Dave GameDevelopment

10 Day Learning Plan!

Welcome to this learning plan, here you'll learn in just 10 Days everything you need to know in order to code your own advanced player movement controller.

Requirements:

This plan does not require you to be an experienced game dev, but you do need to know the basics of C# and Unity, such as common variables, functions and Unity components.

In the main documentation, there is an entire section called "New to Coding – What Now?", there you'll find everything you need in preparation for this 10 Day Plan.

How it works:

Every day is dedicated to one or two new movement mechanics. You'll get an overview of how this mechanic works and then a step-by-step guide on which code parts to look at understand (the code is fully commented). At the end you'll also find a few optional coding challenges you can complete to control if you really understood the code.

Day 1 – Walking & Sprinting

Overview:

Glad you started this learning plan! On the first day we're going to have a look at basic walking & sprinting mechanics using a rigidbody component.

Explanation:

Since it's the first day, here a quick explanation. Below you'll find a table with all the pieces of code you need to understand in order to learn the topics of the current day. You can then open the script from the Unity project and have a look at the mentioned sections, since everything is fully commented you should be able to understand the code by yourself. If for some reason the comments aren't clear enough, head over to my discord server to the channel #MovementLab and tell me what you don't understand. This way I can also improve the code to make it clearer for the next person reading it. (Link to my discord at the end of this document).

One tipp I want to give you right now:

Sometimes you'll stumble over variables and code that aren't part of the current day, just ignore them for now.

Note:

For basic movement I also made a YouTube tutorial, so check it out if you prefer that! https://youtu.be/f473C43s8nE

If you watch the tutorial, still have a look at the code afterwards, it's a bit different.

Step by Step:

	Content	Script	Section	Done?
1	Understand which variables you'll need	PlayerMovement _MLab	Lines 28 - 79	
2	Learn how to get the W,A,S,D Inputs		Lines 211 - 213	
3	Add Forces to the player based on your Input		MovePlayer()	
4	Learn how to perform a ground check		Line 172	
5	Understand the StateHandler (Only sprinting and walking)		StateHandler()	
6	Add drag to the player		HandleDrag()	
7	Learn how to limit the players velocity		LimitVelocity()	

Day 2 – (Double) Jumping

Overview:

Second day, hope you're getting a bit used to the big PlayerMovement script :D (No worries, the other scripts are a lot shorter)

Today you'll learn how to perform clean jumps on ground or in the air.

Step by Step:

	Content	Script	Section	Done?

1	Understand which variables you'll need	PlayerMovement _MLab	Lines 28 - 79	
2	Learn how to perform a jump		Jump()	
3	Learn how to perform a double jump		DoubleJump()	
4	Call the jump and double jump functions based on your input		Lines 215-230	

Day 3 – Crouching & Sliding

Overview:

Hope you've had fun creating the double jump yesterday, today it's all about crouching and sliding.

Here's how I handle the difference between these two abilities, but feel free to do it differently:

- When you're not pressing W,A,S,D and press Control you start crouching. (Afterwards you can keep holding down Control use W,A,S,D to crouch around)
- If you press Control while pressing W,A,S, or D you start sliding.

Step by Step:

	Content	**Script**	**Section**	**Done?**
1	Understand which variables you'll need	PlayerMovement _MLab	Lines 28 - 79	
2	Understand how to start and stop a crouch		StartCrouch() StopCrouch()	
3	Learn when and how to call these crouch functions.		Lines 232-239	
4	Check out the variables of the sliding script	Sliding_MLab	Lines 18-35	
5	Understand how to start and stop sliding		StartSlide() StopSlide()	
6	Understand how to add forces while sliding		SlidingMovement()	
7	Learn how to call these functions		Update()	

Day 4 – Slope Movement

Overview:

Day 4, it's time to tackle slope movement.

For this you need to check if your player is standing on a slope, and if so, get and add force in the correct movement direction relative to the slope you're standing on.

Step by Step:

	Content	Script	Section	Done?
1	As always, check out which variable you'll need	PlayerMovement_MLab	Lines 28 - 79	
2	Learn how to check if the player is standing on a slope		OnSlope()	
3	Understand how you can easily find the correct slope direction		GetSlope MoveDirection()	
4	Find out when and how to apply this calculated slope direction		Lines 253 - 255	

Day 5 – Dashing

Overview:

You already created solid player movement, from now it's time to learn a few cool abilities. We'll start with dashing!

Step by Step:

	Content	Script	Section	Done?
1	Variables, as always :D	Dashing_MLab	Lines 19 - 49	
2	Understand how to perform your dash		Dash()	
3	Learn how to find the right direction depending on your allowed direction bools		GetDirection()	
4	Make sure to reset everything again after the dash is over		ResetDash()	
5	Implement input stuff and dash timer		Update()	

Day 6 – Swinging

Overview:

It's time to swing around like spiderman. Ok these overviews start becoming stupid, I literally just repeat the title of the day...

Ah no wait, there's something else that needs to be clarified.

The difference between swinging and grappling:

- Swinging is where you shoot your rope onto a target and then swing through the air
- Grappling is where you shoot your rope onto a target, then quickly freeze mid air before pulling yourself towards that target

Note:

I learned how to do this swinging stuff from Dani, so check out his video if it helps you understand my code: https://youtu.be/Xgh4v1w5DxU

Step by Step:

	Content	Script	Section	Done?
1	Variable time! (Just ignore everything that has to do with grappling)	Grappling_MLab	Lines 24 - 57	
2	Learn how to start your swing by adding a Joint component and setting it up		StartSwing()	
3	Stop your swing again		StopSwing	
4	Understand when and how to call start and stop swing		MyInput()	

Day 7 – Grappling

Overview:

Grappling is like swinging, but cooler.

