

PRESS A FOR ASSISTANCE

Making Games Accessible With AI

Veronica Reingold and Steven Rice





Genshin Impact - miHoYo

Lv. 20

3551 / 3771

E Q
UID: 600023101

3



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Recently Unlocked

Fatui Skirmisher - Pyroslinger Bracer

Fatui Skirmisher - Electrohammer Vanguard

Fatui Skirmisher - Geochanter Bracer

Warming Seelie

Scarlet Quartz

Ancient Rime

Subzero Climate...

Elemental Reaction: Bloom



Fatui Skirmisher - Pyroslinger Bracer

Fatui Skirmishers that shoot Pyro projectiles in battle. They receive some kind of elemental buff. Perhaps using an element that reacts with Pyro could make quick work of their buff.

Previous



Next



r/Genshin_Impact • 2 yr. ago

Expensive-Session152



Do i need to read this?

Guides & Tips

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Recently Unlocked

- Fatui Skirmisher - Pyroslinger Bracer
- Fatui Skirmisher - Electrohammer Vanguard
- Fatui Skirmisher - Geochanter Bracer
- Warming Seelie
- Scarlet Quartz
- Ancient Rime
- Subzero Climate...
- Elemental Reaction: Bloom

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X



Fatui Skirmisher - Pyroslinger Bracer

Fatui Skirmishers that shoot Pyro projectiles in battle. They receive some kind of elemental buff. Perhaps using an element that reacts with Pyro could make quick work of them.

Previous

Next

UID: 896534789

I'm new. I'm too lazy to read. Do I need to read all of this?

Created
Used to Obtain
Used to Create

Used to Manufacture
Alternative Method
Produces
Drops

Minecraft Production Web

Zone_Control
FugiATX
bubodui
Version 1.6
For Minecraft version
1.8.1



PRESS A FOR ASSISTANCE

Making Games Accessible With AI

A portrait of a young woman with long, straight, light brown hair, blue eyes, and a gentle smile. She is wearing a white ribbed sweater and a small, gold-colored pendant necklace.

Veronica Reingold

“Nonika”



MSc in Computer Science
University of Windsor

Researching Accessibility
Vector Scholarship in AI



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Steven Rice

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Robotics
Simulations
Artificial Intelligence

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Terminology

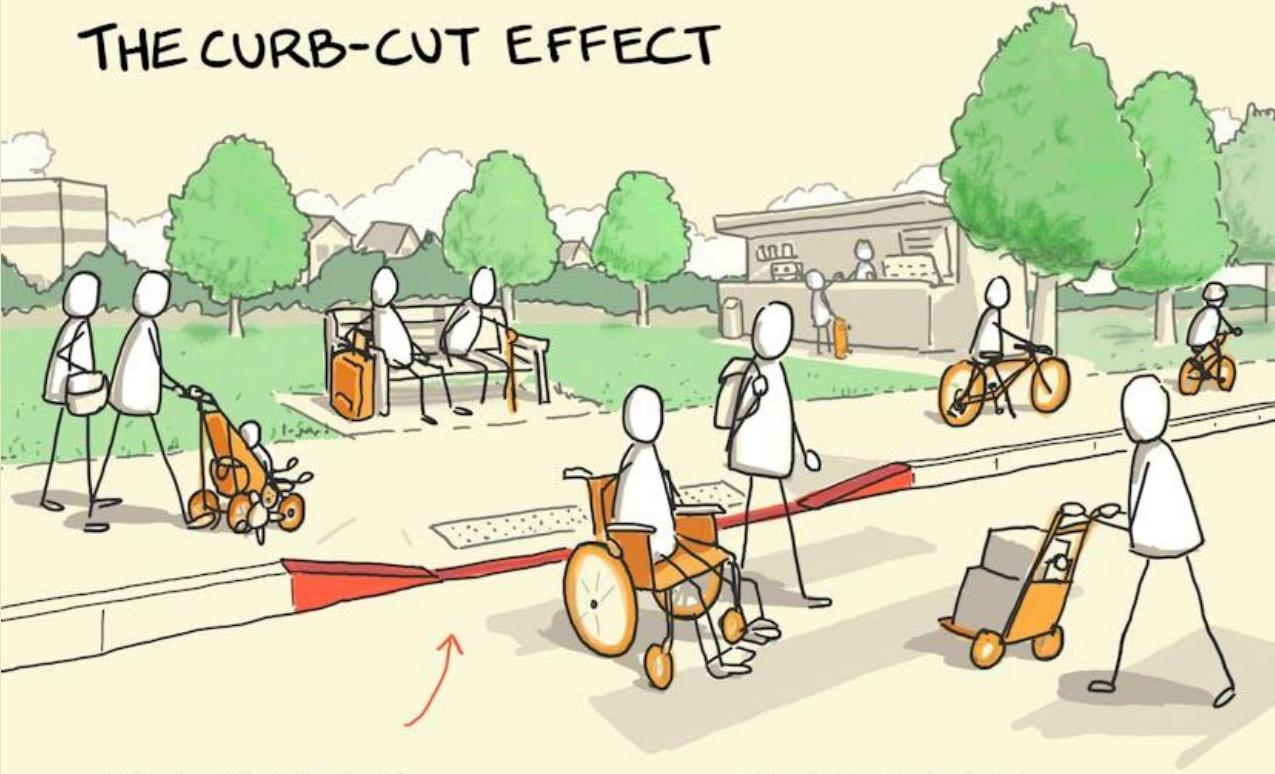
1. Accessibility accommodations for individuals with disabilities
2. Approachability early game: tutorials and communities
3. Learnability late game: tutorials and mastery
4. Difficulty game challenge and personal skills
5. User Experience effectiveness of game, HUD, and UI



