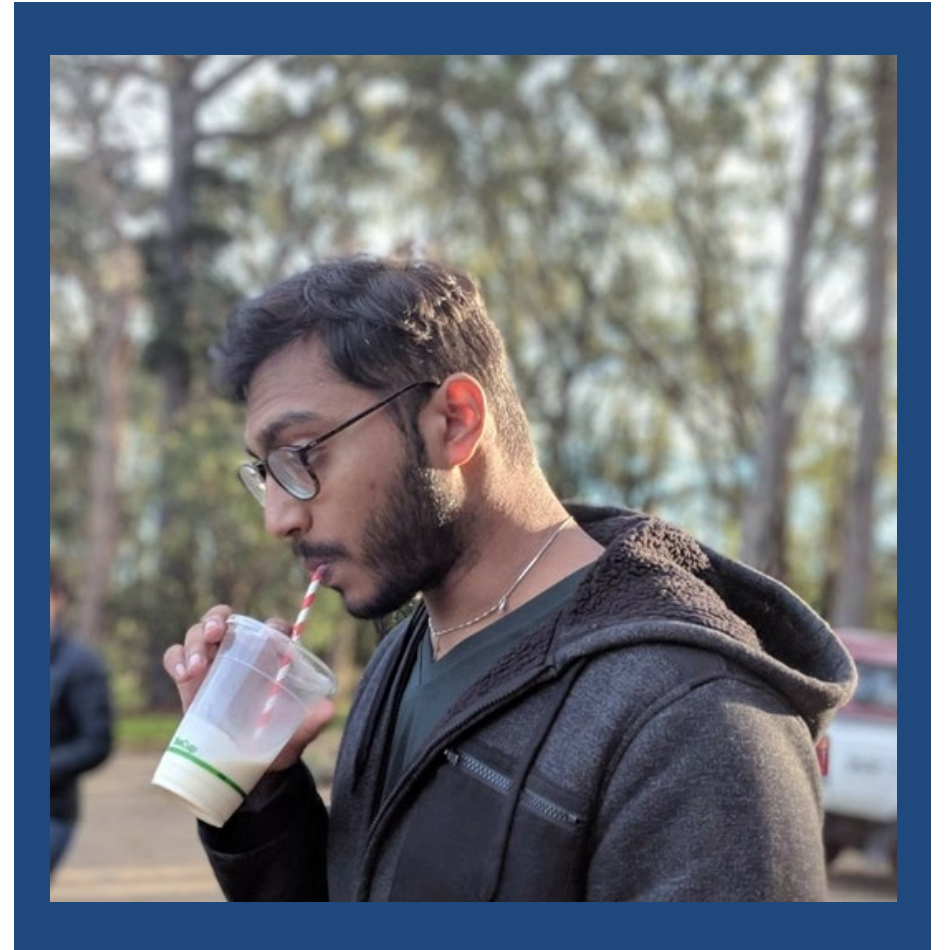


Growing Your Code Library With Each New Project

Serveen Uduwana
@sduwana

Hi there! I'm Sherveen (He/Him)

- I Make Games
- As A Freelancer
- Also Making Midautumn
 - It's a supernatural roguelite about Asian Diaspora



Making a Living as a Freelancer In Games



Time for some Cavy-Eats



Making games is **ALREADY** hard.
Don't make it harder!



Finishing that project can be daunting



The next game can feel MORE daunting



You now know the amount of work required



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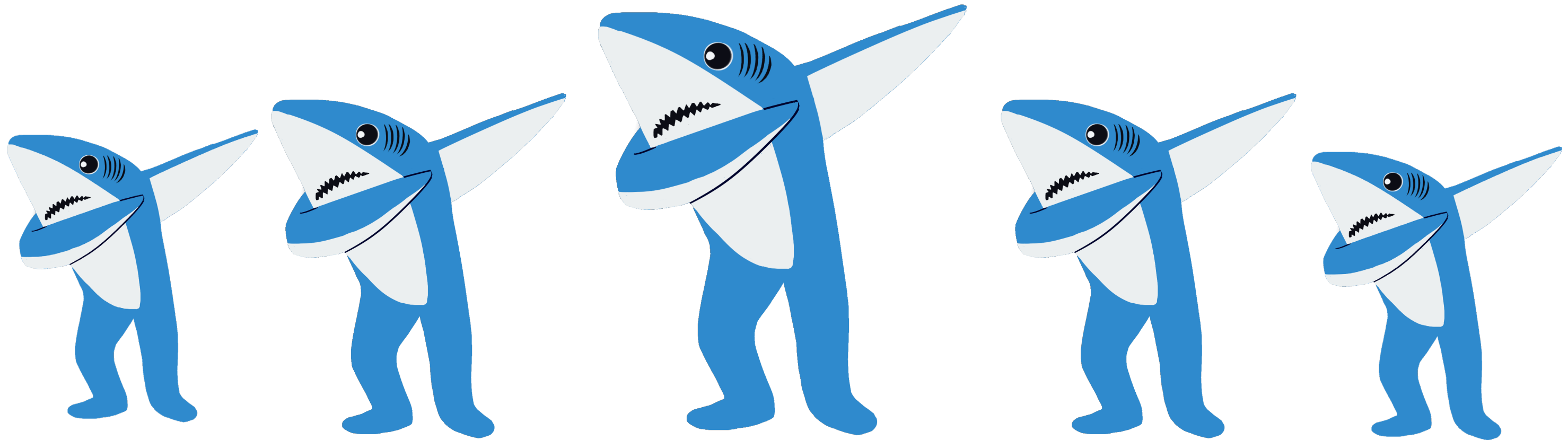
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The second time around we can better

propose



Now, imagine a game is some assemblage of
SHARKS



Game
(lots of sharks)



