**Introduction**

My project idea is a full recreation of a classic platformer game called Mega Man which was first created in 1987 for the Nintendo Entertainment System. The action platformer involved tight controls with carefully designed stages of which gave the game its true platformer feel. I intend to mimic the responsive controls and unique level design, whilst taking advantage of the now non-existent hardware limitations for games built for older generation consoles. This would allow me to expand upon the original game, for instance my plan for procedurally generated levels that can give a new experience for players of the original. The game is critically acclaimed for its meticulously crafted level design with positioning of platforms and enemies portraying challenging yet satisfying gameplay. Replay-ability of the Mega Man series is one of its main promoting factors, as even 35 years later there remains a sizeable fan-base which continue to replay the original.

I do not plan to noticeably change core mechanics as it would possibly affect the gameplay negatively, thus I will be initiating a close analysis of the original game physics to mimic the game as closely as possible, though simultaneously expanding the gameplay experience with new and unique game mechanics to keep the gameplay experience fresh.

**Overview**

In the original, there are 4 main player mechanics: running, jumping, shooting and sliding - running involves basic movement to allow for horizontal traversal of each stage; jumping allows for vertical movement involving gravity – this allows for more level obstacles involving specific positioning and movement to progress further in each stage; the player can shoot pellets which move at a consistent speed horizontally in the direction the player is facing, which also creates another layer of difficulty for the player when timing and positioning shots at the right place, and right time in order to successfully damage moving enemies – and sliding gives the player a slight speed boost as well as reducing their collision radius vertically to allow for reaching tight spaces.

I would like to implement the speed boost of sliding using momentum so that the boost can be temporarily maintained in regular movement. This would speed up the pace of traversal, and add a risk/reward scenario where the speed comes at the cost of less manoeuvrability which could lead to bumping into hazards more often. Another change I would aim to implement is different difficulty levels, as the original game was known to be notoriously challenging (something the sequels would end up addressing well). This can either be done with a change of enemy ai skill or certain difficult level templates in the procedural generation algorithm being blacklisted.

**Objectives**

1. Use said system to allow for precise collision checking between sprites which require it, and an option to use a rectangle mask for collision.

* Detect collision in all directions.
* Take size of image overall to draw rectangular collision.

1. Procedurally generated levels.

* Pre-made 256x224 screens (consisting of level design with platforms and hazards)
* Conditions/logic to allow linear progression, no soft locking to prevent progression.
* Conditions to allow challenging level design with random generation.

1. Camera system to follow main player as it travels map, view is 256x224. Linear camera.
2. Store all game objects in a dictionary/list with properties such as x/y and image data to be recalled for the drawing system.

* Only draw items on screen to avoid lag.

1. Player physics

* Horizontal movement
* Vertical movement (gravity)
* Collision with platforms (solids)
* Collision with hazards (e.g enemies)
* Attacks (shooting)

1. GUI

* Pause menu that draws on front layer
* Health bar

1. Pause menu system

* Save game (save properties of player e.g health and level layout generated)
* Load game (retrieve level generated in a previous game as well as player state)

1. Enemy AI

* Small enemies with basic attacks based on your position, limited mobility / range for attacks.
* Main boss with larger range and mobility, different attacks for your positioning within the same 256x224 boss room.
* Variable skill level for different difficulties

1. Dynamic camera system

* Do not go past room border
* Follow player