Curb-Cut Effect

Originally made for wheelchair users, curb cuts are a fantastic example of how accessibility features benefit all users!

THE CURB-CUT EFFECT



WHEN WE DESIGN
FOR DISABILITIES

... WE MAKE THINGS
BETTER FOR EVERYONE

Myth:

Accessibility options make games easier.

Fact:

Accessibility options remove barriers without impacting difficulty.

“ Elevators make it too easy to get to the 12th floor. - Nobody

Guidelines

Video games feature an incredible diversity of genres, styles, difficulties, audiences, and game loops.

There's no one-size-fits-all standard to accessibility and user experience!

In real life

stairs → install ramp or elevator

In a game

??? → ?????

Guidelines

Keywords: Game accessibility, user experience, approachability, learnability, tutorials, etc.

Accessibility:

gameaccessibilityguidelines.com

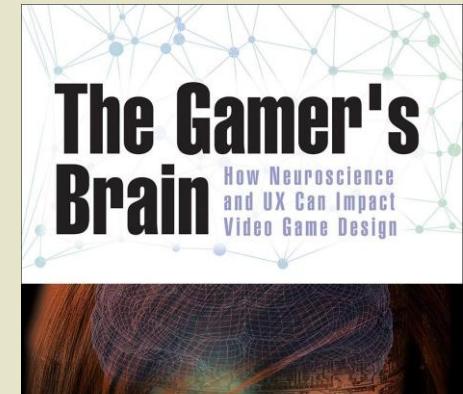
accessible.games/accessible-player-experiences

caniplaythat.com

Games User Experience:

gamesur.com

thegamersbrain.com



Celia Hodent

Foreword by Brenda Romero

CRC Press
Taylor & Francis Group

Guidelines

Guidelines are grouped by disability for our convenience!

Our focus today is on cognitive accessibility and assistance—things that impact both disabled and non-disabled gamers!

The image displays four mobile phone screens, each showing a different guide from the CIPT (Can I Play That?) website. The guides are:

- Blind and Low-Vision Accessibility**: Features a large eye icon. Published on January 18, 2020, by Christy Smith, 9 minute read.
- Cognitive Accessibility**: Features a brain icon. Published on September 12, 2019, by Ruth Cassidy, 3 minute read.
- Deaf/Hard of Hearing Accessibility**: Features a stylized ear icon. Published on July 11, 2019, by Can I Play That?, 2 minute read.
- Motor/Physical Accessibility**: Features a person icon. Published on July 4, 2019, by Can I Play That?, 4 minute read.

Each screen has a purple header with the CIPT logo and "CAN I PLAY THAT? GUIDE". Below the header, the specific guide title is displayed with its corresponding icon. The main content area contains the guide's title, a brief description, and publication details.