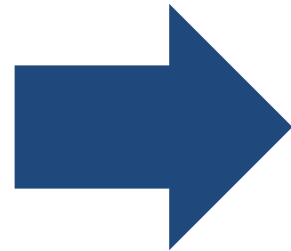
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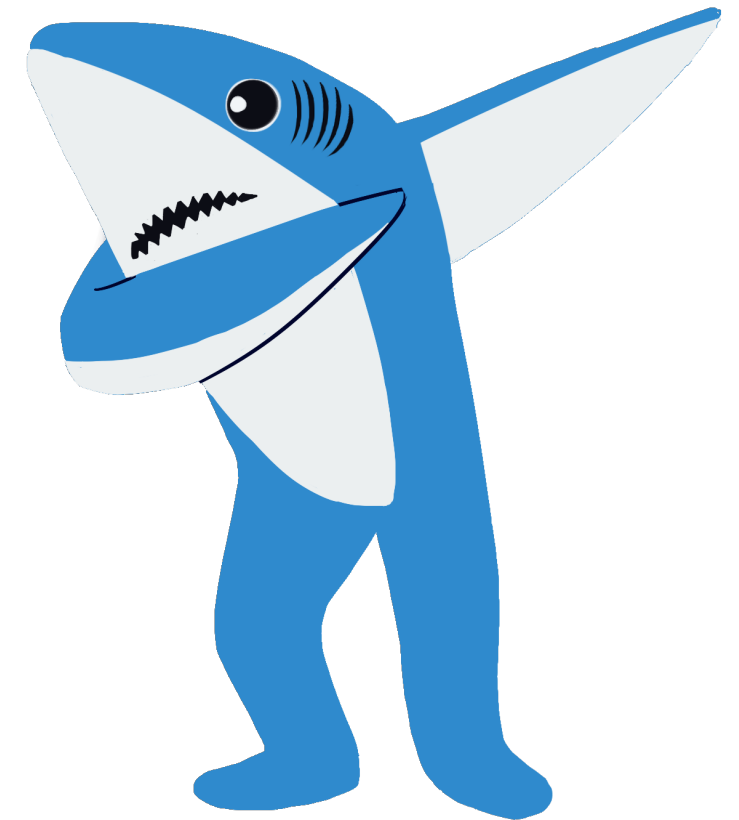
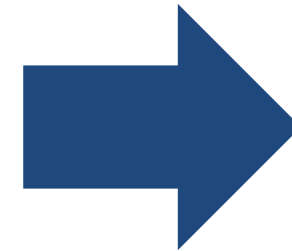
Now, Imagine a game is some assemblage of SHARKS



Code Templates
(Shark Repellant)



Code Library
(Utility Belt)



Game
(Lots of Sharks)

What do I mean by “Code Library”?



- A collection of helpful resources
- **Reusable**
- Backed up somewhere
- Not just Code Templates:
 - Software you like using
 - Settings checklists
 - Documentation
 - Video/article links you often refer to

What goes in a Code Library?



- Solves a Problem
- Lightweight
- Doesn't need a lot of setup
- Self Contained
- Can be extended easily
- **Reusable**

Maintaining a Code Library

What to keep out of your Code Library?

- Keep these out, but make sure you can access if needed:
 - Full project files
 - Unique or non-generalized systems
- Keep these out entirely:
 - things you don't own and are not licensed to use in your projects

How to Add to Your Code Library

Best time to do so:

- Right after finishing a project
- Right before starting a project

Basic Steps

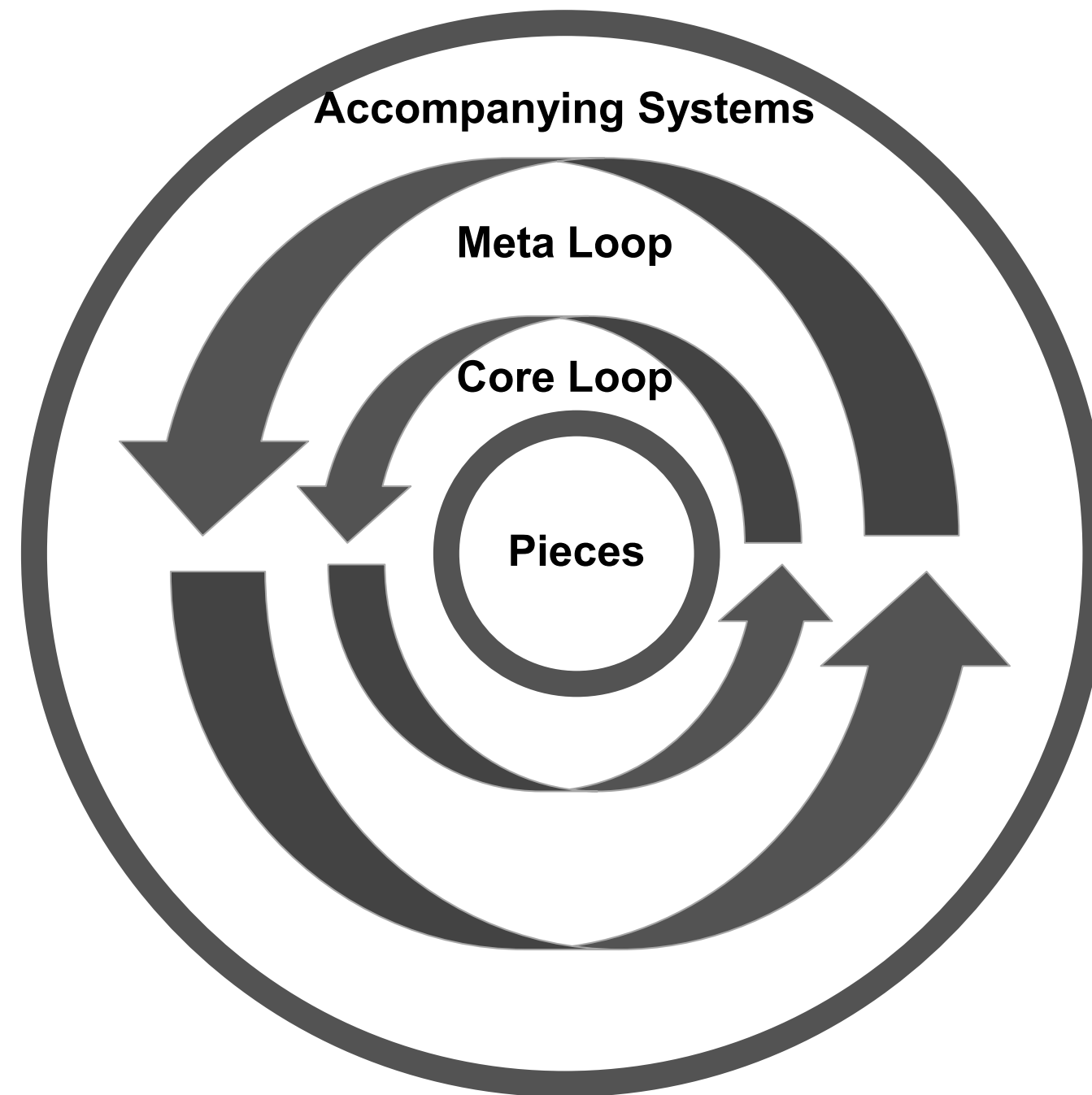
- Identify some code in an older project that you will want to reuse
- Get rid of any elements that tie that code to that specific project
- Give it an easily searchable name
- Store it somewhere you can access easily, in a location you can intuitively find again

