Research Project – SpeedRun Labs - Tasks & Scripts

As of April 25th, 2019

Finish by April 26th, 2019

**GOAL**

Create a First Person Time Trial/Platformer that recreates the pilot movement of Titanfall 2 with the game engine Unity 3D. End release goal is a 5 level demo that a player can Walk, Run, Double Jump, Crouch, Slide, Wall Run, and Wall Jump through with obstacles that can get in the way or kill the player. There will be things that can’t be recreated, such as Clamber (Edge detection that player can latch onto and pick themselves up over and onto).

**TASKS**

**PLAYER**

* **Movement**

|  |  |  |
| --- | --- | --- |
| **TASK** | **Status** | **Issues** |
| **Walk** | Implemented + Not Final | If player is on a slanted surface detected as ground, the player will need to stay attached to that surface while they move.  May need to change how fast a player moves. |
| **Sprint** | Implemented + Not Final | Same as Walk |
| **Jump** | **Implemented + Finished** | Jump while sliding does not maintain slide velocity  Order of events? |
| **Double Jump** | **Implemented + Finished** |  |
| **Crouch** | Implemented + Not Final | Can’t Lerp Camera smoothly to new position.  Unparent camera when crouching? |
| **Slide** | Implemented + Not Final | Jump, Crouch, Land and then Slide issue when Player isn’t moving  Character does not slide when xz magnitude is at proper value for sliding while crouched and player not moving at the moment of landing on the ground.  Needs to be able to slide when xz mag value is reached when crouching and on the ground whenever these happen.  Works when player is still moving, fails only when player is not moving. |
| **Wall Jump** | **Implemented + Finished** | Continue Testing, make adjustments as needed.  Jumping off a curved surface doesn’t properly work due to having to use ForceMode.VelocityChange |
| **Wall Run** | Implemented + Not Final | Able to wallrun on a curved surface.  Need to be sure that player stays on a convex surface as they turn.  Player flies off as they move on occasion  Decrease Movement speed while on the wall?  Helped mitigate issue, did not solve  Wall speed was 20, now 15 |

* **Collision**

|  |  |  |
| --- | --- | --- |
| **TASK** | **Status** | **Issues** |
| **Detect Ground** | Implemented + Not Final | Slanted/Sloped surfaces need to be able to be detected as ground (How much of a slope to cause that will need to be tested) |
| **Detect Wall** | Implemented + Not Final | Using raycasts when on a wall to further detect more walls for a curved surface to wall run on.  Using 6 ray casts currently (Immediate Left + right, 45 deg to the Left and Right, 135 degrees to the left and right)  May need to add more (30 deg, 60 deg, 120 deg, 150 deg) |
| **Detect Kill Object** | Not Started | Simple way to implement this is to have the object that can kill be tagged as such and using the tag of an object collided with to determine if this event has happened |
| **Detect Ceiling** | **Implemented + Finished** | Make it so player can’t stand while being crouched when there is an obstacle above their head |

* **Death**

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| --- | --- | --- |
| **TASK** | **Status** | **Issues** |
| **Die** | Not Started | Automatically respawn the player |
| **Respawn** | **Implemented + FInished** | Should happen if the player dies |

* **HUD**

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| --- | --- | --- |
| **TASK** | **Status** | **Issues** |
| **Player Status** | **Implemented + Finished** |  |
| **Timer** | **Implemented + Finished** | Hours:Mins:Secs |
| **Pause Screen** | **Implemented + Finished** | Pause has to stop everything where it is and un-pausing has to resume their pre-pause actions |
| **Level Results** | **Implemented + Finished** |  |
| **Speed** | **Implemented + Finished** |  |

**OBJECTS/NON-PLAYER MODELS AND ASSETS IN A SCENE**

|  |  |  |
| --- | --- | --- |
| **TASK** | **Status** | **Issues** |
| **Block** | Implemented + Not Final | Texture  Yellow/Green |
| **Wall** | Implemented + Not Final | Texture  Blue |
| **Path** | Implemented + Not Final | Texture |
| **Cylinder** | Implemented + Not Final | Wall run works but player flies off  Texture  Yellow/Green |
| **Platform** | Implemented + Not Final | Texture  White |
| **Pyramid** | Not Started | Be sure Player can Wall Run/Jump on and off of if Slant/Slope of it can allow (Determine what slope or slant would be best to cause wall detection) |
| **Pit** | Not Started | Texture |
| **Goal/Start** | **Implemented + Finished** | Goal needs to be easily understood, same for start  Goal stops the timer of the run, and causes results screen to be displayed. Also, stops player movement.  Start starts/resets the timer |
| **Kill Box** | Not Started | Texture  Red and Transparent |
| **Kill Pit** | Not Started | Texture  Red and Transparent |
| **Kill Floor** | Not Started | Texture  Red and Transparent |
| **Kill Sphere** | Not Started | Texture  Red and Transparent |
| **Respawn Points** | **Implemented + Final** | Have Respawn as Start?  Yes |
| **Start Points** | **Implemented + Final** | Have Start act as a Respawn Point?  Yes |

