The Adventures of Hopper

Section 0: Summary
- Working title: *The Adventures of Hopper*

Team Member	Roles (these are rotated every week and detailed in the timeline)
Sanvi	Level Manager for Week 1, Debugging Lead for Week 2, Integration Lead for Week 3
Sophie	Debugging Lead for Week 1, Level Manager for Week 2, Deliverable Manager for Week 3
Evelyn	Integration Lead for Week 1, Deliverable Manager for Week 2, Level Manager for Week 3
Shrishti	Deliverable Manager for Week 1, Integration Lead for Week 2, Debugging Lead for Week 3

Concept statement: A single-player game where the protagonist, Hopper (the player), has to move through multiple levels (settings), encountering obstacles, power-ups, and enemies to reach the final destination, Annenberg.

Section 1: Gameplay
- Our game progresses as Hopper moves through different levels that are represented by different settings
    - **Level 1: "Super Hopper at Red Door"**
        - The player starts off with 3 Hoppers, i.e., 3 chances
        - They can use the UP and DOWN arrows to choose the height at which they want to be launched, but the gravitational acceleration is kept constant
        - They can press the SPACE bar to launch the Hoppers
        - There will be some bones at different locations on the screen (in projectile patterns), so they can choose which height to launch at, to collect as many bones as possible
        - The end goal is to enter the portal that is at the other end of the screen – but the portal is moving up and down (although in a predictable manner), so they have to factor that in when they are launching their Hopper
        - As soon as one Hopper makes it through the portal, the player can move to next level
        - There is also a pineapple on screen, in a path that is not the optimal bone path, so the player would have to have the foresight to sacrifice one of their Hoppers to get the pineapple

- The pineapple activates a power-up that shows the optimal projectile path (with the most number of bones) to the player
  - ■ If none of the Hoppers make it through the portal, the player loses, and they are taken to the end screen that displays their points
- ○ **Level 2: "Platform 9 ¾"**
  - ■ The player can control Hopper's movements with LEFT and RIGHT arrows only
  - ■ On the right side of the screen, there is a pineapple that causes Hopper to start bouncing, which means she can then collect all the bones and reach the Golden Bone
  - ■ The player has to jump on platforms to attain the bones that are spawned across the screen
  - ■ There will also be Decoy Bones that exist on screen, and for each Decoy Bone that Hopper collects, her score is halved
  - ■ The platforms will be spawned randomly on the screen but in a way that makes obtaining the Golden Bone possible
  - ■ Some of the platforms will rotate when the player jumps on the platform and the rotation will be dependent on the torque created by the player's mass and their position on the platform
  - ■ Other platforms will break once the player jumps onto them
  - ■ The rest of the platforms on the screen will be normal platforms that can support Hopper as she jumps on them
  - ■ The player also has the ability to change their coefficient of restitution within a bound for level 2, which will affect the height of their bounces and allow them to reach different heights depending on where they want to go
  - ■ Once the Golden Bone is collected, a portal opens so that the player can advance to level 3
- ○ **Level 3: "Attack of the Turtle Pond"**
  - ■ Hopper is placed at the center of the Turtle pond, on a little island
  - ■ She is surrounded by turtles of different masses that spawn at random locations in the pond and are gravitating towards her
  - ■ The player can shoot food at the turtles by pressing the SPACE bar, which gets rid of the turtles that the food makes contact with
  - ■ The player can change the orientation of Hopper by using the RIGHT and LEFT arrows to move clockwise and anti-clockwise respectively
    - ● The angle of rotation is proportional to the time that they hold down each key
  - ■ Pineapples will also spawn in the pond, which gives Hopper a "bomb" power-up, allowing her to get rid of all the turtles on the screen at the same time by pressing the T key
    - ● There will only be 3 pineapples over the course of the level, and each will only appear for 5 seconds
  - ■ If a turtle reaches Hopper, the game ends and the player can see what score they achieved

- Hopper's goal is to shoot at the turtles to collect points
- There will also be Golden Bones that shows up at random intervals
  - Every time the player misses an opportunity to capture the Golden Bone, more turtles will begin to spawn on the screen and it will become more difficult for the player to survive
  - Shooting the Golden Bone makes the player win the game, and they are shown their score

- In general, the bones increase Hopper's score by 10 points each
- The pineapples increase Hopper's score by 20 points each, along with granting her super-powers
- The Decoy Bones halve Hopper's score
- The Golden Bones allow Hopper to advance to the next level/win
- The turtles can kidnap Hopper if they make contact with her

Controls	*keyboard*: T - activates the power-ups once they have been acquired *keyboard*: LEFT and RIGHT arrows - allows motion across the screen, or rotation, depending on the level *keyboard*: UP and DOWN arrows - allows movement up or down the screen, or changes the coefficient of restitution value, depending on the level
Physics	- The launching of Hopper and subsequent projectile motion in level 1 depends on the implementation of gravity - The power-up in level 2 implements bounce (ability to change restitution coefficient to bounce higher and lower) - In level 3, the turtles are attracted to Hopper by gravity - Shooting turtles and collecting bones implements destructive collision - Jumping on the rotating platforms implements angular forces - Jumping on the fragile platforms results in one-sided destructive collision - The turtles reaching Hopper results in a destructive collision
Game flow	- The player needs to go through 3 levels to make it to the end of the game - For each level, Hopper needs to make it from one end of the screen to the other, where the portal exists - For more details about game flow, see description in "Gameplay"
Graphics	- Hopper (sprite) - Turtles (sprites) - Turtle pond (setting) - Portal (shape) - Pineapples (sprites) - Bones (sprites)