How to Add to Your Code Library

Don't worry about getting it perfect

- Spend a few hours to a day on it
- You might not generalize it that well
- You might overlook something or include something unnecessary
- That's all okay!

A non-shark-based model of a game



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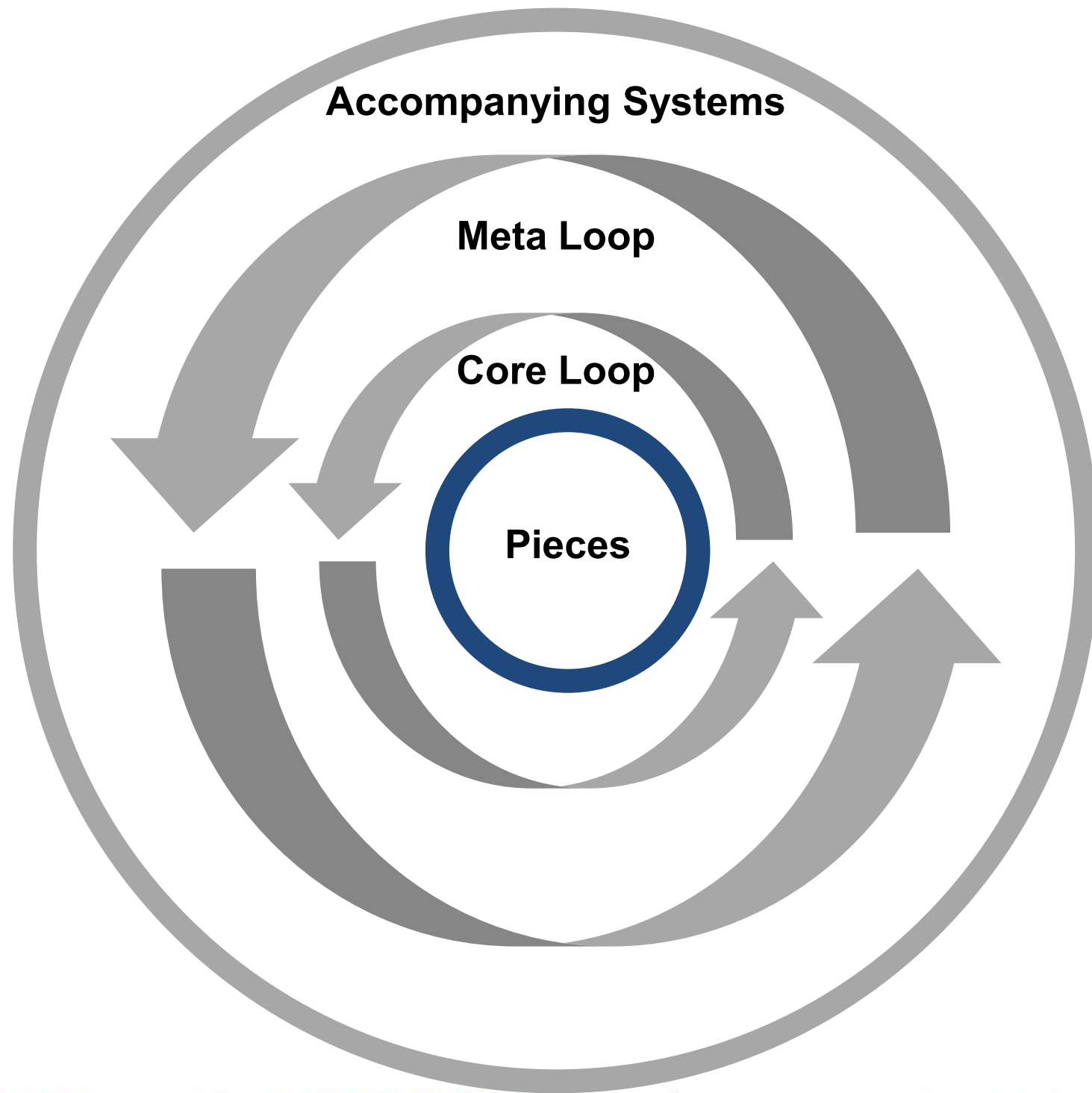
“A Chess Board + Pieces”



