

## Assignment Instructions

This is a **GROUP** assignment with an **INDIVIDUAL** component. Only one member of your team should turn in your files.

**Due:** June 24, 2016 @ 11:55 PM

### Late Policy

See milestone one for the late policy ( $2^{(n+1)}$  late policy).

### Description

For this assignment, you will complete both a team objective and an individual objective. The team objective involves the creation of a character that can interact with a physically simulated world, while meeting game feel criteria. The individual objective involves the creation of a game feel garden for the character to interact within. There will be a game feel garden level created by each group member in your group utilizing the same character controller.

### Team Objective

For the team objective you will update your team's character controller to support physical interactions. This will be based on extending the work you and your teammates completed in Milestone 1. (Select one of your team member's M1 characters to work with, or blend the best parts from everyone.)

Your character should interact with physical objects, most likely through use of a kinetic capsule collider. The collider should provide reasonable collisions with objects in the environment with minimal interpenetration of 3D models. For instance, your character should be able to bump into rigid body objects in a scene (e.g. push crates or spherical objects around). The specifics of interaction should be determined by your particular game.

### *Collider Animation*

Your collider should have animated dimensions such that the volume of the collider is optimally sized in comparison to the current animation. For instance, a crouching character should become a smaller (and perhaps wider) collider. Similarly, a jumping character should result in the collider's height and shape changing. Probably the best way to implement this is to create a Mechanim curve that is public and can be used in scale calculation of your collider. (Refer to Unity's Mechanim Animation Tutorial.)

### *Rag Doll Physics*

Additionally, your character should utilize a ragdoll mode for some aspect of the gameplay. For instance, if your character can die or become briefly stunned, then upon incapacitation your animated character should become a humanoid ragdoll (no longer controlled by the Mechanim animation system and instead simulate weighted limbs under the influence of gravity and other forces). We recommend use of the Ragdoll Wizard in Unity.

### *Game Feel*

Lastly, your character should be implemented with an emphasis on meeting the criteria of game feel. This includes responsive, realtime controls for moving through a spatially simulated world and a level of polish that reinforces cohesiveness of the character and its interactions within the world.

You will define a target physical description of your character that you are attempting to capture in the character controller. Similarly you will define an emotional state that you aim to convey to the game player through interaction with the character (e.g. You might make a character controller meant to capture the lightweight and speedy physical characteristics of a tiny mouse while conveying a nervous and frenetic emotional feel to the player.)

### Individual Objective

For the individual objective, you will be creating a game feel garden (as a scene in Unity) that leverages the physics interactions of the character controller implemented as described above in the team objective for this assignment.

To demonstrate the game feel of your controller you will work **individually** within your team to develop different themed game feel “gardens” (or levels) and have the game feel of your character respond appropriately to them. Each garden should be switched to by a keypress 1 to  $n$  (where  $n$  is the number of team members). On each garden there should be a HUD display of the name of the person and the theme/biome you are going for. Each team member must select a unique theme/biome to implement.

### Example

*For Team Shaft we have decided on a physical target of a fast, twitchy character with an ill-tempered and evil emotional state. We express this target through implementation of a character that moves quickly and has an alert and ready-to-pounce idle animation. Together as a team we develop the character controller and interaction with physical material properties.*

*One team member makes an icy level with low friction and many obstacles, which will require precision to move and back and forth. There are cute little penguins that she kicks angrily out of her way when she runs into them. Another team member makes a desert level with sand that will slow the character down in places and sandstone rock outcroppings that the character can exercise her dexterity and wall jumping on. Sand crunches under foot, while the sandstone makes a tapping sound of boots against stone. Both levels implement a variety of polish effects including particle effects, audio, physics parameters, etc.*

### **Grading Criteria**

Your submission should satisfy the following requirements.

#### Group Component

Basic Physics Interaction (20 points)

Collider Animation (10 points)

Ragdoll Simulation (10 points)

Game Feel (10 points)

- Realtime, responsive control
- Identify and document physical and emotional target for your character
- Document and demonstrate how your character meets these game feel goals

### Individual Component

Each level must exhibit the following environmental behaviors:

- The level should have at least five **unique** actors (geometry nodes) in it that have dynamic physical properties controlled by the physics engine. These can be rigid bodies, soft bodies, etc. **(10 pts)**
- The level should additionally have at least two compound objects consisting of joints somewhere in it. **(10 pts)**
- The level must have variable height terrain (e.g. ramps, stairs, platforms, etc.) that your character can move up and down on. **(10 pts)**
- The level must have at least three material sounds that play while the character is interacting with the ground surface (e.g. sliding sound while going across ice, grit sound while going across sand, bang sound when colliding with a metal wall at high speed, etc). **(10 pts)**
- Game Feel: A level of polish that improves the game feel of the character. Place an emphasis on a reactive environment (e.g. clouds of dust from footsteps, anything that looks interactive is so) **(10 pts)**

### **Submission:**

Submit your assignment in two ways.

You should submit a 7ZIP/ZIP file of your Unity project directory via t-square. **Please clean the project directory to remove unused assets, intermediate and final build files, etc., to minimize the file size and make it easier for the TA to understand.**

The submissions should follow these guidelines:

- a) Your team name should appear on the HUD of your game when it is running.
- b) ZIP file name: <teamname>\_m2.zip
- c) Readme file should be in the top level directory: < teamname >\_m2\_readme.txt and should contain the following
  - i. Full name, email, and prism account name for each member of the team
  - ii. Detail which requirements you have completed, which are incomplete, and which are buggy (be specific)
  - iii. Detail any and all resources that were acquired outside of class and what it is being used for (e.g. Asset Bundles downloaded from the Asset Store for double sided cutout shaders, or this file was found on the internet has link <http://example.com/test> and does the orbit camera tracking ).
  - iv. Detail any special install instructions the grader will need to be aware of for building and running your code, including specifying whether your developed and tested on Windows or OSX
  - v. Detail exact steps grader should take to demonstrate that your game meets assignment requirements (e.g. "First, walk towards the pile of blocks using WASD and mouse and bump into them to knock them down. This should demonstrate actor movement via physically simulated forces and interactivity with environment...") Please also include game feel description.
  - vi. Which scene file is the main file that should be opened first in Unity
- d) Complete Unity project (each script file you created should include team name and members' names in comments at top of file, and any file you acquired outside should also be attributed with the appropriate source information)

Submission total: (up to 20 points deducted by grader if submission doesn't meet submission format requirements)

**Be sure to save a copy of the Unity project in the state that you submitted, in case we have any problems with grading (such as forgetting to submit a file we need).**