Step by Step:

	Content	Script	Section	Done?

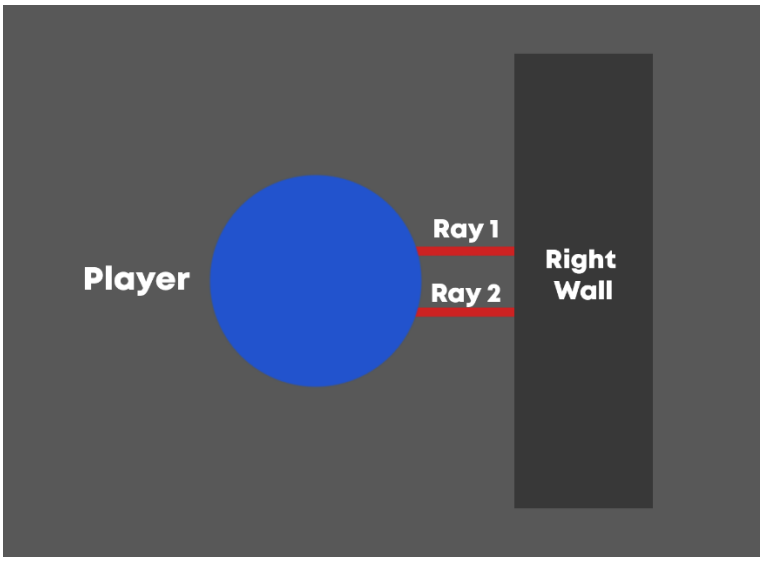
1	Variable time! (This time focus on the grappling variables)	Grappling_MLab	Lines 24 - 57	
2	Learn how to start your grapple, freeze the player and execute the grapple after some time		StartGrapple()	
3	Learn how to push the player in the direction of an object depending on how far it is away		ExecuteGrapple()	
4	Don't forget to stop your grapple again		StopGrapple()	
5	When to I call these functions?		MyInput()	
6	How to prevent the player from stopping the grapple while it hasn't even been executed		TryStopGrapple()	

Day 8 – WallRunning

Overview:

Now it's finally time for the coolest (and most complex) part of movement – wall running. Ok, no worries, it's not that complex, but tomorrow we'll combine it with climbing to get full 360-degree wall movement!

But first, you really need to understand how I handle my wall detection with raycasts:



To check if a wall is on the right side, we're going to shoot 2 raycasts to the side, one being in front of the other.

This way we can always calculate the exact direction of the wall by calculating the direction from hitPoint2 to hitPoint1. This works even if the wall is curved.

Step by Step:

	Content	Script	Section	Done?
1	Make sure to understand all of the variables you'll need (focus on wallrunning only)	WallRunning_MLab	Lines 31-121	
2	Understand how to check for walls using raycasts		CheckForWall()	
3	Learn how to start and stop a wallrun		StartWallRun() StopWallRun()	
4	How to create the actual movement while wallrunning		WallRunning Movement()	
5	When to I call these functions? Understand the state machine.		StateMachine()	

Day 9 – Wall Jumping & Climbing

Overview:

We're approaching the end of this learning plan, keep going!

Today, you're going to learn how to exit walls again using wall jumps and how to perform climbing movement.

360-degree wall movement:

But first, let me explain how I handle my 360-degree wall movement. Knowing this is crucial to understanding the full WallRunning_MLab script.

Basically, there's 20 different things that can happen (4x walls in all directions, and W,A,S,D + Space inputs on any given wall direction)

So here's what should happen depending on where the wall is and which inputs you're pressing:

Wall on front:

W -> Climbing

A,D -> Nothing

S -> Exit wall without walljump

Space -> climb jump backwards and up

Wall on side (left or right):

W -> WallRunning

W + A,D -> Diagonal WallRunning

A,D (in direction of wall) -> slowly slide down wall

A,D (away from wall) -> exit wall without walljump

S -> nothing

Space -> Wall jump away from wall

Wall on back:

W -> exit wall without jumping

A,D -> nothing

S -> slide down slowly

Space -> push yourself away from wall (no upward force)

This way you have full wall control using 5 inputs and 4 wall directions, hope that makes sense to you!

Step by Step:

	Content	Script	Section	Done?
1	Make sure to understand all of the variables you'll need	WallRunning_MLab	Lines 31-121	
2	Learn how to perform wall jumps (and climb jumps)		WallJump()	
3	Understand how to start and stop climbing		StartClimbing() StopClimbing()	
4	How to create the actual movement while climbing		Climbing Movement()	
5	With the explanation above, try to understand how the full state machine works		StateMachine()	

Day 10 –Boosting & Moving Objects

Overview:

Ok last day, we'll just use the time to have a look at a few more things that you can add to your game to make the movement more interesting.

Step by Step:

	Content	Script	Section	Done?
1	Check out how to create the boost pad, the script is short, you'll get it in one go	BoostPad_MLab	Full script	
2	Learn how to create moving objects	MovingObject_MLab	Full script	
3	Understand how I created the blue bounce pads in Unity (Look at the physics material I used)	Scene MovementLab		

And with that, thank you so much for following this 10-Day Plan. If you have any questions left, make sure to use the dedicated discord channel. (#MovementLab)