Perception



Attention



1:26

ATTACK OBJECTIVE A

HEX
SUPERBLYAT
SUPERBLYAT
SOLD



111,200

Overwatch - Blizzard Entertainment

18

Learning



TUTORIAL

SECRET missions



Stand on the glowing point nearby
and adjust your viewing angle to
line up the pattern correctly.
This will let you access this
area's secret mission.





07
01
00

Cricket's Head
+0.5 Damage up
+50% Damage
Multiplier

Red Patch
Chance to get +1.8
Damage up when getting
hit

COLLECTIBLES

- 2 of Spades
- Duplicate your keys

TRINKETS

- Speed Up
- +0.15 Speed up

CARDS

PILLS





[Main Page](#)[Talk](#)[Read](#)[View source](#)[View history](#)[More](#) ▾[Search Minecraft](#)[Minecraft](#)[Movie](#)[Dungeons](#)[Legends](#)[Story Mode](#)

Chase the Skies

- Locator Bar
- Happy Ghast
- Vibrant Visuals [BE]



Java Edition 1.21.8

Bedrock Edition 1.21.101

The Copper Age (upcoming)

- Copper Golem
- Copper expansion
- Shelf



Java Edition 1.21.9 (25w37a)

Bedrock Edition 1.21.110 (Preview 1.21.120.21)

Latest versions



Trading



Brewing



Enchanting



Mobs



Blocks



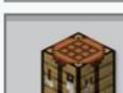
Items



Biomes



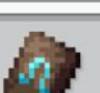
Effects



Crafting



Smelting



Smithing



Structures



Redstone



Commands



History



Tutorials



Welcome to the most comprehensive
proudly community-run since 2009. A

14,984 articles • 140,425



Did you know...

- ... that [planks](#) were added before
- ... that the orange [terracotta](#) symbols [pyramids](#) resemble the [Ankh](#), the
- ... that bone meal can be used on [coral](#) and [coral fans](#)?

More f

Help improve the wiki

The wiki is made by people like you. You could be improved on a page just click

23

Useful pages

[Minecraft Wiki Page](#)