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Game Pieces

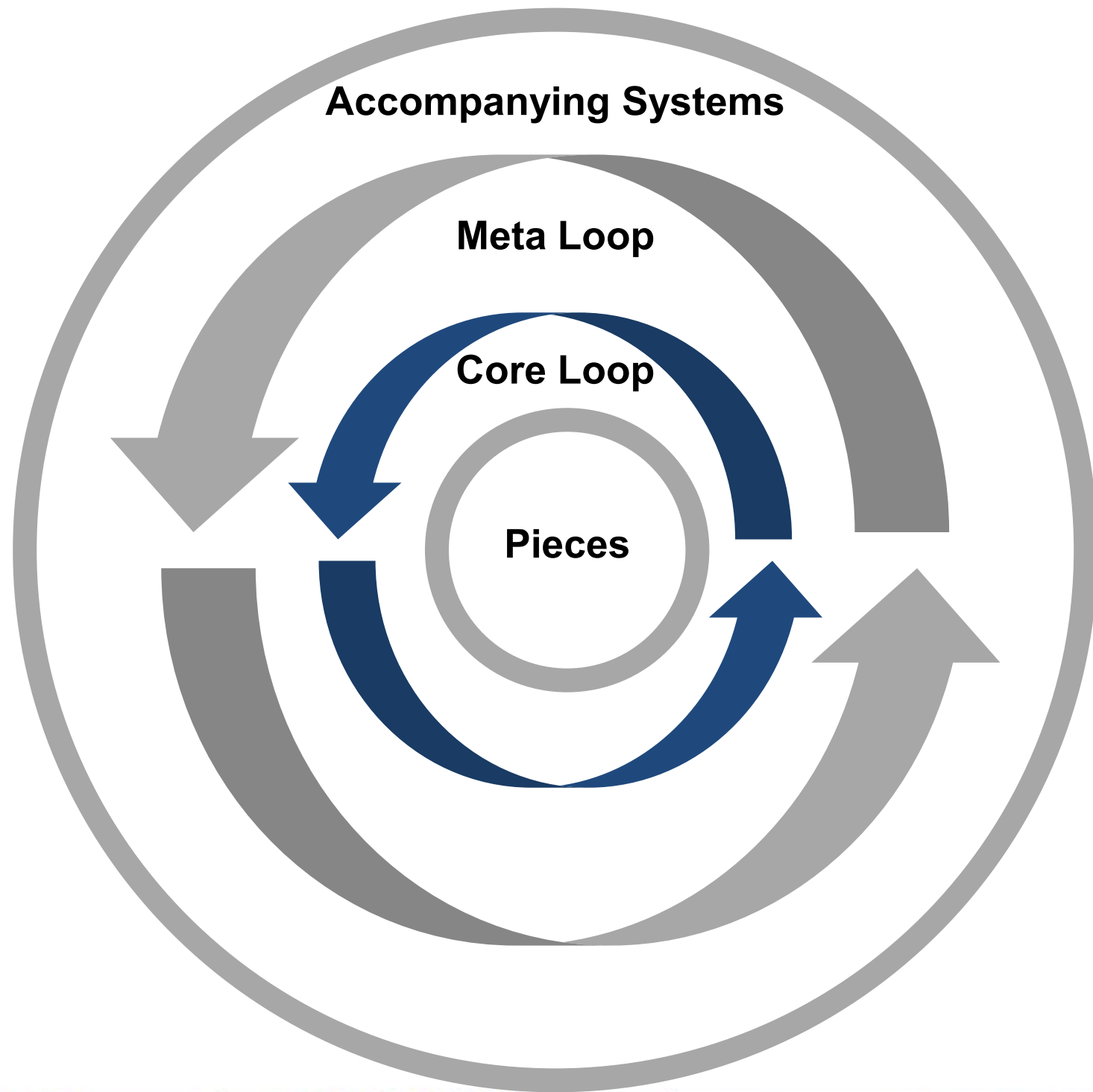


- Character Controllers
- Health Systems
- Physics

“A Game of Chess”



Core Loop

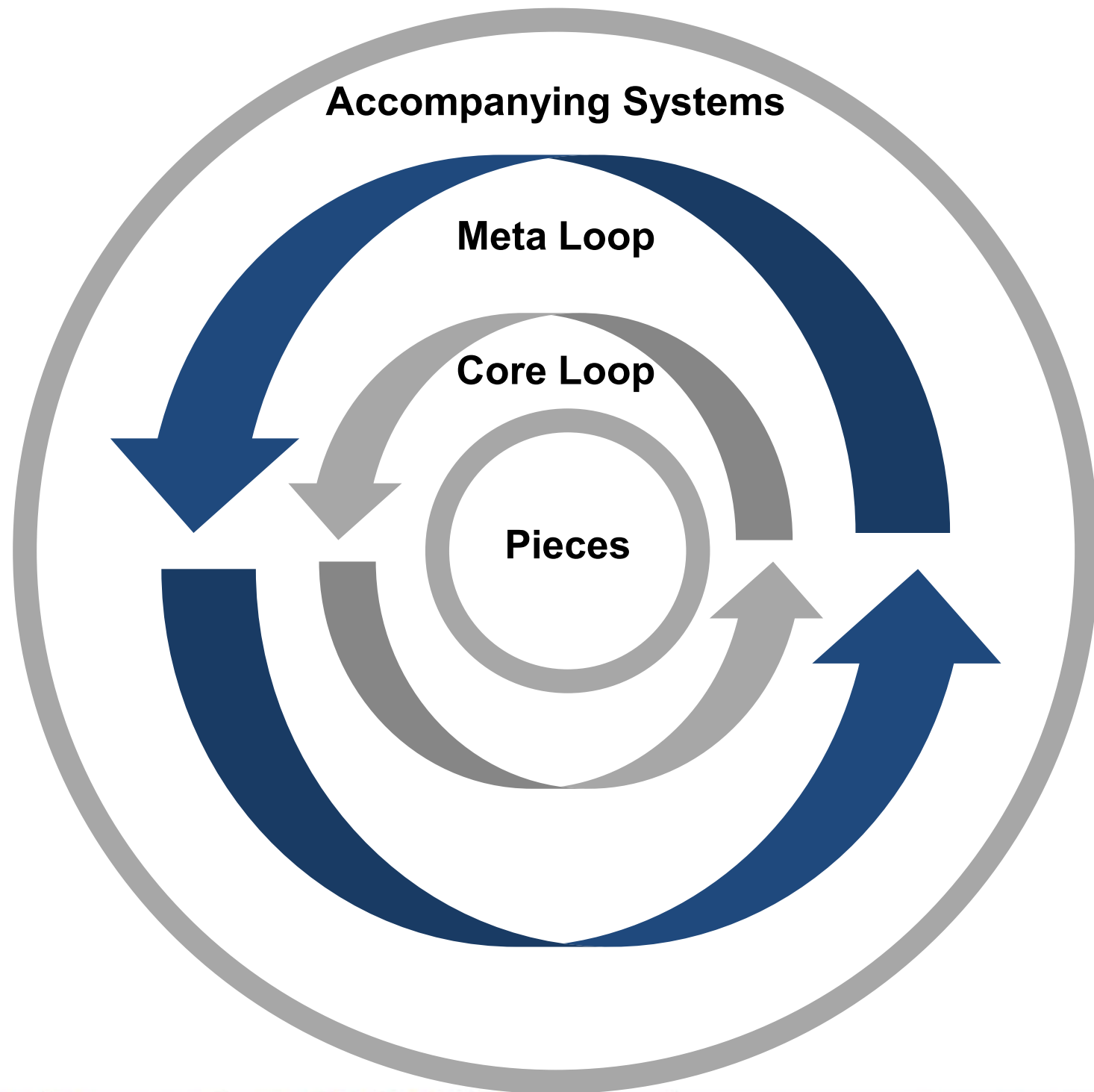


- Game Managers
- Resource Systems
- Loot Drops

“A Chess Tournament”



