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March 21-25, 2022 San Francisco, CA

Figuring Out How Things Work in an **Unfamiliar Codebase**





About Molly Jameson





Overview

- 1. Assumptions and motivations
- 2. Tips on exploring codebases on your own
- 3. When and how to approach asking for help
- 4. Forming a big picture mental model

' own or help



Assumptions

12 // [TODO] Write docs. 13 // ticket: JIRA-002





Story time What I got out of this

interaction:

Molly For reference: Line 563 of Weapon.cpp

What the intern got out of this interaction:





Most important rule

- Don't be an arrogant a**hole
- When you see something "strange" in a new codebase, don't assume the code is just bad
- Do keep an open mind



Frequent but irrelevant advice

"If you don't know something, just ask."



Exploring a Problem



Image CC: https://pixabay.com/photos/cat-carrier-cat-backpack-pet-6939688/

GDC

Step 0

- Play with the editor and game
- Focus on a small task first



Good first tasks

- Mostly additive
- Bite sized
- •"Nice to haves"





Example Starter Task



// TODO: This should be configurable per harvestable, not hardcoded. constexpr float RECHARGE_TIME_DAYS = 1.f;



Start with Data

How to actually learn any new programming concept



O RLY?

@ThePracticalDev

Image CC: https://github.com/thepracticaldev/orly-full-res/blob/master/changinstuff-big.png



Look at Logs

- Scan for relevant text
- Modify verbosity and channels



Use Grep/Find in Files

ubuntu@MollyPC:~\$ grep -Hn HarvestableAmount -r ./*.cfg ./ContrivedGDCExample.cfg:4:HarvestableAmount: 2











Set breakpoints and inspect

Ca	Call Stack						
	Name						
0	Void GameOverState:FinishRun ()+0x1 at D:\SideProjects\UnityRunnerExample\UnityRunnerEx						
	Void GameOverState:Exit (AState)+0x14 at D:\SideProjects\UnityRunnerExample\UnityRunnerE						
	Void GameManager:SwitchState (String)+0x41 at D:\SideProjects\UnityRunnerExample\UnityR						
	Void GameOverState:RunAgain ()+0x19 at D:\SideProjects\UnityRunnerExample\UnityRunnerE						
	Void UnityEngine.Events.InvokableCall:Invoke ()+0x16 at :-1						
	Void UnityEngine.Events.UnityEvent:Invoke ()+0x23 at :-1						
	Void UnityEngine.UI.Button:Press ()+0x2d at C:\Program Files\Unity\Hub\Editor\2019.4.17f1\Editor						
	Void UnityEngine.UI.Button:OnPointerClick (PointerEventData)+0x11 at C:\Program Files\Unity						
	Void UnityEngine.EventSystems.ExecuteEvents:Execute (IPointerClickHandler, BaseEventData)+						
	Boolean UnityEngine.EventSystems.ExecuteEvents:Execute (GameObject, BaseEventData, Event						
	Void UnityEngine.EventSystems.StandaloneInputModule:ReleaseMouse (PointerEventData, Gar						

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GameObjec	C#



Tracepoints and Conditional Breakpoints

190		
191	⇒ m_Foo++;	
	Location: LootTable.cpp, Line: 191, Must match source	ce
	Conditions	
	Actions	
	Show a message in the Output Window:	\$FUNCTION: For
	Continue code execution	
	Close	
192		





Thread pulling adventure





Back out of rabbit holes you've fallen into



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Take notes as you step through







Explore the debug menu

15	Display Hrcnetype	
ĥ	Display Knowledge Rays	
	Display State	
1	Display Skill	
2	Display Health	
l	Display Zone	
P	Display Cover Rating	
	Display Cover Status	
8	Display Has Been Shot At	
i.	Display Influence Map	
2	Display Influence Map Weights	
4	Influence Map Weight Cull Dist	50.0
	Display Progress Spline	
2	Display Distance to Target	
i.	Display Water Ripple	
Ľ	Display Wetness	
	Display Sound Info	
	Display NPC Active Count	

Display

shambhalansham couctuard-pre-combat is Active!

