RPG Character Classes

Enemy health is now being affected by Gameplay Effects (although it’s only a placeholder, since we want damage to be affected by the secondary stats for a real RPG combat experience)

Also, character is just using the default attribute value; in a real RPG different character types start with different attributes

These character types are often separated into different character classes

A screenshot of a video game

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To properly initialise enemy attributes we should think about how we will do this; Aura will level up and get stronger; we also have enemy class level (a class variable) and for an enemy to spawn in at a different level that should **mean** something – higher level enemy = higher attribute values

So, how to initialise attributes for a character based on it’s character class?

Warrior: mainly melee attacks

Rangers: ranged attacks

Elementalist: magical spells

So characters should have a way to easily set their character class, which determines their starting attributes. Starting Level should also affect starting attributes

Loading in a character with a certain class and level is mostly related to enemy characters; Aura starts with base stats, unless being loaded from a save

Enum perhaps?

An asset to store data…a data asset

Gameplay effects can use curve tables to scale gameplay effect magnitudes based on level

Curve tables are a single asset that can hold multiple curves, like for Primary Attributes for example

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So each character class, specified with character class Enum, can have a curve table with curves for each primary attributes storing the starting values that can scale up as level increases

Will also apply a Gameplay effect to initialise the attributes, then populate the secondary attributes based on the primaries, and an effect for Vitals once everything else is set

Finally any Abilities the enemy character class has should be in this data asset so they can granted at the beginning of the game

Some of the enemies may have the same abilities and effects eg Death or hit react as an ability and each enemy share those ability classes, so the data asset should also have all abilities and effects that all enemies should be given

A screen shot of a black and yellow text

Description automatically generated

6: could be in the AuraAbilitySystemLibrary, take in the Asset, ASC, and character level and apply all effects to initialise attributes

# Character Class Info

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Asset created, now need to store data for each character class and Enum to categorise classes

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We can add constants for each character class

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Now we can distinguish between character classes

We also need a struct, with all the information for each class

New struct for the character class default info:

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In this struct we’ll need a gameplay effect to apply the primary attributes

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Now primary attributes can be set here

We could have Secondary and Vital gameplay Effects per class, or share the same Secondary and Vital among all classes

Let’s share them outside of the struct, in the main body

A computer screen shot of a program code

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The asset now needs a way to store the structs, one for each class.

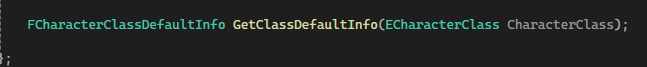
TArray or Map?

Map, so we can map the Enum to the struct

A screen shot of a computer

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We want to retrieve the information for a given enum constant, so we’ll make a function to look up the info



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FindChecked is good because it will perform an assertion and if no enum we’ll get an assert

New Data Asset BP in Unreal based on the class:

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A black and white screen

Description automatically generated with medium confidence

Now we have a data asset we can create some new Gameplay effects to add to the pulldown menus

# Default Attribute Effects

We have already created default attributes for the Aura Character, but we will need them for the enemies as well

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The Secondary Attribute Effects could just be the same some shared among all classes unless there was a reason to tweak the coefficients in the calculations made in the modifiers

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So this could be set up to be different for each class with a separate GE so for example Warriors get more armor from their resilience or something, but we don’t have to do that

For this exercise I’ll use the same Secondary Attributes formulae and rename GE\_AuraSecondaryAttributes to GE\_SecondaryAttributes

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Now we have some Gameplay effects they can be set in the Data Asset

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# Curve Tables – CSV and JSON

Currently these Primary Attribute GameplayEffects have no modifiers – with modifiers we can have curve tables that allow the modifier magnitude by a modifier based on what the curve table returns using a lookup by level

GE\_Primary Atributes will be a gameplay effect with instant duration policy. There will be 4 modifiers, one for each attribute and for each we’ll use a curve table. For the curve tables we’ll have different value based on level, so that when we spawn in an enemy we can apply the gameplay effect at the level specified.