**SCENES**

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| --- | --- | --- |
| **TASK** | **Status** | **Issues** |
| **Title** | **Implemented + Finished** |  |
| **Level Select** | **Implemented + FInished** | Display All Levels Created  Need to be able to interact using a mouse or a controller |
| **Credits** | **Implemented + Finished** | Profesor, Yourself, and All Software and External Assets Used |
| **Levels(1-5)** | See Levels Table | See Levels Table  Need to be able to interact using a mouse or a controller |
| **Test Level** | Implemented |  |
|  |  |  |

**LEVELS**

|  |  |  |  |
| --- | --- | --- | --- |
| **TASK** | **Description** | **Status** | **Issues** |
| **Level 1** | Basic Level, Can’t Die, Single Path, Double Jump, Wall Run, Wall Jump, Slide | **Implemented + Finished** | For some reason, Ground Detection Failed. Issue already addressed  Have Respawn Points/Restart Points |
| **Level 2** | Same as before, Add Obstacles, Pit Fall | **Implemented + Finished** | Have Respawn Points/Restart Points |
| **Level 3** | Same as before but Pit Fall kills and causes player respawn, Add Multiple Paths | Implemented + Not Finished | Have Respawn Points/Restart Points |
| **Level 4** | Same as Before, Add Kill Platforms and Boxes | Implemented + Not Finished | Have Respawn Points/Restart Points |
| **Level 5** | Same as Before, but only 1 Platform to start from and 1 to end on, Kill Floor | Implemented + Not Finished | Have Respawn Points/Restart Points |

**SOUND (Look into BFXR and Creative Commons Sources, like Youtube)**

* **Sound Effects**

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| --- | --- | --- |
| **TASK** | **Status** | **Issues** |
| **Walk** | Not Started |  |
| **Run** | Not Started |  |
| **Slide** | Not Started |  |
| **Jump** | Not Started |  |
| **Wall Run** | Not Started |  |
| **Land** | Not Started |  |
| **Die** | Not Started |  |

* **Music**

|  |  |  |
| --- | --- | --- |
| **TASK** | **Status** | **Description** |
| **Title** | **Implemented + FInished**  Want a new song  Using Skyline, Sequential Movement, New Sun? | Welcoming |
| **Level Select** | **Implemented + Finished**  Want a new song  Will use Watching Unfold | Making a Decision |
| **Credits** | **Finished + Implemented** | Title – Take a Look |
| **During Level** | **Finished + Implemented**  Want new music (2 or 3)  Can use previously made music (Devastate, Skyline, The Hydra) | Energetic  Gained three tracks from CC Sources  Made it so music is played as a playlist, somewhat |
| **Level Completion** | **Implemented + Finished**  Need to make it so music plays when Goal reached  Will use Settle Down | Celebratory |

**SCRIPTS (C#)**

**Player:**

* **CharacterControls – Handles Player Movement, Y Rotation and Collision**
  + **Variables**
    - RotationAxes axes
    - Rigidbody rigid
    - Vector2 xzVelocity, wallNormal
    - Vector3 velocity, velocityChange, targetVelocity, wallDir, prevWallDir, prevVelocity, holdPos
    - GameObject spawner
    - Float moveSpeed, sprintSpeed, crouchSpeed, wallSpeed, speed, speedToSlide, slideMultiplier, gravity, maxVelocityChange, smoothing, jumpHeight, sensitivity, joySensitivityX
    - Bool onGround, onWall, isCrouched, canStand, isSprinting, isSliding, isMoving, isTurning, newWall, addedWallYForce, pause
  + **Functions**
    - Awake()
    - OnCollisionEnter(Collision obj)
    - OnCollisionStay(Collision obj)
    - OnCollisionExit(Collision obj)
    - OnTriggerEnter(Collider other)
    - GetXZMag()
    - CalculateJumpVerticalSpeed()
    - Check4Wall()
    - Check4Ceiling()
    - Jump()
    - Sprint()
    - Slide()
    - Move()
    - AirMove()
    - WallMove()
    - AdjustSpeed()
    - AdjustRotation()
    - PausePlayer()
    - UnPausePlayer()
    - Update()
* **CameraControl – Handles Camera X Rotation (Look Up/Down)**
  + **Variables**
    - RotationAxes axes
    - Float sensitivity, joySensitivityY, minimum, maximum, rotation
    - Bool pause
  + **Functions**
    - Start()
    - PauseCamRot()
    - UnPause()
    - Update()
* **PlayerModel – Handles Adjustments to Player Model and Camera Rotation**
  + **Variables**
    - GameObject playerModel, cam
    - CharacterControls controller
    - Vector3 crouchPos, normalPos
    - Float smoothing, wallcamRot
    - Bool transformed, wallChange
    - Int wallLeftHash, wallRightHash
    - Animator camAnim
  + **Functions**
    - Start()
    - HandleCrouch()
    - HandleWall()
    - Update()