Trading

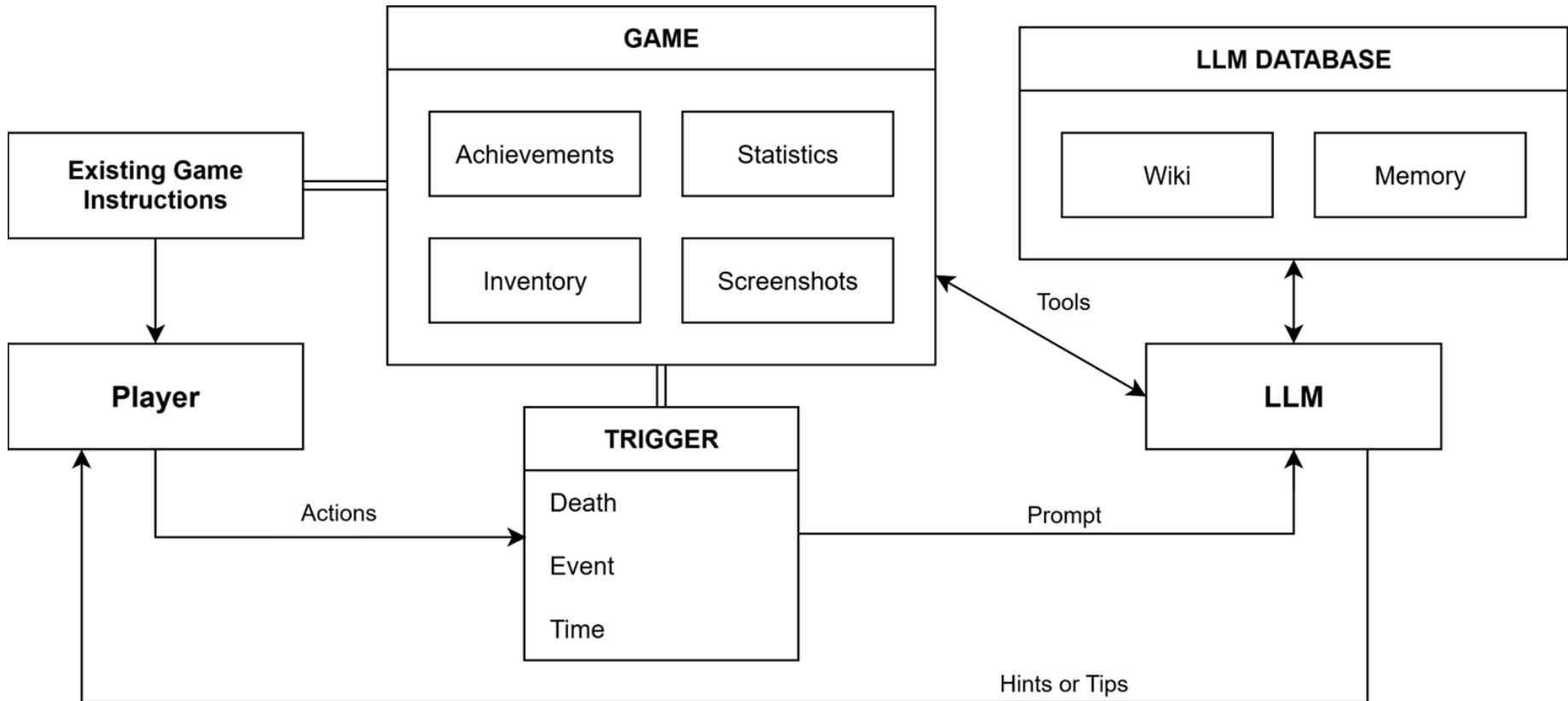
Brewing

AI Assistance

Large Language Models
(LLMs) are great at
summarizing!

Can we use LLMs to search
the web and game wikis to
provide contextual
assistance to players?





Game

Achievements

- Items unlocked
 - Mechanics mastered
 - Monsters killed

Statistics

- Kills, deaths, items, etc.

Inventory

- Equipped or in storage

Screenshots



LLM Database

Tutorial/Wiki:

- Items
- Mechanics
- Enemies
- Tips

Memory:

- Enemies encountered
- Resources acquired
- Game/player state save



Trigger

Event:

- Taking damage
- Nature/monster effect

Death:

- One or more causes

Time:

- Time of day
- Additional calls via timer

Manual

Nonika Getting Bones to Tame Wolves - Minecraft



LLM Tools

Read (Text/Image)

Database:

- Game tutorial
- Wiki
- Memory

Game State:

- Achievements
- Statistics
- Inventory

LLM Tools

Write

Print message to HUD

- Memory
- Attention

Highlight Item/Creature/etc.

- Perception
- Attention
- “Show, don’t tell”

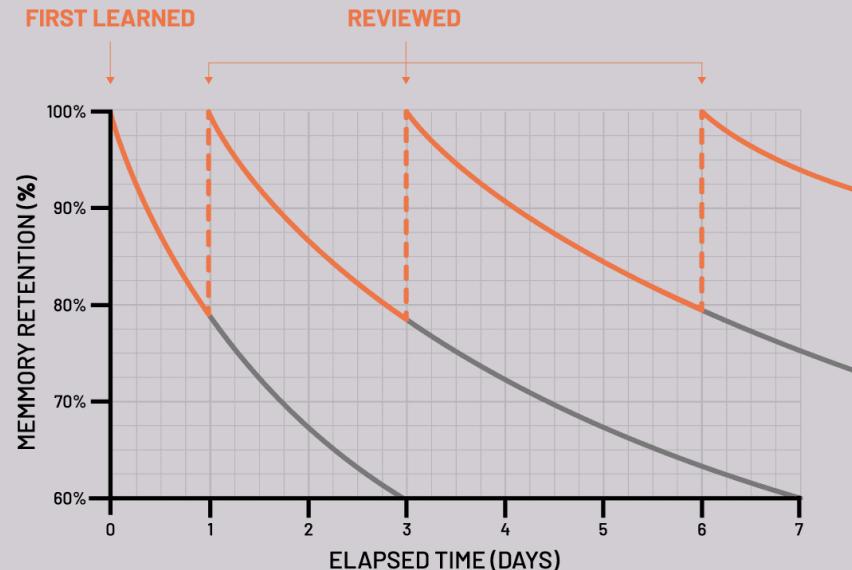


Considerations

- Memory allocation
- Developer and player control
- Consistency

How can we get consistent, predictable assistance in a constantly-changing environment?