Meta Loop

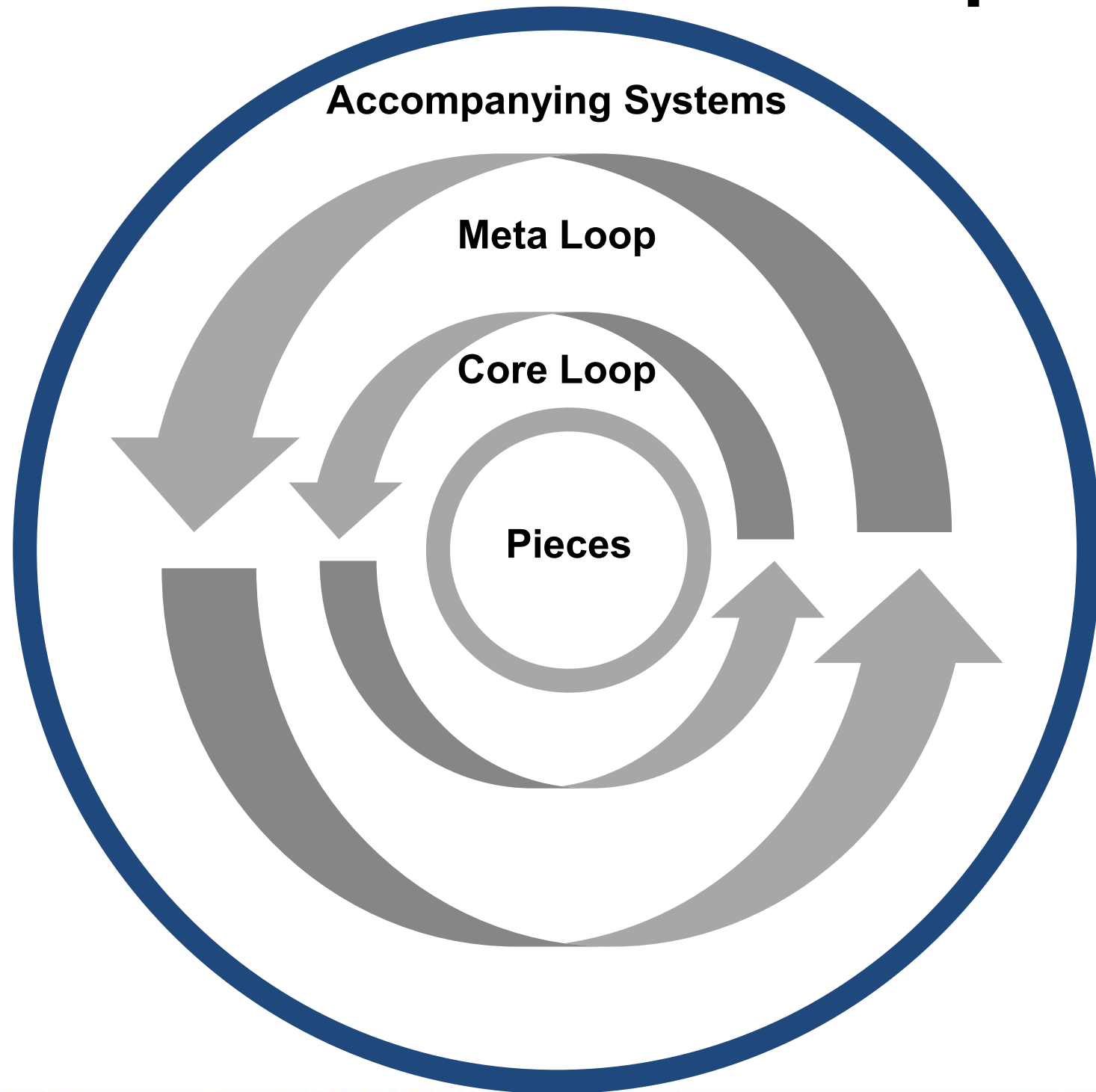


- Overworld Managers
- Progression Systems
- Quests

“A Tournament Venue”



Accompanying Systems



- Menus
- Localization
- Button Prompts
- Saving Systems

Where to Store Your Code Library?

- Version Control
 - Git
 - Perforce
 - Mercurial
- Cloud Storage
 - Google Drive
 - Dropbox
 - Wetransfer

How to Organize your Code Library?

Organize around systems:

- Dialogue
- Menus
- Save/Load
- Settings

How to Organize your Code Library?

Organize around tasks:

- Prototyping
- Building Levels
- Animating
- Asset Creation

How to Organize your Code Library?

Organize around game structure:

- Game Pieces
- Core Loop
- Meta Loop
- Accompanying Systems

How to Organize your Code Library?

