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CS242 Final Project Proposal

Tile-Based 2D Game Engine

1. Abstract

a. Project Purpose

My goal is to make a tile-based 2D game engine which will produce results that look similar to 8- and 16-bit top-down RPGs. I will only be working on the engine – not a full game – with the purpose of making it transferrable across games. There will be a few core modules that serve as the basis for any game. Modules can be modified or additional ones can be added to fit the specifics of each game being made.

b. Background/Motivation

I like playing games and am also interested in the design process behind them. Although I do not intend to pursue this as a career, I am interested in working on a few games as side projects. I made a few simple applets in high school, but now, with the skills I have acquired, I would like to make something a bit more complex. This final project will serve as my motivation to finally get something started.

2. Technical Specifications

- a. Platform:** PC (executable file; no emulator required)
- b. Programming Language(s):** Java
- c. Stylistic Conventions:** Javadoc conventions
- d. SDK:** Java SE Development Kit 8
- e. IDE:** IntelliJ
- f. Tools/Interfaces:** PC (mouse + keyboard)
- g. Target Audience:** People who want to get started on making 2D games (me)

3. Functional Specifications

a. Features

- i.** Grid-based 2D maps featuring keyboard for movement
- ii.** Customizable visuals depending on the tile set the user chooses
- iii.** Map editing through a dedicated GUI
- iv.** Separate module will allow for turn-based combat
- v.** Encounter types can be customized according to user preference
- vi.** Will allow user to script events and their prerequisites/dependencies
- vii.** Supports save files (save/load game state to/from text file)

b. Scope

This engine will only be able to support a very specific kind of game: a top-down tile-based 2D game. Combat and visuals will be completely customizable through addition of modules but movement will be restricted to a grid.

4. Timeline

a. Week 1

- i. Get the core engine up-and-running
- ii. I will complete the basic structures required to form an area map and allow for grid-based movement within it using the arrow keys
- iii. Will support limited interactions with objects in the environment
- iv. Should be able to cross over to another map or enter a new area
- v. Basic “collision detection” by determining which tiles can be walked on

b. Week 2

- i. I will create a dedicated GUI for creating maps (represented by 2D tile arrays)
- ii. User will specify the size of the map and then fill in the tiles manually
- iii. Keyboard controls will be supported at the very minimum with hotkeys linked to certain tiles; may support mouse, as well, if deemed beneficial
- iv. Will output the 2D tile array representing the map the user made

c. Week 3

- i. I will work on a separate combat module
- ii. I will implement random battles as the encounter type using simple turn-based combat as an example of one option that can be made
- iii. Combat module can be configured to allow any type of combat while the overworld file can be modified to change the encounter type
- iv. Support for save files will be added either this week or the next

d. Week 4

- i. I will make a separate event log module which will allow the user to script basic cutscenes and the prerequisites that need to be met for them to activate
- ii. Will rely on dependencies (ex. Player must talk to a specific character before being able to proceed)
- iii. Event logs can be specific to locations or span the entire game
- iv. If I didn't add support for save files last week, I'll add it this week

5. Future Enhancements

This game engine is meant to be very general. That means that I should be able to make several different games using the same engine as the basis. Future enhancements would, therefore, be extensions of the engine to meet different game specifications. I may want to add visual effects, as well. I might change movement from grid-based to free range depending on the game I'm making. Some types of games might not even require a separate combat module, with battles taking place on the overworld rather than in a separate screen (as seen in most old-school RPGs). Other than that, more specific enhancements will depend on the nature of each game.