Curve tables can be created in a number of different ways, and the data can be stored in a number of different ways.

Creating a new curve table you have interpolation options:

A screen shot of a computer

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Linear: Between each XY value pair(each key in the curve) the curve is a straight line

Cubic: the curve is a smooth curve

Constant: no interpolation at all

For Elementalist going with Cubic, and renaming the curves to match the Gameplay tags of the attributes

A screenshot of a computer

Description automatically generated

Cool thing about interpolation types is we don’t have to have a value for each level; can enter one for every 5 or 10 levels, and if we try to retrieve a value at a give point we get the interpolated value on the curve

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A screen shot of a graph

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NB in the curve table the values are assumed to be seconds and are marked with an S, but they don’t have to be used that way

A black screen with white text

Description automatically generatedAdd a second value:

A graph with a line going up

Description automatically generated

Select the points, R-click and auto interp:

A screenshot of a graph

Description automatically generatedA graph with a line going up

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This table has a cubic interpolation type, so we can get a mathematical graph of a cubic function

A screenshot of a video game

Description automatically generatedNew Key:

A graph with a line going up

Description automatically generated

Normalized view mode will normalise to all keys involved:

A graph with a line going up

Description automatically generated

As we can see the curve smoothly interpolates from one value to the next, so if we query the key at level 2

A screenshot of a computer

Description automatically generated

This can save some time if we want to shape out the curve by shape and just interpolate between major values, then we don’t have to put in a value for each level

New Key:

A graph on a black background

Description automatically generatedA graph with a line going up

Description automatically generated

We can also click and move the existing values to make the curve look more as we like, if we wish, 10.5 at 10 is a more pleasing curve:

A graph with a line

Description automatically generated

So far this is looking a bit linear so maybe cubic is overkill, but that’s OK, we’re only querying once at spawn anyway

New key:

A graph on a screen

Description automatically generated

Str isn’t THAT important for an elementalist so 14 at 20 is fine

We can add one last for fun at 40!

A graph on a black background

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Now we have a curve for Strength for the Elementalist

A blue rectangle with white text

Description automatically generatedNew curve:

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In GE\_PrimaryAttributesElementalist:

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Remember to Override!

Repeat for Warrior and Ranger.

Additional possible formats for the curve table data:

A screenshot of a computer

Description automatically generatedA screenshot of a computer

Description automatically generatedThe first row determines X Axis value (levels)

At level 1 Str 5, int 15 etc

Some are empty because I did not fill them in

A white grid with black numbers

Description automatically generatedUseful because we can look at the values and edit them here

In Notepad it looks like this:

A screenshot of a computer

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Description automatically generated

New values are present and no longer interpolated

A graph on a black background

Description automatically generated

If select all and r-click can no longer Auto, forced to be linear – limitation on importing data

CSV:

So, we can import and export – can also create curve tables direct from CSV by making a CSV file (or copying the Elementalist and saving with a new name and values as I did) and import as before

JSON:

Exported Ranger and saved as a JSON:

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Description automatically generated

Defaulted to open in VS but I reopened in Notepad

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Description automatically generated

Import File CT\_PrimaryAttributes\_Warrior.json:

A screenshot of a video game

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JSON allows for cubic curve import:

A graph with a line going up

Description automatically generated

Now we have the curve tables and have associated them all with the GE Primary Attributes gameplay effects, we can use the Data asset to apply those values

Nb: currently the Secondary attributes affect, which is shared with Aura, is infinite so that Aura’s secondaries can update in response to changes in the Primaries. But we don’t plan on having the enemies update primary stats at runtime – they get attributes based on level and that’s it

So we can duplicate the Secondary, set it to an instant Gameplay effect and add it

A screenshot of a video game

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We could use Infinite for enemy secondaries if they can level up, but they won’t in this project