Organize around type:

- Managers
- Controllers
- Effects
- Sequences

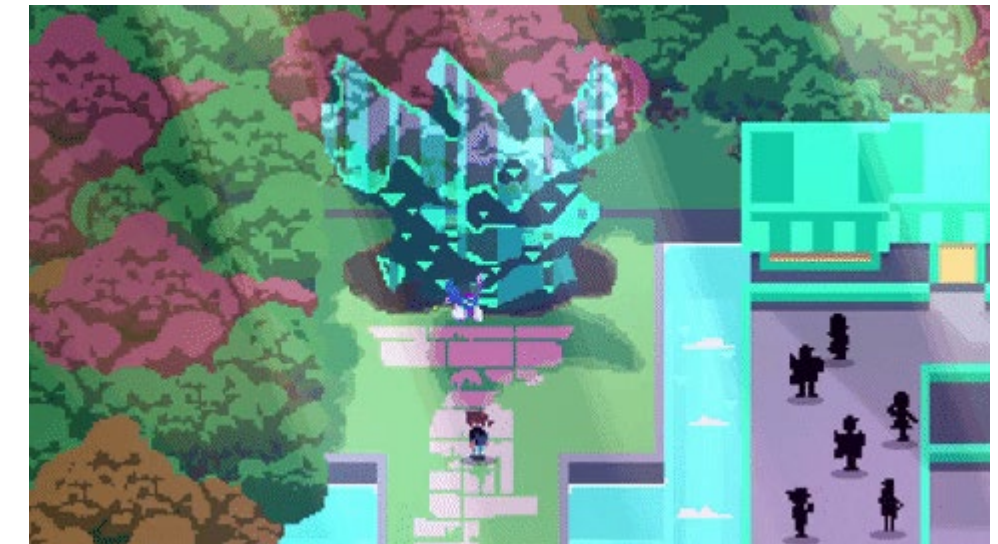
Time for some examples

Time for some examples



MIDAUTUMN

- A roguelite about blasting evil spirits
- With a persistent narrative about Asian diaspora culture
- Kickstarter later this year: bit.ly/midautumn_KS



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Example #1 - Making a Sound Effects Controller reusable between projects

Making a script reusable between projects

BlackCurrent SFXController

- List of Audio Clips
- Basic Play Method
 - Volume
 - Pitch
- Play Random...
 - Footsteps
 - Dialogue Blips
 - Attack Sounds
 - UI Click
- Singleton



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Quick Aside: Singletons

Singletons describe class that is:

- Globally Accessible
- Can only be instantiated once

They're especially great for when you need something that:

- is easily accessed from a lot of different scripts
- only needs to exist once
- **Doesn't need a lot of setup**

Warning: You probably don't want anything in your code library to reference a different script, singletons included

Making a script reusable between projects

BlackCurrent SFXController

- List of Audio Clips
- Basic Play Method
 - Volume
 - Pitch
- Play Random...
 - Footsteps
 - Dialogue Blips
 - Attack Sounds
 - UI Click
- Singleton

```
Play(SFXType.Attack0)
```

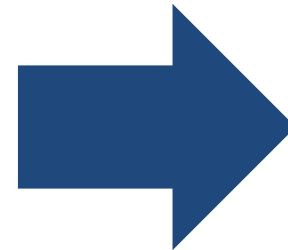
```
Play(SFXType.Click, volume: 0.5f)
```

```
PlayRandomFootstep()
```

Making a script reusable between projects

BlackCurrent SFXController

- List of Audio Clips
- Basic Play Method
 - Volume
 - Pitch
- Play Random...
 - ~~◦ Footsteps~~
 - ~~◦ Dialogue Blips~~
 - ~~◦ Attack Sounds~~
 - ~~◦ UI Click~~



SoundEffectsController

- List of Audio Clips
- Basic Play Method
 - Volume
 - Pitch
 - Semitones
 - optionally takes a custom Audio Clip
- Play Random
 - takes a list of Audio Clips



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Making a script reusable between projects

SoundEffectsController

- List of Audio Clips
- Basic Play Method
 - Volume
 - Pitch
 - Semitones
 - optionally takes a custom Audio Clip
- Play Random
 - takes a list of Audio Clips

```
Play(SFXType.Confirm)
```

```
PlayRandom(Player.footstepClips)
```

```
Play(Player.attackClip, semitones:3)
```



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Example #2 - Extending the same dialogue system for two different genres

Extending the same script for different genres



Speech Bubbles



Dialogue Boxes
+ Character Portraits

Extending the same script for different genres

DialogueLine

- line
 - string
 - technically "Localized string"
- actor
 - Actor

Actor

- name
 - string
- Unique ID
 - string
 - super useful

StoryBeat

- lines
 - DialogueLine list
- Unique ID
 - string

Extending the same script for different genres



BlackCurrent

- Dialogue occurs parallel to gameplay
- Authored dialogue events
- 3D Characters can move, and play animations
- Speech bubbles appear over the character who is speaking

Extending the same script for different genres

DialogueLine

- line
- actor
 - CharacterData
- animation
- display Time

CharacterData

- name
- Unique ID
- characterObject
- associated Color
- non-dialogue related data for characters

StoryBeat

- lines
- Unique ID
- auto advance
- freeze player
- use letterbox



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Extending the same script for different genres



Midautumn

- Dialogue drives gameplay progression
- Procedural dialogue pool
- Dialogue box is in a fixed position
- 2D characters stand in one position
- Characters have portraits

Extending the same script for different genres

DialogueLine

- line
- actor
- portrait index

Actor

- name
- Unique ID
- nickname
- associated Color
- default Location
- actor Portraits

StoryBeat

- lines
- Unique ID
- associated Actor
- priority
- location
- Beats to unlock
- Beats to disable
- prerequisite Beats
- concurrent Beats



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Example #3 - Extending a generic Enemy Controller to add variety fast

Extending a generic script to add variety fast



EnemyController

Full of **Virtual** methods

- can be overridden by child classes
- Has a default behavior
- Does not HAVE to be overridden



Extending a generic script to add variety fast



EnemyController

Full of **Virtual** methods:

- Awake
- Setup
- OnSpawn
- ChooseNextState
- EnemyBehaviorUpdate
- Attack
- TakeDamage
- OnDie



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Extending a generic script to add variety fast



EnemyController

Add game-specific functionality

- PlayVFX
- MeleeAttack
- GetEnemyTag
- ShowPopup
- UpdateHealthBar
- OnDialogueEnd



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Extending a generic script to add variety fast



MeleeEnemyController

Overrides:

