Mobile Application Design 2019 project

Dungeons&Dragons Combat Assistant

team: **Jiří Matějka**, xmatej52
Matěj Mlejnek, xmlejn04
Tomáš Opichal, xopich00

Project goal

Dungeons&Dragons Combat Assistant is an application that eases combat part of Dungeons&Dragons adventure. The goal is to offer an offline application for game masters, that enables to:

1. Create templates for NPCs, weapons, armours and shields
2. Create separated rooms that can be filled with NPCs
3. Automatically generate NPCs into rooms by few clicks
4. Automatically compute all common actions during combat (attack power, defence power, damage, initiative, etc.)

The most important part is the last specified feature. But without proper design and implementation of previous features, the application will not be usable. The application will be implemented for Czech version of the rules – Dračí doupě 1.6e by Altar.

Used Technologies

- Android
- AndroidStudio
- GitHub
- Java
- Kotlin
- SQLite
- Game-icons.net
- Facebook Messanger

Used Resources

The only resources used for project implementation are icons provided by Game-icons.net [1]. There are multiple authors of the icons. List of all authors is available on their website [2].

[1] https://game-icons.net/
[2] https://game-icons.net/about.html

Most Important Achieved Results

The most important achieved result is the implementation of a combat system. Dungeon master can perform many common actions during the combat and application shows all the necessary information (like hit points, magic energy, initiative, number of actions, round order, etc.) about NPCs in room.

Another important feature is the detail of the generated NPC. The detail contains more information about NPC that are useful when NPC is affected by the player's special abilities or spells. The dungeon master is able to manage NPCs equipment during the combat as well.

Last essential feature is advanced NPC template. The user can create an unlimited number of templates and specify all necessary information about NPC. They can specify possible weapons NPC can use and a chance that generated NPC will have the weapon.

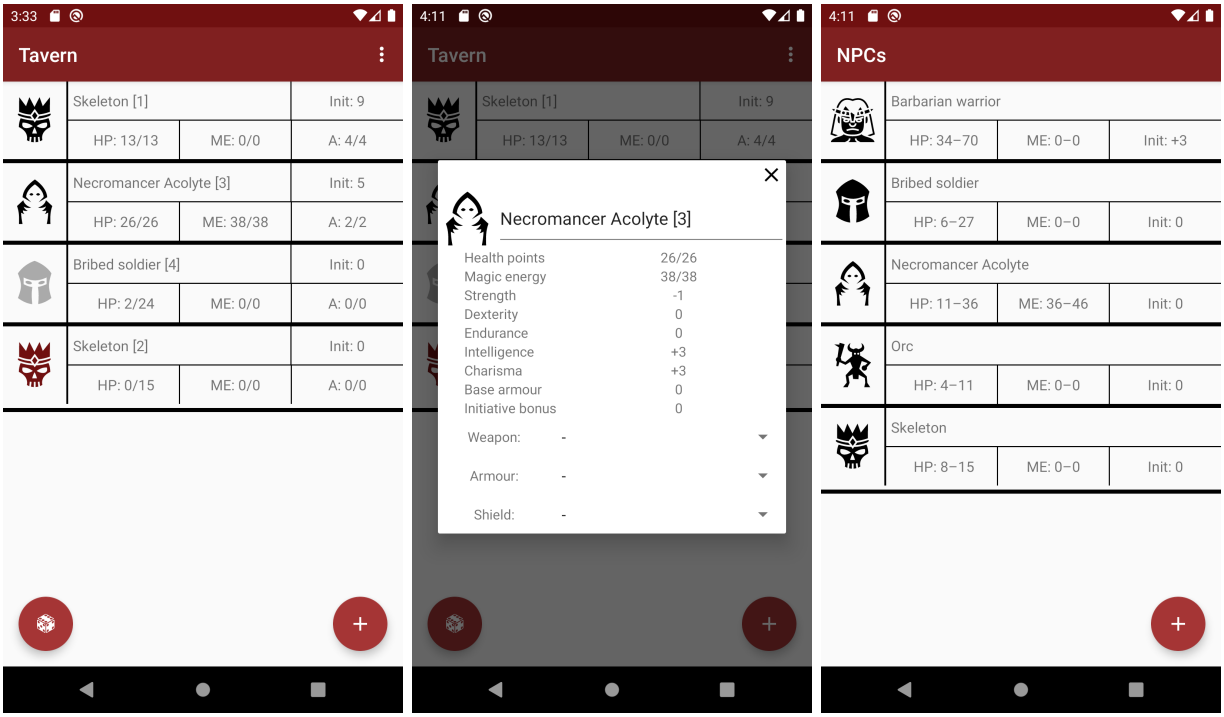

Figure 1: From left to right: Combat system, NPC templates, detail of the generated NPC

Controlling of Created Program

Once application started, a room is displayed (if there is no room, then the NPC template is shown). The room can be deleted by tapping "trash bin" icon in the top right corner. The initiative can be rolled with dice floating button and new NPCs can be generated with a plus floating icon. Detail of NPC can be displayed by holding your finger on NPC and by tapping the NPC, list of possible actions is shown. A hidden menu is on the left side and can be revealed by "swiping" from left to right. From the menu, you can access different rooms, create new rooms or manage templates. Templates can be created using floating plus button, edited by tapping at them and deleted by holding your finger on them.

