**Cow**

*CowSpawn\_v2*

CowSpawn\_v2 is a small script that contains the logic for spawning the cows into the game. It contains two functions, the default Start() function and a cowSpawn() function. The Start() function calls the cowSpawn() function every .25 seconds. cowSpawn() uses a random number generation algorithm to decide whether to spawn a cow or not. It generates a random number between 0 and 100, and if the number is between 0 and 35 it spawns a cow by using the built-in Instantiate() function to create a copy of the cow prefab stored in the Resources folder.

**UFO**

*BeamBehavior*

The BeamBehavior script is a long script that begins by declaring the following attributes:

* GameObject **parentUFO** to track the UFO's location
* List<GameObject> **cows** to store the cows being abducted by the tractor beam
* List<Vector2> **cowVels** to store the velocity of each cow
* bool **isExtended** that is true when the beam is fully extended and false otherwise
* bool **isRetracting** that is set to true when the beam is about to retract
* float **timeExtended** that keeps track of how long (in seconds) the beam has been extended
* const int **BEAM\_DURATION** (initialized to 2) that stores how long the beam should stay extended
* const int **BEAM\_SPEED** (initialized to 60) that stores the time in frames (60 per second) that the cows should take to be sucked up by the tractor beam.

After the class attributes have been declared, there are 9 functions:

* default:
  + **Start**()
  + **Update**()
* destructor functions:
  + **OnDestroy**()
* mutator functions:
  + **setParentUFO**()
  + **removeCow**()
  + **setExtended**()
  + **retractorBeam**()
* inspector functions:
  + **getExtended**() and **getRetracting**()

The **Start**() function initializes the script by assigning the UFO's location to **parentUFO** and instantiating Lists **cows** and **cowVels**. The bools **isExtended** and **isRetracting** are both set to false, and **timeExtended** is set to 0.

The **Update**() function begins by filling the **cows** with each cow that hits the tractor beam's hitbox. If either **isExtended** or **isRetracting** are true, a for-loop is called that cycles through each element of **cows**. For each cow in cows, the **stopMoving**() function (a function of their attached script Moove) is called, and a Vector3 **current** is declared and assigned the value of the cow's current position. Then the cow's change in position per frame is determined by multiplying the change in time (a single frame) by 235 (the value that gives the optimal speed), and the value is assigned to a float **deltaY**. The cow's position is increased vertically by adding **deltaY** to its vertical component, and the for-loop repeats those steps for each cow caught in the tractor beam. **timeExtended** is increased by the time elapsed since last execution of **Update**() (one frame). If **timeExtended** is greater than or equal to **BEAM\_DURATION**, **isExtended** is set to false and **isRetracting** is set to true.

The destructor function **OnDestroy**() is called after the tractor beam object has been destroyed. The cows that were still being pulled up when the beam was destroyed fall back to the ground.

The mutator function **setParentUFO**(GameObject newUFO) updates the **parentUFO** object with its parameter **newUFO**. This allows for tracking of the UFO's position.

The mutator function **removeCow**(GameObject cow) removes **cow** (the given parameter) from List **cows** and removes the corresponding cow object from the scene.

The inspector function **getExtended**() returns true if the tractor beam has already been extended completely and false otherwise.

The mutator function **setExtended**(bool ext) assigns the value of **ext** to **isExtended**.

The inspector function **getRetracting**() returns true if the tractor beam is ready to retract and false otherwise.

The mutator function **retractorBeam**() is called (in another script) when the user opts to retract the beam before the time stored in **BEAM\_DURATION** has elapsed. It sets **isExtended** and **isRetracting** to true, which tells the script to retract the beam.

*BeamAnimator*

The BeamAnimator script works in tandem with the BeamBehavior script. It animates the tractor beam based on the boolean variables provided by BeamBehavior, **isExtended** and **isRetracting**. It contains an array of sprites, which consists of every frame of the tractor beam animation. It is called to begin animating the extension of the tractor beam, and constantly checks to see if the beam is fully extended (**isExtended** == true) via the **Update**() function. Once it is, it keeps checking to see if the beam is ready to retract (**isRetracting** == true). Once it is ready to retract, it plays the animation backwards from the current frame (in case the user manually retracted the beam while it was extending) until the beam has been fully retracted, at which point the animation is over and the tractor beam GameObject is destroyed.

**Sounds/Music**

*SoundManager*

The SoundManager script contains functions that play the music and sound effects of the game. The **Start**() function (which is called in the Main Menu screen at startup) checks to see if music is currently playing; if it isn't, it will call the **musicGame**() function to create a **Sound\_GameMusic** object, which begins playing the game music on loop. The **musicGame**() function also calls the function **DontDestroyOnLoad**() (a function provided by Unity) to prevent the music object from being deleted upon moving to the gameplay scene. This check ensures that it doesn't begin playing the music again upon returning to the main menu.

The **moo**() function calls a random number between 1 and 4 to determine which of 4 moo sound effects will be played (by instantiating one of the prefabs Sound\_Moo1 through Sound\_Moo4). This function is called by the script BeamBehavior when the cows are being abducted.