- Attack

New Enemy Tag

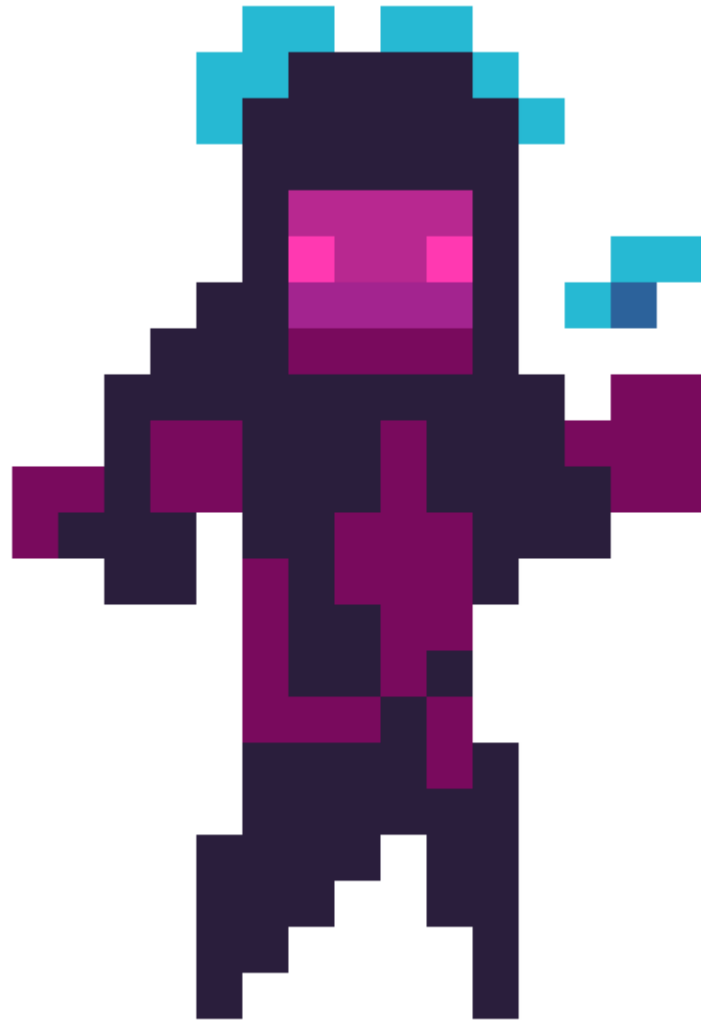
- "Melee"
- "Ranged"



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Extending a generic script to add variety fast



RadialAttackEnemyController

Overrides:

- Attack

Extending a generic script to add variety fast



ShieldedEnemyController

Overrides:

- Setup
- Update
- TakeDamage

New Enemy Tag

- "Shielded"

New Virtual Methods:

- TakeShieldDamage
- OnShieldDeath

Extending a generic script to add variety fast



BossEnemyController #1

Overrides (ShieldedEnemy):

- ChooseNextBehavior
- Attack
- TakeDamage
- OnDie

New Enemy Tag

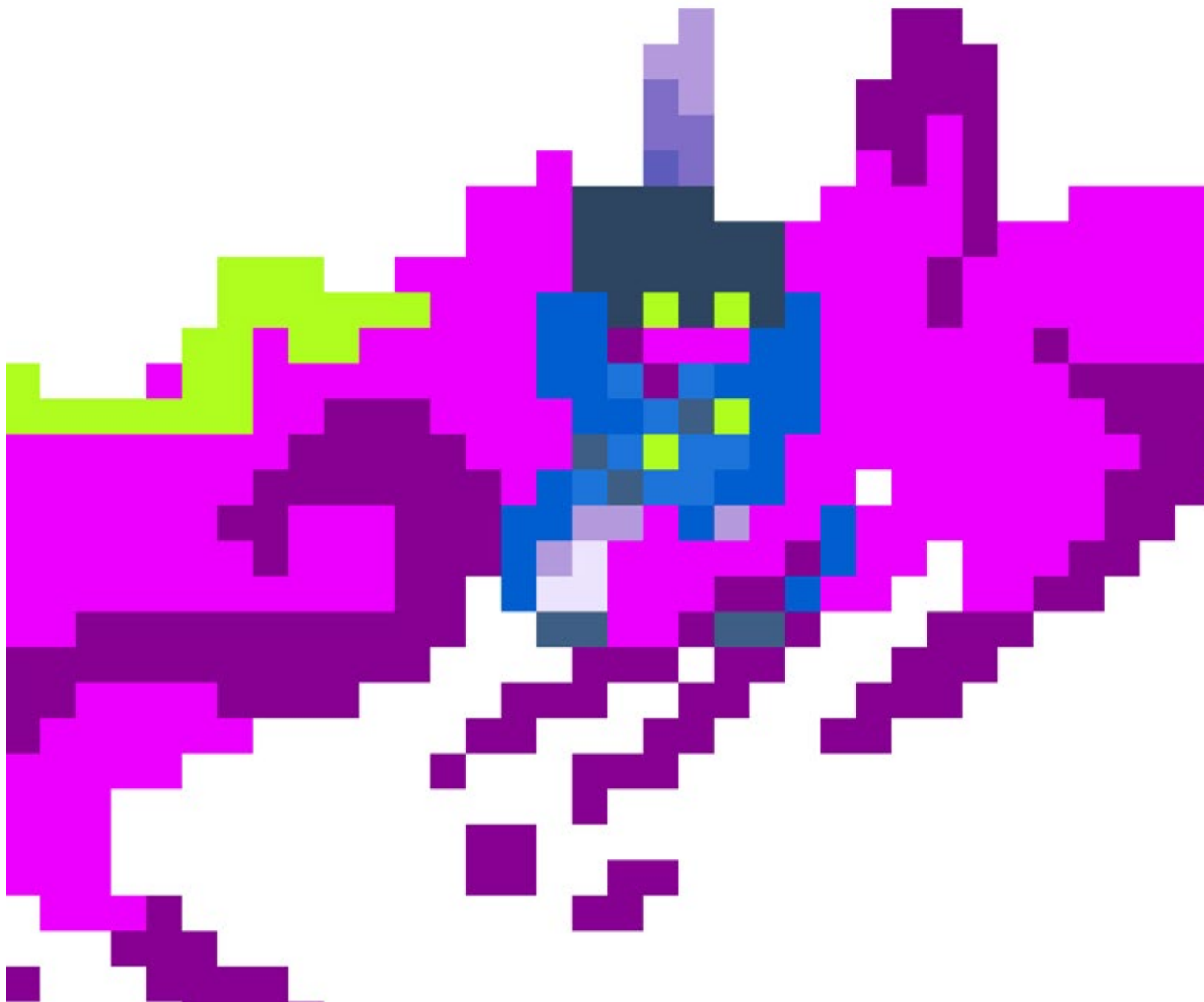
- "Boss"



