature list		
CONCLUSION:			
POST-CONDITION:			
BUSINESS RULES			
IMPLEMENTATION CONSTRAINTS AND SPECIFICATIONS			
ASSUMPTIONS:			
OPEN ISSUES:			

All members of our team have helped complete and contribute to this document as well as the project overall. All team members have also reviewed the document and project to make sure it is to their standards.

Ross Landgraf, Aaron Hong, Nickolas Earles, Cormac Strickland