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Assignment 2B

The classic game that I opted to deconstruct is *Space Invaders*.

1. **Game Design**
   1. Player Goals and Objectives

* The goal is to destroy all of the enemy ships before the player loses all of their lives or before the enemies destroy the bases.
  1. Challenges and Conflict
* The ships move closer to the home bases and also begin to move faster after more and more ships are destroyed.
* The enemies can also shoot at the player and bases.
* A misfire by the player can result in damage to the bases.
  1. Constraints and Boundaries
* The player starts with three lives and can gain an extra life each level they complete.
* The bases are given a certain amount of health to start the game and do not replenish from level to level.
* The player is constrained to moving left/right.
  + They can’t wrap around the screen so they will stop moving at the edges.
  1. Resources
* An extra life is gained at the completion of each level.
  1. Rules
* Players move left and right to avoid enemies and to aim at enemies.
* Players shoot to destroy enemies.
* Win Condition
  + Since there are N number of levels, the player just plays towards a high score.
  + I also read on a forum that there are 6 levels for each level of difficulty.
* Loss Condition
  + Players lose all their lives.
  + Players cannot protect their bases and all get destroyed by the enemy.
  + The enemies reach the bases as they move down.
* Points
  + Enemy ships can be 10, 20, or 30 points.
  + The red UFO is a random number (50, 100, or 150)

1. **Scene Descriptions**
   1. Game Menu
      1. Description

* Splash screen to give players options of how to proceed to the game.
  + 1. Game Objects
* StartButton
* HighScoreButton
* QuitButton
  + 1. Player Inputs
* Players can click on either of the buttons to trigger the game to start, view the high score list, or quit the game entirely.
  1. Levels
     1. Description
* Depending on the difficulty, the enemy horde spawn closer and closer to the base.
* Players can gain an extra life if they complete a level.
  + 1. Game Objects
* HighScoreGUI
* ScoreGUI
* LivesGUI
* LevelGUI
* ShipObject
* BaseObject
* EnemyObject
* ufoObject
* BulletObject
  + 1. Player Inputs
* A - moves player left
* D - moves player right
* Space/Fire1 - shoots bullets
* Escape - pauses game
  1. End Game
     1. Description
* Game Over gets shown along with the player’s final score. Any of the aforementioned loss conditions can trigger this screen.
  + 1. Game Objects
* GameOverGUI
* ScoreGUI
* PlayButton
* QuitButton
  + 1. Player Inputs
* Players can restart and play again.
* Players can quit the game all together.
  1. Pause Menu
     1. Description
* Players can take a break from the game, restart the game, or quit the game.
  + 1. Game Objects
* ResumeButton
* QuitButton
  + 1. Player Inputs
* Players can hit the buttons to trigger the next event.

1. **Scene Connectivity**
2. **Object Descriptions**
   1. ShipObject
      1. Assets

* shipTexture
* Sounds
  + Movement
  + Shooting
  + Explosion
    1. Standard Components
* Transform
* Mesh
* Box Collider
* Rigid Body
  + 1. Custom Components
* PlayerController Script
  + Variables
    - Speed
    - Min/Max Bounds
    - Shot
    - ShotSpawn
    - Fire Rate
    - Lives
  + Functions
    - Start()
    - FixedUpdate()
    - Update()
  1. EnemyPrefab
     1. Assets
* Textures
  + 10 Point Enemy
  + 20 Point Enemy
  + 30 Point Enemy
    1. Standard Components
* Transform
* Mesh
* Box Collider
* Rigid Body
  + 1. Custom Components
  1. EnemiesObject - This just holds all the enemies in one convenient location.
  2. ufoObject
     1. Assets
        + Transform
        + Mesh
        + Box Collider
        + Rigid Body
     2. Standard Components
     3. Custom Components
  3. BasePrefab
     1. Assets
        + Transform
        + Mesh
        + Box Collider
        + Rigid Body
     2. Standard Components
     3. Custom Components
  4. Bases - This just holds all the bases in one convenient location.
  5. BulletPrefab
     1. Assets
        + Transform
        + Mesh
        + Box Collider
        + Rigid Body
     2. Standard Components
     3. Custom Components
  6. ScoreGUI
     1. Assets
     2. Standard Components
        + Transform
        + GUIText
     3. Custom Components
        + ScoreScript
          - Communicates with the global score variable to update everytime the player destroys an enemy.
  7. LivesGUI
     1. Assets
     2. Standard Components
        + Transform
        + GUIText
     3. Custom Components
        + LivesScript
          - Communicates with the PlayerController to display the number of lives the player has.
  8. HighScoreGUI
     1. Assets
     2. Standard Components
        + Transform
        + GUIText
     3. Custom Components
        + HighScoreScript
          - Communicates with the global HighScore variable to display top scores.
  9. GlobalObject
     1. Assets
     2. Standard Components
        + Transform
     3. Custom Components
        + GlobalScript
          - Variables

Score

HighScore

* + - * + Functions

Start() - Called to initialize the variables.

Update() - Called to update the variables.

GameOver() - Determines if the player finished a level or lost.

1. **Inter-Object Communication**
   1. PlayerObject communicates with the GlobalObject to update the score and lives displayed.
   2. PlayerObject communicates with the BulletPrefab when the player hits Fire1 to spawn a bullet at the player’s position.
   3. BulletObject communicates with the EnemyPrefab/ufoObject when there is a collision.
   4. BulletObject communicates with the PlayerObject when there is a collision.
   5. BulletObject communicates with the BasePrefab when there is a collision.
   6. EnemiesObject communicates with the GlobalObject to determine if the player has destroyed all the enemies.