# Game Design – Final Project Template

***This is a skeleton outline for a game design. Your design may be more than one page!***

High Level Concept/Design

## (Module 3) Working title:

*Title should communicate the gameplay and the style of the game*

**Project: Supersonic**

This working title aligns with the core concept of the game, which revolves around controlling a speedster superhero. The term "Supersonic" emphasizes the high-speed nature of the gameplay and the superhero's abilities. Additionally, the inclusion of "Project" suggests a sense of purpose and urgency, hinting at the mission of the player character to save the day while maintaining an explosive pace.

## (Module 3) Concept statement:

*The game in a tweet: one or two sentences at most that say what the game is and why it’s fun.*

**Project: Supersonic is an “Auto Runner”-style 2D platformer game where the player controls a speedster superhero with a bomb strapped to their chest that will detonate upon slowing. They must use quick reflexes to dodge oncoming obstacles, enemies, and area hazards while racing through the cityscape environment to reach exciting new levels of speed and save the day!**

## (Module 3) Player experience and game POV:

*Who is the player? What is the setting? What is the fantasy the game grants the player? What emotions do you want the player to feel? What are the major phases of the player’s experience in the game?*

The player controls Sonic-Man, a superhero with super speed (Think of comic book characters like The Flash or Quicksilver). The setting is a generic metropolitan city the player will navigate through at intense speeds, constantly provoking their awareness as they platform and avoid hazards while running through streets of busy traffic, up walls, and possibly through buildings.

The player controls Sonic-Man from a 2D-sidescrolling perspective, the character perpetually locked in the bottom left-hand quadrant of the screen while the environment moves around them – allowing for players the maximum view and time for reaction. Obstacles such as fire hydrants, railings/barriers, pedestrians, missiles, and goons trying to tackle the player will appear as they run by. Environmental hazards such as waterspouts from hydrants, passing vehicles, and building walls will appear that can also inflict damage. Ideally each obstacle or hazard should be visible within a range of 1-2 seconds prior before damaging the player if not avoided.

Contacting any obstacle will damage the player, causing Sonic-Man to flinch and enter the “**Slow**” state. In the **Slow** state, Sonic-Man will move at 80% speed and have I-frames (invincibility frames) when first entering it; allowing the player to more easily recover and avoid further obstacles more easily. After 15 seconds, Sonic-Man will return to his **Normal** state. If the player is damaged in Slow state, the bomb explodes, and it is Game Over.

To further incentivize avoiding obstacles and maintaining speed, a “**Speed**” state can also be activated by filling the “**Hyper gauge**” that increments every second. The gauge will be filled after 30 seconds, but empty completely if the player is damaged. In the **Speed** state, Sonic-Man will move at 120% speed and only go back to the **Normal** state when damaged. The **Hyper Gauge** can be filled further in the **Speed** state, but it will only increment once every two seconds. If filled again, the Sonic-Man will enter the “**Hyperspeed**” state, which increases their movement to 150% speed and unlocks the “**Phase**” power. The **Phase** power can be activated once to momentarily make Sonic-Man go intangible, making him impervious to all damage for 5 seconds and increasing his speed by +10%. The Hyper gauge will continue to fill at the same rate as prior, and an additional usage of the **Phase** power will be unlocked each time (The gauge will not charge while there is an active usage of Phase available however).

Being damaged in the **Hyperspeed** state will also reset the player back to **Normal**, rewarding the player using the additional tools to bolster their fast reflexes and keep up their momentum while punishing them for overestimating their reactivity or getting cocky.

## (Module 3) Genre(s):

Product Design

*Single genre is clearer and recommended for this class. Genre combinations are okay but can be RISKY.*

The game will be a 2D platformer in the style of auto-runner gameplay. This means that the player character will have a constant rate of forward movement, forcing the player to tackle platforming challenges and avoid objects on a strict timeline. This also will allow for closer control of the gameplay flow and timeline during the development process. I took primary inspiration of this concept from the Endless Runner genre of games, with games such as Sonic Runners and Jetpack Joyride. The former’s adaptation of the platforming gameplay from the Sonic the Hedgehog series alongside a system of shifting speeds and blitz-paced challenges were of particular inspiration to me. (Example: <https://www.youtube.com/watch?v=yKAM_XgD5x4>)

## (Module 7) Visual/audio Style:

*What is the “look and feel” of the game? How does this support the desired player’s experience?*

The "look and feel" of "Project: Supersonic" currently takes a minimalist approach, as evident in the prototype under development. Sonic-Man's design is simplistic, featuring a dark green color and an occasional black aura trail during movement. Similarly, the game's aesthetics for the cityscape setting are assembled from creative commons backgrounds and free-to-use low-detail models, such as cars and fire hydrants. While fully developing stylized art assets could be a resource-intensive endeavor, the minimalist art direction aligns well with the game's theming.