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Extending a generic script to add variety fast

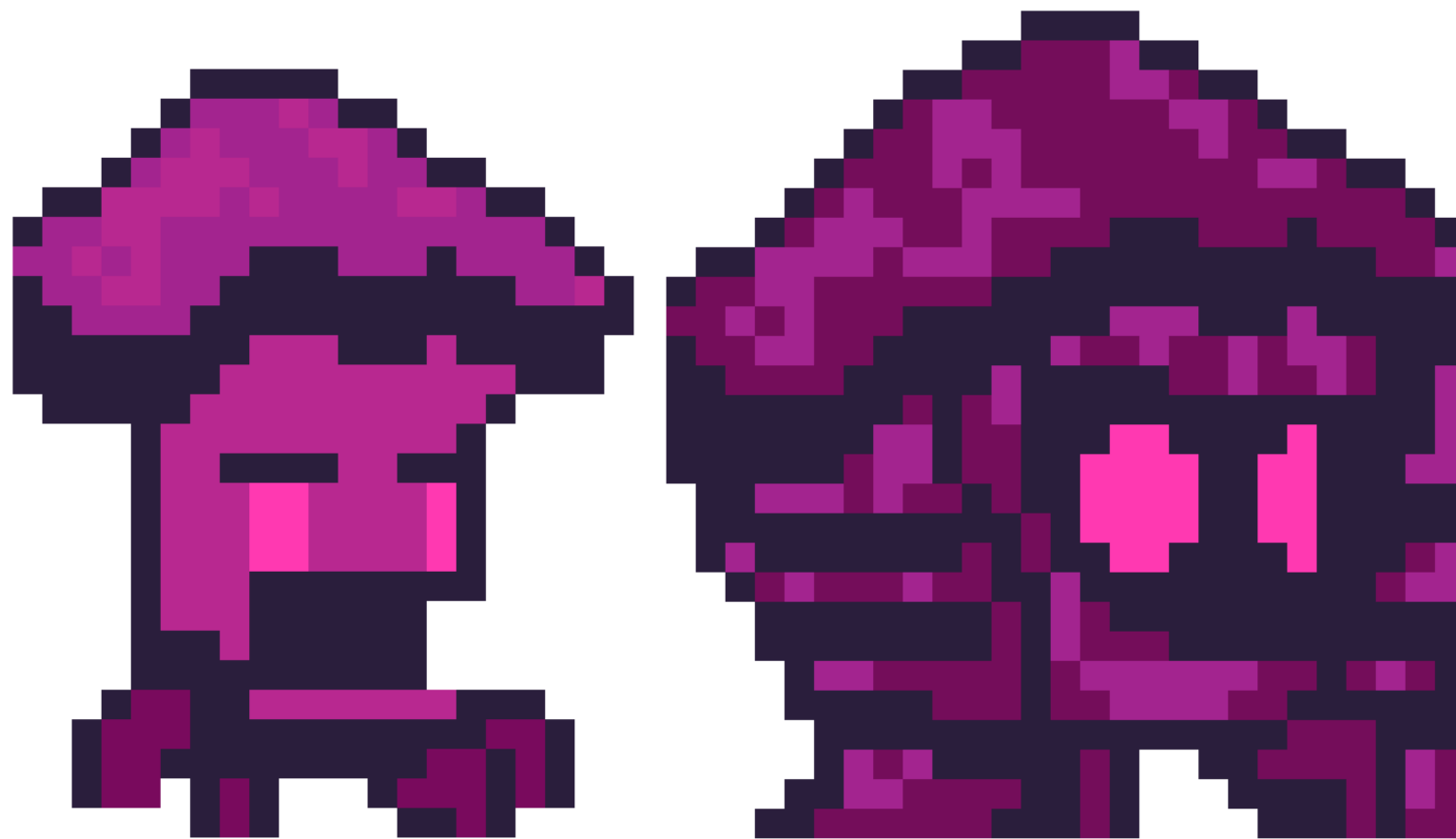


BossEnemyController #2

Overrides:

- Setup
- ChooseNextBehavior
- EnemyBehaviorUpdate
- TakeDamage
- OnDialogueEnd

Extending a generic script to add variety fast



EvolvingEnemyController

Overrides:

- EnemyBehaviorUpdate
- Attack

New Enemy Tag

- "Evolving"

New Virtual Methods:

- OnEvolve
- OnDevolve

Extending a generic script to add variety fast



ToxicEnemyController

Overrides:

- Awake
- Update
- Attack

New Enemy Tag

- "Toxic"

How did repurposing code help?



Rapid Prototyping

- Working on my own IP while still meeting 40 hrs a week with contracts
- Investing less time and effort per prototype
- Making the Unity Engine more comfortable to work in

Sharing Builds

- builds were self playable after a week or two
- had more time to work on debug features
- could send a build to someone with little to no instruction

Targeting Accessibility

- Accessibility Features are much easier to implement when you're targeting them from the start of a project
- Control remapping
- Color blind testing
- High contrast mode
- More settings functionality

Increasing Scope

- Spend more time on design, art and narrative and less on implementation
- Able to experiment and iterate on high priority features
- Could use pre-existing dev tools to speed up content pipeline

Helping Out

- Easy to share a sample library: bit.ly/GDCCodeLibrary
- Can more readily provide samples or resources when people ask
- Have reference of working systems when bug fixing on other projects



**REINVENTING
THE WHEEL**



**MAKING
YOUR GAME
100% WHEEL**



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A game is some assemblage of WHEELS??



Game
(lots of wheels, also sharks)

Growing Your Code Library With Each New Project

Thank you for listening!

Sherveen Uduwana
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