Experience with the Selected Platform

AndroidStudio is an advanced IDE and it takes some time to be able to use it for development. Android studio also drained laptop battery and consumed a huge amount of memory, especially while using an emulator. We also missed feature for importing multiple SVG icons and had to import tons of icons manually. But in the end, we agreed that AndroidStudio saved us a lot of time during development.

Android has detailed documentation and many examples how to use many features and it took almost no time to create the first prototype with hardcoded items, but implementing rest of the project took much more time than expected.

Distribution of the Work in the Team

- Jiří Matějka – Application design, design and implementation of database and backend
- Matěj Mlejnek – Decisions about used technologies, implementation of user–interface (displaying existing items, menu)
- Tomáš Opichal – Implementation os user–interface (creation and modification of items)

What Was the Biggest Challenge

The biggest challenge was to implement NPC template so generated NPCs can differ the same way as the dungeon master would generate them (different hit points, magic energy and equipment). Another difficult challenge was to include in project all of the basic combat system rules from the book as well as most common features from the advanced combat system.

Experience Gained From the Project

We have learned how to design and implement android application and that this process is not as difficult as we feared at the beginning. We also learned that implemented application is never perfect and that there is always some things that can be added or done better and we had to choose what to implement while considering how much time we have and how important the feature is.

Autoevaluation

Technical Design (90%): We implemented all the designated features from beginning with some little changes and some added features (weapon, armour and shield templates). Application is usable as we desired.

Programming (40%): The implemented solution is not usable for a different set of rules. But it can be used as a foundation stone for such development. Source code has bad readability due to lack of comments.

Usability of the Created Solution (90%): Application is usable for all common situations that can occur during the combat. The application reduces the time it took the dungeon master to compute damage to both players and NPCs. It also prevents from making common mistakes (like miscalculation) and eases dungeon master to prepare combat for payers. Due lack of time od players, the application was not tested in a real game but in a simulated game only (dungeon master took control of player's characters).

Use of Resources (90%): We used available icons for development and we tried to use as many features of GitHub and AndroidStudio as possible.

Team Cooperation (40%): Most of the project was implemented near the project deadline and most of the deadlines created by team leader were not met. All team members should be more communicative, responsible and independent.

Chances of Publishing the App (80%):
Some people showed interest in the applicationa and wish to try it once it will be complete. We want to test the application during one or two games and if it will be useful as we believe, we plan to publish it.

Overall Impression (90%): We have learned many new things and gained much–needed experiences with app development. We are really happy with the implemented application and I, Jiří Matějka, will carry on future development and I might get assistance from my friends as well since they already asked me to provide them with access to the source codes.

Autoevaluation

What drives this sector of IT?
Mobile is the most popular platform with many users and many market possibilities. Developing a mobile application is easier every year and there is every year new developers with new ideas.

What it will be like in five years?
Virtual reality will be available for most of the mobile users and developing of application for Virtual reality will be at its peak. Like almost every one has its mobile phone today, the same will be with smartwatches.

What speeds it up?
The amount of money and market possibilities are attractive to many software companies and self-employed developers. The number of users is still growing and people are willing to pay for the newest devices like virtual reality or smartwatch.

What slows it down?
Many companies do not wish to invest money into these technologies because they do not have capabilities for it or the current state is more profitable for them. Compatibility of older devices also does not make it easy to succeed with new ideas. There is also a need to solve many

security problems and that reduces performance and increase the cost (time, money, number of developers, etc.) for a new solution.

What ideas are dead (though they appeared great once)?

- Google glass
- Windows phone
- Symbian OS

Where do new ideas come from?
New ideas come from visionaries, communities but from new problems as well (as a solution for those problems).

Recommendation for Assigning Future Projects

We recommend picking a project that helps you in your life or is related to any of your hobbies. You will then develop an application for yourself and you will care more about the design and implementation. Also, it will be more fun.

Recommendation for Future Students

We recommend to specify and keep multiple deadlines over semester. Work in a team with students you worked with before (if possible). Don't be shy to disgust your project with friends or family, they have sometimes really good ideas they can see important parts you are missing.