Spaced Repetition



LifeHack

+

Arrow hits
Skeleton shoots
Player hurts
< Footsteps



Considerations



1. Players get distracted easily (attention)
2. Players forget things due to those distractions (memory)
3. Players' goals change constantly

Remember—players need to learn from trial and error:

- Support player with their main goal
- Provide a consistent tip to achieve the main goal
- Track player progress
- Reevaluate tip depending on progress

What can we use to implement this?

Goal-Oriented Action Planning

Goals → What the player is/should be trying to achieve

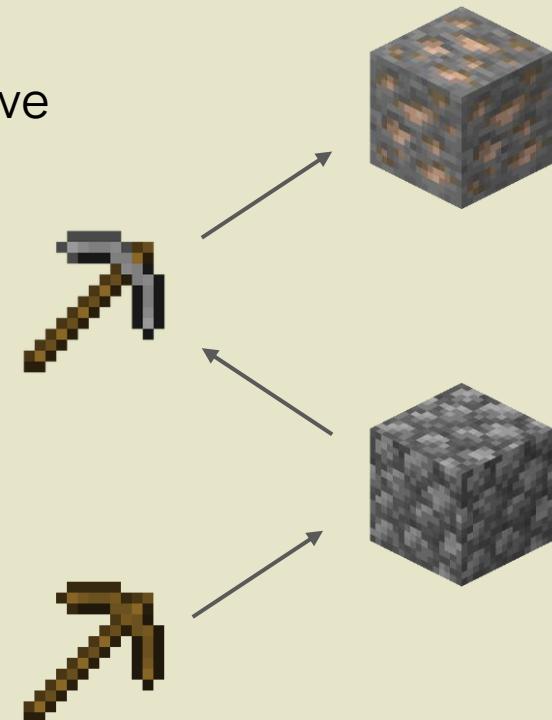
- Determined by the LLM
- Have weights or desires to achieve them

Actions → What the player can perform

- Costs associated

Planning → Potential action path to achieve goal

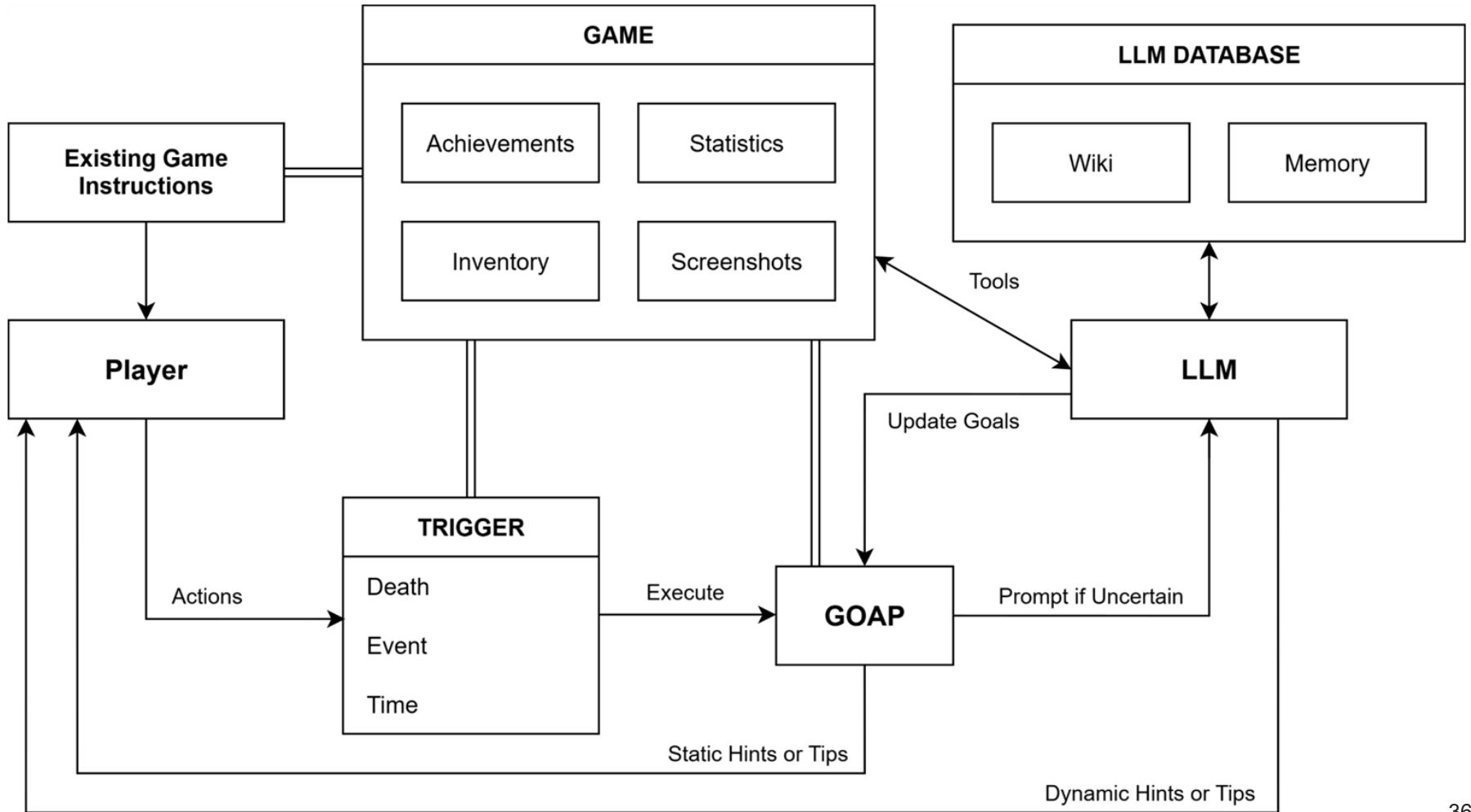
- Prioritize lowest cost path/steps
- Reevaluate if player is struggling



