Piscine Unity - d08

Les animations

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Summary: *Here is the subject for the D08 of the Unity Piscine of 42.*

Contents

Chapter I

Instructions

- Only this page will serve as reference. Do not trust rumors.

- The exercises have been ordered from easiest to most difficult. Under any circumstance you can submit or take into account an exercise if a previous one has failed.

- Be careful with the access rights of your files.

- You should follow the submit procedure for all you exercises.

- Your exercises will be corrected by your piscine peers.

- You cannot leave any extra file on your repository except the ones explicitly specify on you subject.

- Got a question? Ask your peer on the right. Otherwise, try your peer on the left.

- Everything you need can be found on the `man` or out there on Google.

- Read carefully the exercises: they may contain some features you should implement that are explicitly mentioned on the subject.

- Think about discussing on the forum Piscine of your Intra!

- Use your brain!!!
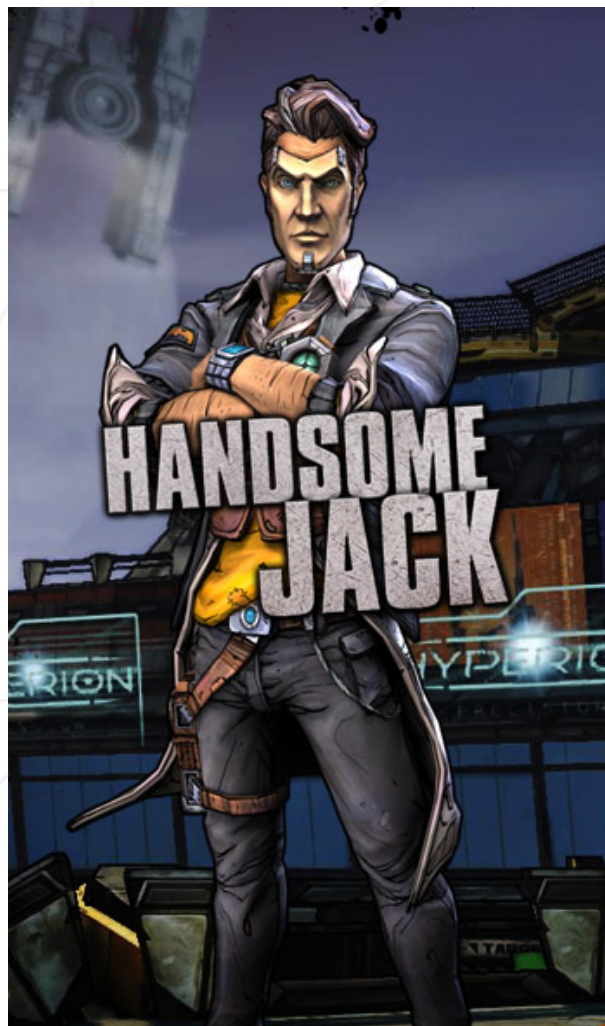
Chapter II

Preamble

Figure II.1: "My day? It's been pretty good. I just bought a pony made of diamonds, because I'm rich. So, you know. That's cool. Kay, bye."

Chapter III

Exercise 00: Setting up the scene

	Exercise : 00
	Exercise 00: Setting up the scene
Turn-in directory : *ex00/*	
Files to turn in : `"ex00" scene and anything useful`	
Forbidden functions : `None`	

WARNING! WARNING! Now that I've got your attention, here are a few precisions about today's exercises. Today will focus on a technical demo. So: don't waste time on level design or the scenery. Or do it when you've completed the rest. Sure, today's assets are pretty cool, but don't worry, you'll have other opportunities to use them!

For the whole project, you'll work in human scale. Use the 1 unit cube and set its height on 2 to get the idea of what a character should look like. Use it as a template to build your scenery.

For the first exercise, you're gonna create a simple terrain, generally flat, with a few bumps and steep slopes we will use later.

Finally, create a building. A shed for instance. It must be reasonably sized, it must not be a small shed. But it shouldn't be a cathedral either. A shed, like a hangar, will do. Of course, it will feature a door. Opened.

> ⚠ If you're a fast worker, this exercise will take 30 minutes. If it
> takes more than one hour, you're gonna have a bad day!