The choice to embrace minimalism complements the core concept of the game, where blindingly fast movement as a speedster superhero inherently lacks intricate details. By de-emphasizing precise visual intricacies, the game benefits both in terms of level design and gameplay. The levels, being longer and spaced out due to the fast-moving character, allow players more time to react and plan their moves. This decision also directs players' focus to their own reaction times and encourages them to recognize critical, albeit brief, details, such as the emergence of distinct enemies or area hazards.

In the realm of audio, "Project: Supersonic" intends to follow a similar minimalist approach while paying tribute to the golden age melodies found in classic comic-book heroes. Simple instrument melodies reminiscent of the famous suites of old will harmonize beautifully with the game's direction, further enhancing the overall experience. The audio design aims to complement the fast-paced gameplay, emphasizing the exhilarating speed and the superheroic theme of the game.

By embracing the minimalistic style for both visual and audio aspects, "Project: Supersonic" immerses players in a unique gaming experience. The combined effect of minimalist visuals and iconic comic-book-inspired audio enhances the sense of being a true speedster superhero, relying on quick reflexes and keen observation to overcome obstacles and save the city. This cohesive visual and audio style harmonizes with the game's core concept, elevating the desired player experience and ensuring an engaging and memorable journey through the world of Sonic-Man, the speedy savior of Speedopolis.

## (Module 3) Platform(s) and primary technology:

*Platform as in PC or mobile? Primary tech as in Unity engine or Unreal Engine? For this class we will be targeting simple 2D PC games made with Unity 3D.*

This game is designed primarily to function on PC; however, due to the simple nature of the game, it could be readily adapted to a mobile design in the future. The game will be designed and programmed using the Unity engine’s Unity 3D system. It will be published via Unity Play using its WebGL Publish feature.

## (Module 3) Schedule and scope

*This is for your final project so your total time to schedule is the next 4 weeks. Your final project will be made by you and should be a 30sec-60sec experience.*

This program is scheduled to be completed over roughly a 4 week period from 6/25/23 to 7/28/23, which is the constraints determined by the SDEV 148 course this project is for. It will be a roughly 30-50 second experience, the prototype running for a single platforming level of gameplay.

## (Module 4) Game world fiction:

*Describe the game world and any narrative in player-relevant terms.*

The game takes place in **Speedopolis**, a bustling albeit generic silver-age metropolitan city. The player’s character, Sonic-Man, is the hero and protector of Speedopolis who constantly speeds across city blocks in seconds to save the day from whatever dastardly villain of the week is wreaking havoc. In the context of the game’s setting, prior to the game’s start, Sonic-Man was engaged in battle with the Supervillain **Dr. Doomsday**. The villain was preparing to set out to the mayor’s office to blow it up before the hero confronted him. Before the evil doctor escaped in a helicopter, he managed to strap a bomb to Sonic-Man’s chest, explaining that it would explode if he stopped running at any point. While Sonic-Man races to get to the Mayor’s office in time, Dr. Doomsday’s goons (Aka: the Oblivion Orderlies) post up across the city to set up obstacles, hinder Sonic-Man, and trigger his bomb. (This explains all the elaborate hazards blocking Sonic-Man’s way through the game.)

## (Module 6) Objectives and Progression

Detailed Game Design

*How does the player move through the game, literally and figuratively, from tutorial to end? What are their short-term and long-term goals (explicit or implicit)? How do these support the game concept, style, and player-fantasy?*

* Short-term Goals: The player's immediate objective is to navigate Sonic-Man through the bustling city of Speedopolis while avoiding various obstacles, hazards, and enemy goons (Oblivion Orderlies). The primary aim is to maintain high speed and avoid damage to prevent the bomb from detonating. The player must strive to reach the end of each level within a given time frame.
* Long-term Goal: The overarching goal of the game is for the player to stop the supervillain Dr. Doomsday's evil plan by reaching the Mayor's office in time. The game will consist of multiple levels, each progressively increasing in difficulty, introducing new challenges, and demanding faster reflexes and strategic play from the player.
* The game will implement a smooth difficulty curve, gradually increasing the challenge as the player progresses through levels. The introduction of new mechanics, faster enemy patterns, and tighter platforming sequences will contribute to the escalating difficulty.
* The game's story will advance as the player completes levels and progresses closer to the Mayor's office, where the final confrontation with Dr. Doomsday awaits. Cutscenes and narrative elements will unfold between levels, motivating the player to continue their mission and engage with the game's world fiction.