Goal-Oriented Action Planning

Is the player making progress towards our given objective?

- **Yes** → Hints on next steps as needed
 - Save plan for future repetition
- **No** → Determine a new objective and plan
 - Was the LLM wrong?
 - Did the player change objectives?
 - Is the current plan/tip not successful/helpful?



Pros and Cons

Pros

- More consistent
 - Less hallucinations
- Less resources
- Control over assistance

Cons

- Quantifying goals - can this always be done?
- More coding



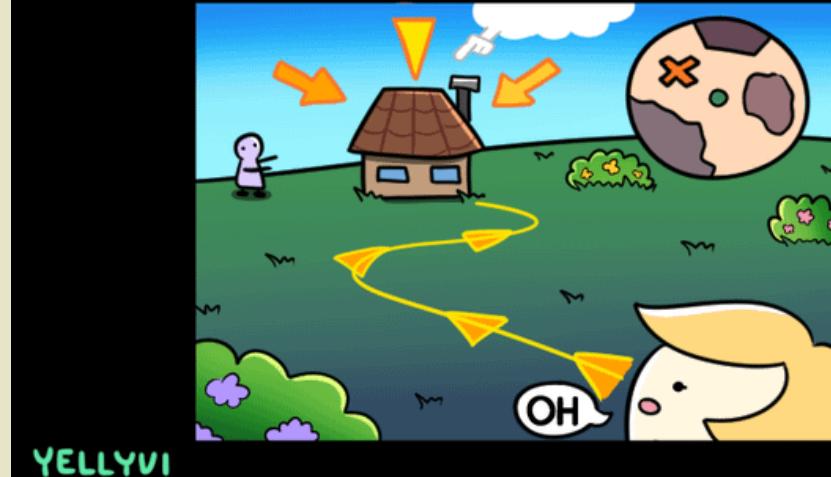
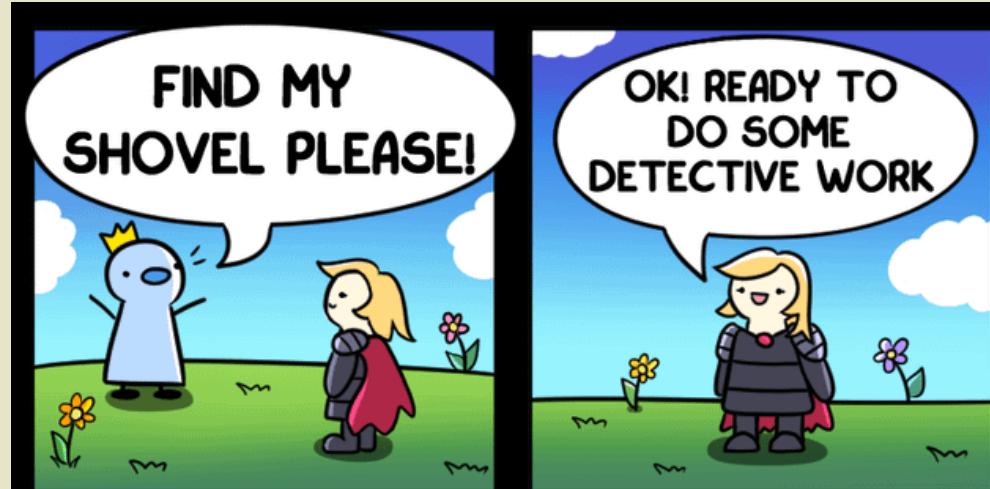
Complete minigames by either tapping the prompt button rapidly or holding it down.