Chapter IV

Exercise 01: Maya

	Exercise : 01
	Exercise 01: Maya
Turn-in directory : *ex*01/	
Files to turn in : `"ex00"` scene and anything useful	
Forbidden functions : `None`	

> Today's assets don't have the same scale. You won't be able to use them right away. You should modify them to give them a unit, using everything you've learnt so far.

Now the basic scene is set, you will place Maya, our main character the player will control.

You'll find the model in the asset, along a group of animations. You must create an animator with 4 states: an idle, which will be the default state when the player doesn't do anything. A run that will be triggered when you click the terrain, an attack that will be triggered when you click an enemy in range and a dead, that will be triggered if the life points reach 0.

We'll mention enemies in the next exercise, so, for now, just plan an "attack" state that will be triggered when Maya attacks.

You will also place a top down camera so it's always centered on Maya. The idea is to get a "Hack and Slash" camera. Google in-game pics of Diablo or Torchlight to get the idea.

You must create a NavMesh and set NavMeshAgent on Maya to manage her movement. Your NavMesh must be set so the character moves logically. Your terrain must feature impassable slopes/bumps so the character has to go around them to reach their required destination. If you don't have any impassable obstacles, modify your terrain accordingly.

Once the NavMesh is created, you will manage the character's movement and animation from idle to run when the player clicks the terrain. Of course, the camera must follow the movement.

Chapter V

Exercise 02: Enemies and non-AI

	Exercise : 02
	Exercise 02: Enemies and non-AI
Turn-in directory : *ex02/*	
Files to turn in : `"ex00" scene and anything useful`	
Forbidden functions : `None`	

Now, let's get to the enemies and combats! To make things easier, we're gonna make an original choice: zombies.

Create EnemySpawners. These are empty GameObjects with a script that takes in parameter a list of enemies prefabs and that spawn a random one in the list. You must create 2 enemies prefabs that will use the male and female lambent models provided in the assets.

These enemies must:

- Have a NavMeshAgent to manage their movements in the scene.

- Have an animator with 4 states: idle, run, attack, dead.

- Have a detection area to know when the player gets close and run towards them to attack.

- Have a script to manage everything with a simple life points management. Each enemy has 3 life points.

You must place EnemySpawners on the map and make sure that when an enemy is killed, another one respawns moments later. You will choose the "moments later", but it should not be too short, lest the player might stay in front of the spawn and farm the enemies. But it should be too long so the map can be heavily populated.

You must also manage combat. For the moment, Maya is immortal but you must make sure enemies lose a life point each time she hits them, hence, die after 3 hits. You must also make sure the damages are applied when the weapon hits the enemy, not when the attack animation starts.

To attack, you have to click an enemy. If Maya is in the range of attack, she automatically attacks in close combat. If she's too far from the enemy, she must first run towards it before attacking. If the player keeps the mouse button pressed after left clicking on an enemy, Maya must attack the enemy until it dies even if the mouse cursor exits the enemy's hitbox.

When an enemy has no more life point, launch its dead animation. You must create a coroutine so that after 2 seconds on the ground, its body gradually fades in the ground so it's properly destroyed (rather than make it disappear at once). Don't use any other way to destroy the enemies. There is a challenge in making them fade in the ground, and this is precisely what this exercise is about.

Chapter VI

Exercise 03: Stats, cause we need some

![]	Exercise : 03
	Exercice 03: Stats, cause we need some
Turn-in directory : *ex03/*	
Files to turn in : `"ex00"` `scene and anything useful`	
Forbidden functions : `None`	

Now you have the basic gameplay, we're gonna get into the hard stuff and create some stats and advanced combat systems.

> With this exercise, we're gonna thoroughly study the gameplay mechanics of a Hack and Slash. Some mechanics being hard to describe easily, if you have any doubt, try the provided demo to understand the requirements. If you've played Diablo II/Torchlight, you should already have a few clues. If you don't know anything about hack and slash or only know the most recent ones like, such as Diablo III or PoE, you should really run the demo.

Each character in the game (Maya and her enemies) must have the following features:

- 3 main features: Strengh(STR), Agility(AGI), Constitution(CON)

- An Armor stat that will be subjectively attributed for now, but will be modifiable later with gear.

- An HP stat that is equal to 5 * CON.

- A minDamage stat equal to STR/2 and a maxDamage one that equals minDamage+4. Like the armor, these basic stats will be modifiable with gear.