## (Module 6) Interactivity

*UX sketch of player’s actions in the game –* ***be specific.*** *What is the player doing moment-by-moment? How does the player move through the world? How does physics/combat/etc. work?*

* The player will control Sonic-Man's movement through keyboard or controller inputs. Left and right inputs will affect Sonic-Man's lateral movement, while jump and slide inputs will allow the player to navigate obstacles accordingly.
* Moment-to-moment, the player must make quick decisions to dodge obstacles, including fire hydrants, railings/barriers, and pedestrians, as well as enemy missiles launched by Dr. Doomsday's goons (Oblivion Orderlies). These hazards will approach from various angles, heights, and speeds, requiring the player to react swiftly and accurately.
* The player will need to maintain Sonic-Man's speed at optimal levels to prevent the bomb from detonating. Charging the "Speed gauge" over time will unlock the "Speed" state, rewarding the player with increased movement speed for a limited time. The player can further charge the gauge to reach the "Hyperspeed" state, which unlocks the powerful "Phase" ability. However, overestimating speed and overusing the Phase power may lead to increased risk and potential failure.
* Gameplay experimentation during the development process has opened the game’s concept up to the idea of a 2.5D movement system, as opposed to a straightforward side scrolling system. Some of the prototype’s development was devoted to testing out the potential design; however, due to issues concerning WebGL’s compatibility with Unity’s new input system, among other things, some more of the ambitious features in the game’s main design were unable to be fully implemented in the prototype. The speed stages and gauge are largely absent; however their underlying functions are not. To demonstrate the gameplay shift in speed stages, thresholds were placed about the prototype level to demonstrate the varying velocities that Sonic-Man can assume during gameplay. In addition, it sparked the idea of altering other fundamental physical features of the player character to vary gameplay; resulting in the presence of a shrinking and enlarging threshold implementation as well, adjusting the player’s “damage-able” zones at a cost of mobility and dexterity.

## (Module 4) Internal structure

*“Nouns and verbs” – game objects, attributes, and behaviors: “spreadsheet specific”. This includes locations/levels and their attributes, NPCs, special effects, and any object with internal state or function.*

**Game Objects:**

* Sonic-Man: The player-controlled character, a speedster superhero with the bomb strapped to his chest.
* Dr. Doomsday: The supervillain who attaches the explosive device to Sonic-Man and sets up obstacles throughout the city. Serves as the end-goal of the level.
* Oblivion Orderlies: Dr. Doomsday's goons who post obstacles and hinder Sonic-Man's progress.
* Fire hydrants: Obstacles that can spray water and potentially damage Sonic-Man.
* Railings/Barriers: Objects that Sonic-Man must jump over or slide under to avoid collision.
* Pedestrians: Innocent bystanders who may unknowingly obstruct Sonic-Man's path.
* Missiles: Projectiles launched by enemies that Sonic-Man must evade.
* Buildings: Structures that Sonic-Man can potentially navigate through during high-speed sequences.

**Attributes and Behaviors:**

* Bomb: The explosive device strapped to Sonic-Man's chest, which will detonate if he slows down and is damaged in the Slow state.
* Hazards: Occurrences that, on contact, will damage Sonic-Man and knock him into the Slow state.
* Slow state: A temporary state in which Sonic-Man moves at 80% speed but gains invincibility frames to recover from obstacles.
* Speed state: A state activated by filling the Hyper gauge, allowing Sonic-Man to move at 120% speed until damaged.
* Hyper gauge: A gauge that increments over time and can be filled to activate the Speed state and eventually the Hyperspeed state.
* Hyperspeed state: A state attained by filling the Hyper gauge further, increasing Sonic-Man's speed to 150% and unlocking the Phase power.
* Phase power: An ability that makes Sonic-Man momentarily intangible, providing immunity to damage and a speed boost for 5 seconds.

**Locations/Levels:**

* Speedopolis: The bustling metropolitan city where the game takes place. Its buildings and city layout will serve as the set piece for the game’s platforming geometry.
* Mayor's office: The destination Sonic-Man must reach in time to stop Dr. Doomsday's plan.

**NPCs (Non-Playable Characters):**

* Dr. Doomsday's goons (Oblivion Orderlies): Enemies placed by the supervillain to hinder Sonic-Man's progress and trigger the bomb.