Identifying Stairs

How can you identify cognitive stairs in your game?

- The “challenges”?

A consequence of the fun parts of your game!



Identifying Stairs

Fun parts:

- Rich story
- Complex mechanics and items
- Gorgeous world to explore
- Farming and crafting

Cognitive consequences:

- Too much to remember
- Overwhelmed by options
- A lot to keep track of

Pov: you and your friend went exploring and can't find your way home



Xaero's Minimap



[Xaero's Minimap - Curseforge](#)

66, 1985



3365, 63, 2066





OPTIONS

REDUCE BUFFERING



OFF



DISPLAY PERFORMANCE STATS



OFF



ADVANCED PERFORMANCE STATS



DISPLAY SYSTEM CLOCK



OFF



LIMIT FPS

DISPLAY-BASED



GRAPHICS QUALITY

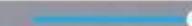
HIGH



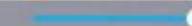
ADVANCED



GAMMA CORRECTION



CONTRAST



BRIGHTNESS



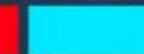
COLOR BLIND OPTIONS



ENEMY



FRIENDLY



GROUP



ALERT



COLOR BLIND MODE



OFF



COLOR BLIND STRENGTH



1:45 ESCORT THE PAYLOAD

5 PLAYER KILL STREAK!



ESCAPE

ELIMINATED MRSHYBOT2006 37

ELIMINATED MCPOLLINGER 100

0%

TIMER

7 / 200

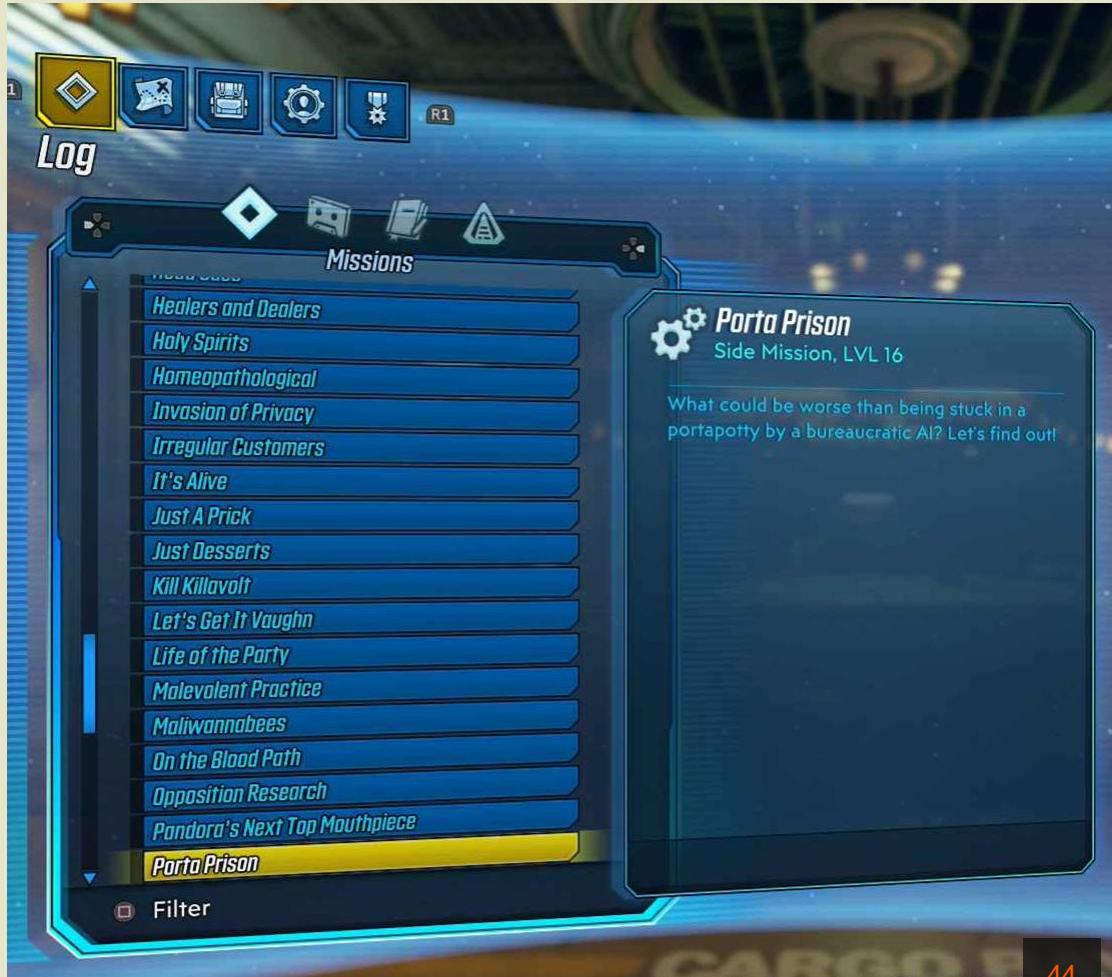


13 / 25

IRONWOLF230			MRSHYBOT2006
SHEFFIELDJOE			MCPOLLINGER
SHEFFIELDJOE			PYROMASTER999
SHEFFIELDJOE			REKANANTERMAN
SHEFFIELDJOE			VENDOBONANZAF

Traditional AI

- Guide main versus side quests
- Planner system suggests side quests before a new main quest
 - Quests along path
 - Time investment
 - Difficulty
 - Rewards



Generative AI

- Recap the story so far
- Summarize current task