- A Level stat matching their level.

- An XP stat. For Maya, this will be the xp she gathered killing enemies. For the enemies, this is their individual value in xp.

- A Money stat. For Maya, this will be the credits she gathered. For the enemies, this will be their average value, in credits.

You can choose the figures you want for your characters/enemies, but an average level 1 enemy will have a basic stat set between 10 and 20.

You must also add a variable on Maya. It will specify the number of xp points she need to reach the next level.

Now the characters have real stats, we're gonna be able to work on the combat system to make it less basic. You must implement the following formulas in your combats: (don't waste too much time trying to fine-tune/ enhance them. This will be irrelevant today)

Calculating the chance of hitting: hit = 75 + AGI - Target.AGI

Calculating the basic damage: Random between minDamage and maxDamage

Calculating the final damage: baseDamage * (1 - Target.Armor/200). For obvious reasons, the armor won't go higher than 150-170. There won't be any reduction of logarithmic damage for now. We'll see about that later.

Maya is still invincible so don't launch the method that applies damage when an enemy strikes.

Chapter VII

Exercise 04: Death and interface

	Exercise : 04
	Exercise 04: Death and interface
Turn-in directory : *ex04/*	
Files to turn in : `"ex00" scene and anything useful`	
Forbidden functions : `None`	

You will now create an interface so the player can have a better feedback about combats:

- A life gauge for Maya, with an accurate number of life points displayed on its side.

- An xp gauge that will gradually fill up as Maya earns experience. You must also display Maya's current xp points + "/" + the xp points necessary to reach the next level.

- Maya's current level by her life gauge.

- The selected enemy's life gauge (see below) in the top of the screen as well as its name and level.

An enemy can be "selected" in two cases:

- If you run the mouse over it. In this case, the informations are displayed in the top of the screen. They must disappear as soon as the cursor is not on the enemy anymore.

- If Maya is attacking. In this case, the informations also appear in the top of the screen, but they must not disappear (even if the cursor doesn't aim at the enemy anymore) until the enemy dies or Maya stops attacking.

Now we finally have a visual feedback of our character, we're gonna be able to make it die! God Mode cannot last forever. Maya is about to become a mere mortal. She will lose a significant amount of life when she's hit by an enemy. If Maya dies, you must display an interface/message showing it. But mostly, you must make sure nothing crashes!

Don't let the enemies hit you too hard so Maya doesn't die after 4 strikes since, for now, she doesn't have any way to regain life. This will be in the next exercise. Ideally, she should be able to kill an enemy in 2-4 hits and take around 20 hits to die.

Chapter VIII

Exercise 05: Level up!

▮	Exercise : 05
	Exercise 05: Level up!
Turn-in directory : *ex05/*	
Files to turn in : "ex00" scene and anything useful	
Forbidden functions : None	

It's time to set the final touches. First, let's finish this interface. You will create a window that can pop when you press "c" and displays the following informations: the character's name, its main 3 features, its min/ max attacks, its shield, level, xp and the xp required to reach next level and its credits.

You will now manage the player's xp. Each time Maya kills an enemy, she must ear experience and when her xp reaches the required level, she earns a new level. When it happens, you must create a visual effect so the player understands what's going on (but don't waste hours on said effect). You must also raise Maya's life back to max and give her 5 skill points the player will use as they like. The xp score is reset and the xp needed to reach next level increases by 150

A clickable button must appear on the HUD next to Maya's life if she has skill points left. When you click it, the character's window appears just as if the player had pressed "c". A clickable button is present next to each main features. When you click it, a point is taken off the available points and added to the specified feature's total points.

You must also manage the enemies' levels (a simple way). Each level higher than 1 must have stats increased by 15have stats 130

Even if it's irrelevant as far as game design goes, you must make sure the enemies that spawn have the same level as Maya to be able to easily set up progress in the game. Remember it's a technical demo.

Finally, set an orb/potion system that randomly fall when an enemy is killed. They will automatically give Maya a maximum of 30walks on it.

Today's exercises (there were plenty) end here. But if you still
have time, try to set up a loot and gear up system. You can also try
to implement the management of credits the monsters drop when they
die. All the necessary stats are included in Maya's and the enemies'
scripts. Be aware though that everything you will add will just be
personal bonus and won't be taken into account during the evaluation.