**Start/Goal:**

* **Starting – Handles Start Object/Point and Tells Timer to Start/Reset**
  + **Variables**
    - Bool start
    - GameObject timer
  + **Functions**
    - Start()
    - OnTriggerEnter(Collider other)
    - StartRun()
    - Reset()
    - Update()
* **Goal – Handles Goal Object, Tells Timer to Stop, and Causes Results Screen to Appear**
  + **Variables**
    - Bool goal
    - GameObject timer, musicPlyr, ui
  + **Functions**
    - Start()
    - OnTriggerEnter(Collider other)
    - Reset()
    - Update()

**Other Objects:**

* **PlayerSpawner – Acts as Player Spawn & Respawn Point in a Level**
  + **Variables**
    - GameObject player
    - Int respawnCount
  + **Functions**
    - Start()
    - Respawn()
    - ResetCount()
    - Update()

**Music:**

* **SceneMusic – Handles Music that Gets Played During Any Scene**
  + **Variables**
    - AudioClip[] music
    - AudioClip prevMusic
    - Int randNum, prevTrack
    - Bool musicPicked
  + **Functions**
    - Start()
    - PlaySelectionMusic()
    - PlayCompletionMusic()
    - PlayPrevMusic()
    - Update()

**Event Handler/System:**

* **LoadScenes – Handles Scene Loading**
  + **Variables**
    - String[] scenes
  + **Functions**
    - Start()
    - CloseGame()
    - LoadTitle()
    - LoadLvlSelect()
    - NextLevel()
    - LoadCredits()
    - PlayGame()
    - Load2()
    - Load3()
    - Load4()
    - Load5()
    - Update()
* **HandleMouse – Handles Mouse Events**
  + **Variables**
    - GameObject eventSys
  + **Functions**
    - Start()
    - OnPointerEnter(PointerEventData eventData)
    - Update()
* **TellEventSys – Tells the Event System what UI Element is to be Selected**
  + **Variables**
    - GameObject[] buttons
    - GameObject eventSys
    - Bool found
  + **Functions**
    - Start()
    - FindFirstButton()
    - Update()

**UI:**

* **UISpawner – Handles the Activating and De-Activating of UI Elements**
  + **Variables**
    - GameObject hud, pause, complete, options
    - Bool paused
  + **Functions**
    - Start()
    - DisplayHud()
    - DisplayPause()
    - DisplayCompletion()
    - DisplayOptions()
    - TurnOffHud()
    - TurnOffPause()
    - TurnOffCompletion()
    - Update()
* **LvlResults() – Adjusts UI Text to Show How Well a Level was Completed**
  + **Variables**
    - GameObject timer, spawner
  + **Functions**
    - Start()
    - GetResults()
    - UpdateText()
    - Update()
* **Pause – UI Script to tell Game Objects to Pause when the Script is Running**
  + **Variables**
    - GameObject player, cam, timer, start, textArea
  + **Functions**
    - Start()
    - Off()
    - On()
    - Update()
* **Timer – Handles Keeping Track of How Much Time a Level Takes to Complete**
  + **Variables**
    - Text time
    - Float minutes, seconds, milliseconds
    - String minutes, seconds, milliseconds
    - Bool stop
  + **Functions**
    - Start()
    - StopTimer()
    - ResumeTimer()
    - ResetTimer()
    - Update()
* **PlayerStatus – Handles Displaying UI Player Status Icons**
  + **Variables**
    - Image status
    - Sprite[] images
    - String[] state
    - GameObject player
    - CharacterControls plyrCntrl
  + **Functions**
    - Start()
    - FindPlayer()
    - Determine Status()
    - Update()
* **Speed – Handles Displaying the Player’s Current Velocity as a Whole #**
  + **Variables**
    - GameObject player
    - Text speed
  + **Functions**
    - Start()
    - FindPlayer()
    - Update()

**REFERENCES**

<https://www.youtube.com/watch?v=EOSjfRuh7x4>

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<http://wiki.unity3d.com/index.php?title=3DText>