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BuddyIdleSkillFPS: 31.8 BuddyFollowDrakeSkilES.2 BuddyOpenCombatSkill BuddyCoverSkill PatrolSkill GrenadeAvoidanceSkill NpcMeleeCombatSkill ScriptSkill-

100000 V DebugDecks (1/1) • S Monu Game Help

No current game

Wall Time Scale (CTRL-KP_MINUS) +Wall Time Scale (CTRL-KP_PLUS) Toggle Debug Give All Cards (CTRL-SHIFT-C) Widget Tracer (CTRL-I) UI Freeze (CTRL-SHIFT-ENTER) Save Inspector (E4) leck inspector (F3) iicksave (FS) Juickload (F9) Juickload Auto (CTRL-F9) enerate PO Template (F10) Switch between touch and mouse input modes (CTRL-P) eload Conversations (ALT-C) Give Money (CTRL-M) oggie Battle Auto-Resolve (CTRL-SHIFT-A) Toggle Console (CTRL-TILDE) loggle Debug Render (CTRL-BACKSPACE) Create Inspector Panel (SHIFT-TILDE) loggle Inspector Panel (TILDE) Toggle Hud Visibility (CTRL-H) Toggle Hud Panel (CTRL-SHIFT-H) Inspect Character Skins (CTRL-SHIFT-S) Profiler Save (CTRI-BACKSI ASH) Execute 'nil' (CTRL-0) Reload Game (CTRL-R) Reload Shaders (GTRE-G) Toggle Trace Allocs (CTRL-SHIFT-T) Engine Warning **BGFX Stats (CTRL-8)** Quick Switcher (CTRL-T)

Essing Inspect Audio (CTRL-A) Inspect FightTester (CTRL-SHIFT-F) Inspect Tuning (CTRL-SHIFT-T) Impect UI (CTRL-SHIFT-BACKSPACE) Inspect Quests (CTRL-Q) Inspect Factions (CTRL-F) Inspect Lister (CTilL-L)-Inspect Negotiation Cards (CTRL-NUM_1) Inspect Battle Cards (CTRL-NUM_2) Inspect Icons (CTFIL-NUM_3) Inspect Argument Sounds (CTRL-NUM_4) Inspect Mods (CTRL-NUM_5)

autosave





Asking For Help



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Image CC: https://pixabay.com/photos/cat-speech-bubble-question-mark-pet-5755815/

Goals for asking

- Not take up too much time of the person you're 1. going to ask
- Not waste an excessive amount of your own time 2. unnecessarily





Before asking

- 1. Clearly state what you are trying to do
- 2. Establish a good list of what to you already tried
- 3. Timebox how long to spend before asking
- 4. Prefer questions that will give you the tools to debug problem yourself

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Who to ask

Check source control "blame" for suspect files and lines



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While asking





After asking

- Take notes on your recent TIL (Today, I learned...)
- "TIL... Animals are implemented by the class named FurnitureItem"
- "TIL... clicking F2 makes the avatar fly and testing way faster"



Forming A Big Mental Model





Image CC: https://commons.wikimedia.org/wiki/File:Cat_sitting_on_a_puzzle.jpg



Modular Black Boxes





Code reviews

- Spy on other people's reviews
- Ask for code reviews



Connect familiar terms

Quick Glossary

The following section contains common Unity terms on the left and their UE4 equivalents (or rough equivalent) on the right. UE4 keywords link directly to more in-depth information inside Unreal Engine's Online Documentation.

Category	Unity	UE4
Gameplay Types	Component	<u>Component</u>
	GameObject	<u>Actor, Pawn</u>
	Prefab	<u>Blueprint Class</u>
Editor UI	Hierarchy Panel	<u>World Outliner</u>
	Inspector	<u>Details Panel</u>
	Project Browser	<u>Content Browser</u>





Common Game Programming Paradigms

- Entity (
- Events
- State I
- Singlet
- And Me

 Adapto Game Programming Patterns



Robert Nystrom





Formal or Informal Diagrams





Write docs for the next person Reinforce what you've learned and help the

 Reinforce what you've learned and hel organization

Submit Changelist: default (molly_

Write a changelist description

[JIRA-002][docs] Added more comments about harvestables





Takeaways

- Keep an open mind
- Start with data, start small
- Ask targeted questions
- Don't worry about learning everything at once

Contact: @UltraRat, www.MollyJameson.com