**Special Effects:**

* Waterspouts: Environmental hazards triggered by fire hydrants, potentially causing damage to Sonic-Man.
* Explosions: Visual and audio effects when the bomb detonates, or certain hazards are encountered.
* Speed lines: Motion/wind dashes effect that will appear on the screen with increasing number proportional to the speed that Sonic-Man is moving at.
* Phase: Visual and audio effects when the Phase ability is activated that will decrease the player character’s opacity and blur his figure.
* Impact: Visual and audio effect when Sonic-Man makes contact with Dr. Doomsday’s model at the end of the level.

**Objects with Internal State or Function:**

* Sonic-Man's movement: Controlled by the player's inputs and affected by the character's current state (Normal, Slow, Speed, or Hyperspeed).
* Collision detection: A system that checks for interactions between Sonic-Man and various game objects, determining whether damage is inflicted or obstacles are avoided.
* Hyper gauge: An attribute that tracks the current level of the gauge and determines when the Speed and Hyperspeed states can be activated.
* Phase power: An attribute that keeps track of the availability and usage of the Phase ability.
* Level complete: An attribute that checks for interaction between Sonic-Man and Dr. Doomsday’s end model, which serves as the end-goal marker for the level.

## (Module 4) Core loops

*How do game objects and the player’s actions form loops? By loops we mean what actions will the player be performing most often? E.g., jumping to grab coins. Why are your action loops engaging? How does this support game goal?*

In "Project: Supersonic," the core loops revolve around the player's actions of navigating obstacles, maintaining speed, and reaching the end-goal of each level. These actions are repeated frequently throughout the gameplay experience.

The player's most common action will be maneuvering Sonic-Man to avoid obstacles such as fire hydrants, railings/barriers, pedestrians, and missiles. These hazards will approach on screen at variable elevations, requiring quick reflexes and precise timing as the player jumps, slides, and maneuvers across platforms through the environment. The player's goal is to maintain high speed, avoid damage, and progress swiftly through the level This constant need for precise movement and reflexes creates an engaging gameplay loop.

Another important action loop is managing Sonic-Man's speed and “state”. The player must balance Sonic-Man's speed states, such as Slow, Speed, and Hyperspeed, by filling the Hyper gauge. The player will strive to keep Sonic-Man in the Speed and Hyperspeed states to maximize their movement speed and unlock the Phase power. Timing the activation of the Phase ability becomes crucial for avoiding hazards and maintaining momentum. This loop adds strategic decision-making and risk-reward elements to the gameplay, enhancing the engagement and skill required.

The engagement stems from the challenge of maintaining momentum and avoiding damage. The player will strive to keep Sonic-Man at maximum speed, as slowing down can trigger the bomb's detonation. A positive feedback loop will be created as the players are rewarded for their successful maneuvers with a filling speed gauge, speed buffs, and unlocking the Phase ability as a reward for consistently good play. Simultaneously, a negative feedback loop will be created to check players that get greedy with constantly charging the Hyperspeed gauge to abuse the phase ability, serving as an inevitable skill check to hinder players unable to adapt to each subsequent heightened speed. The combination of precise platforming, strategic decision-making, and the urgency of the bomb countdown adds tension and excitement to the gameplay.

The engagement of these action loops is supported by the game's goal of reaching the end of the level and stopping Dr. Doomsday. The constant movement, platforming challenges, and variety of obstacles keep the player immersed and on their toes. The need to maintain speed, avoid damage, and utilize power-ups effectively adds depth and replay value to the gameplay. By successfully navigating the loops and overcoming challenges, the player advances closer to the level's end-goal and the ultimate confrontation with Dr. Doomsday, creating a sense of progression, achievement, and satisfaction.

Overall, the action loops in "Project: Supersonic" involving movement, obstacle avoidance, and strategic power-up management make the gameplay engaging, challenging, and directly aligned with the game's goal of saving the day and defeating the supervillain.

**Creative Commons Asset Sources for Prototype:**

* Car model:
  + <https://assetstore.unity.com/packages/3d/environments/roadways/kajaman-s-roads-free-52628>
* Road Texture:
  + <https://www.kenney.nl/assets/city-kit-roads>
* Velocity SFX:
  + <https://www.kenney.nl/assets/city-kit-roads>
* Level Theme:
  + Main Theme (Overture) | The Grand Score by Alexander Nakarada | https://www.serpentsoundstudios.com  
    Music promoted by https://www.chosic.com/free-music/all/  
    Attribution 4.0 International (CC BY 4.0)  
    <https://creativecommons.org/licenses/by/4.0/>