- Item suggestions:
 - Strength
 - Comparison
 - Playstyle
 - Preference

←  r/borderlands3 • 3 yr. ago
Enermis

I don't understand how to compare weapons

[Question] ?

I have 2 weapons which i'm trying to compare. From my naive understanding the right weapon in the screenshot should outperform the left one in pure damage. However when i get a headshot/critical with the left one i do over 500 damage on average. While the one on the right only crits for about 200.



The screenshot shows two weapon stats from Borderlands 3. On the left is the 'True Monocle' (Legendary, Lvl Req. 5) with an item score of 171. On the right is the 'Trick Muckamuck' (Rare, Lvl Req. 14) with an item score of 221. Both weapons are Jakobs brand.

Weapon	Item Score	Lvl Req.	Type
True Monocle	171	5	Legendary
Trick Muckamuck	221	14	Rare

True Monocle Stats:

- DAMAGE: 83
- ACCURACY: 99%
- HANDLING: 83%
- RELOAD TIME: 3.0s
- FIRE RATE: 1.12/s
- MAGAZINE SIZE: 4

Trick Muckamuck Stats:

- DAMAGE: 137
- ACCURACY: 94%
- HANDLING: 34%
- RELOAD TIME: 2.8s
- FIRE RATE: 1.01/s
- MAGAZINE SIZE: 6

True Monocle Abilities:

- One is enough.
- +74% Weapon Damage
- +15% Weapon Fire Rate
- +57% Weapon Accuracy
- 14.6x Weapon Zoom
- Critical Hits ricochet 1 bullet at the nearest enemy.

Trick Muckamuck Abilities:

- +21% Critical Hit Damage
- +25% Weapon Damage
- +19% Reload Speed
- 4.8x Weapon Zoom
- Critical Hits ricochet 1 bullet at the nearest enemy.

PRESS A FOR ASSISTANCE

Making Games Accessible With AI

Thank you for listening & stay tuned!



Nonika

nonika.ca



Steven

StevenRice.ca

