Dungeon Crawler Game

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Project Synopsis

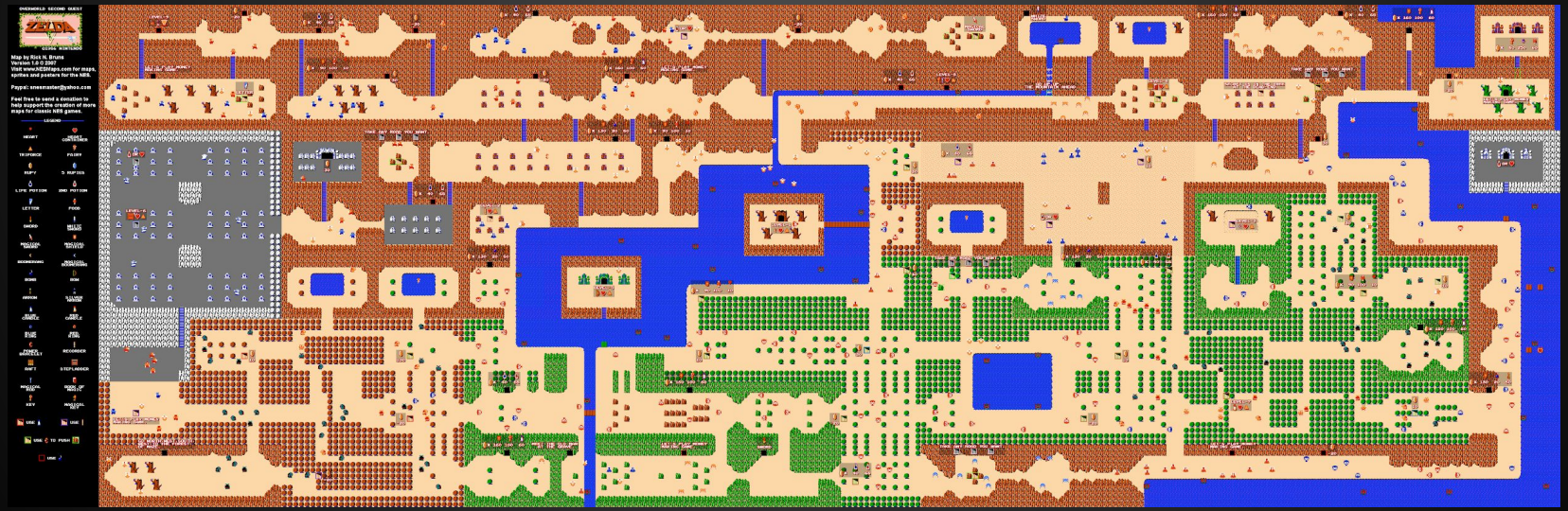
- Dungeon Crawler Game
- Simple Legend of Zelda style action game
- Rogue like gameplay system similar to Binding of Isaac
- Explore the map to find items and enemies
- Use of procedural map generation
- Will use PyGame as a game engine as it is fairly simple to use and doesn't have as big of a learning curve as something like Unity or Unreal

Problem Statement:

- Enemy Pathfinding
  - Use a search algorithm like A* to search for the optimal path to player
- AI Difficulty Scaling
  - Change the level of difficulty based on player performance
- Using AI to Avoid Deadlock Scenarios when using procedural generation
  - i.e. the key for room A is locked inside of room A preventing player progression

Problem Analysis

- Tile based finite state space that generates an MxN space for the player to discover
  - Similar to an old school Legend of Zelda map but on a smaller scale
  - Player has a limited FOV and through exploration the map layout is revealed



Problem Analysis

- AI State Transition
  - Enemy AI will change states (X, Y position) based on its surroundings
  - Will look at it's environment to make sure its next moves are "legal" moves (such as not walking through walls) that move it closer to the player's current state
- Difficulty scaling will be based on how well the player is performing on each level
  - Player performance will affect enemy health, armor, and attack power
  - Player performance is based on a tally of how many enemies the player has killed and how far they progress through the game
- The Goal-State for the AI is to be next to the player so it can attack/kill the player

Agent Analysis

- Partially Observable: Both the player and enemies have a limited FOV
- Multi-Agent: Multiple enemies as well as the player
- Deterministic: The only uncertainty comes from the player movement
- Episodic: Enemy actions won't necessarily affect future decisions
- Dynamic: The player can move while the AI is deciding the best path to get to them
- Discrete: There are a finite number of states in the environment and a finite number of things to do in the environment

Source Material

https://aquila.usm.edu/cgi/viewcontent.cgi?referer=https://www.google.com/&httpsredir=1&article=1307&context=honors_theses

https://www.sbgames.org/sbgames2019/files/papers/ComputacaoFull/198359.pdf

https://spronck.net/pubs/SpronckGAMEON2004.pdf

Questions?