

Computational Game Creativity

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Presentation Outline

- **Position:** games are the killer application for computational creativity.

Presentation Outline

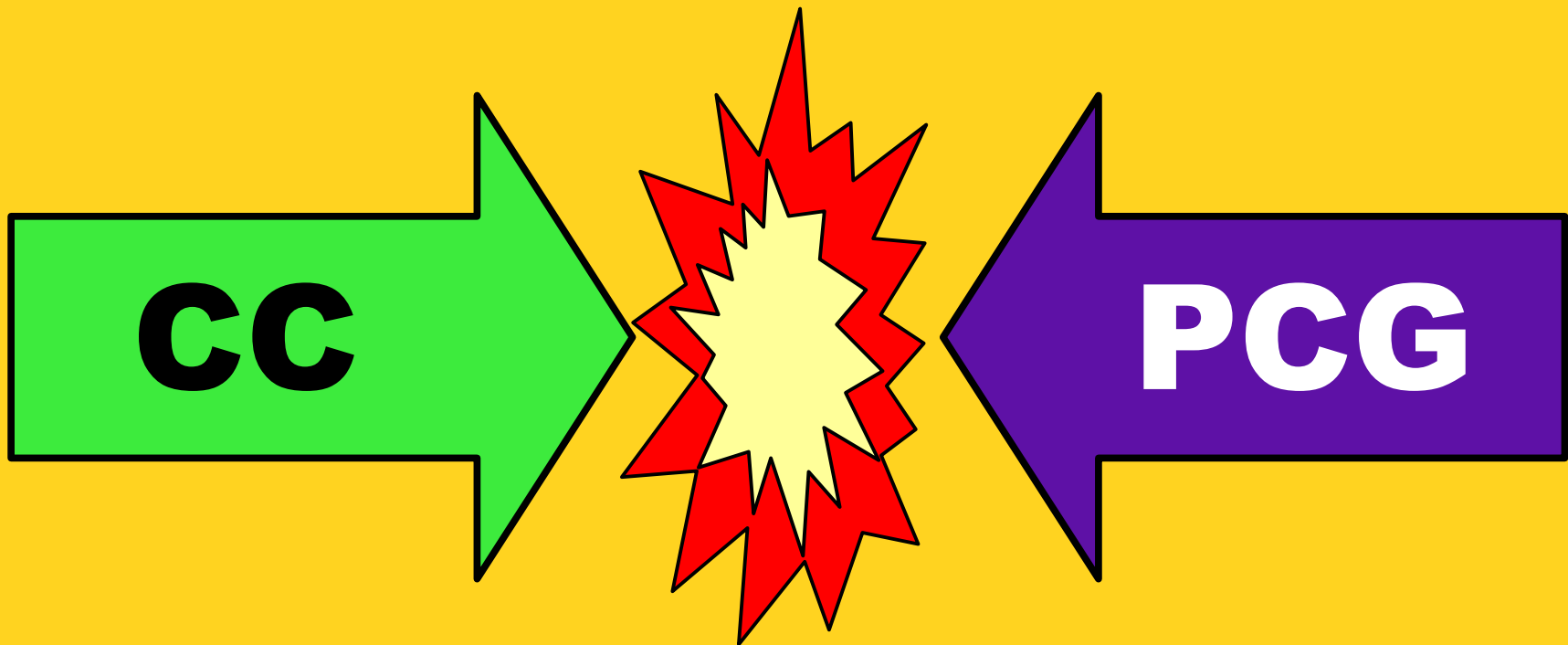
- **Position:** games are the killer application for computational creativity.
- **Contents:**
 - What makes games interesting?
 - Creative facets of games.
 - Synergies between facets: compound CC.
 - Open questions

What is CGC?

- The study of CC **within** and **for** digital games.
 - **FOR:** Games benefit as products from artifacts of CC.
 - **WITHIN:** Games as an ideal canvas for studying CC.

What is CGC?

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Why Games?

- Games are interactive.
- Games are multifaceted.
- Games actually *need* CC.
- Games are sexy.

Games are sexy

- Games are now **accessible** and **fashionable**.

Gamer
Geek
Chic

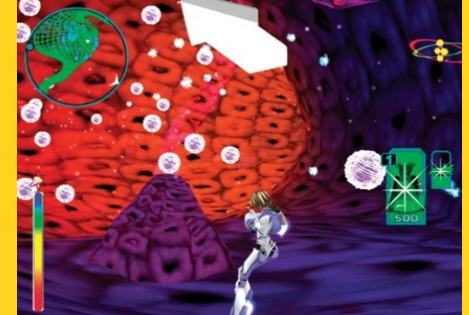
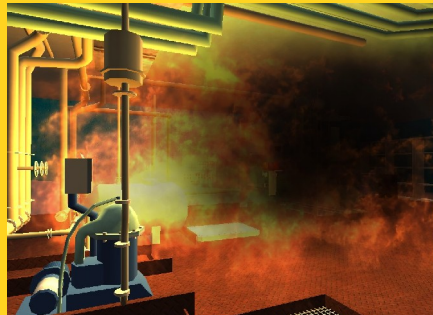


Games are sexy

- Games are now **accessible** and **fashionable**.
- Game **research** sought out.
 - Study lines, Conferences, Journals.

Games are sexy

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- Game **research** sought out.
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- Games for **societal change**.
 - Education/training, rehabilitation, awareness.



Games in need of CC

- PCG is a **commercial necessity**.
 - fast development cycles, replayability, retention.
- The game industry **proudly** displays its CC.

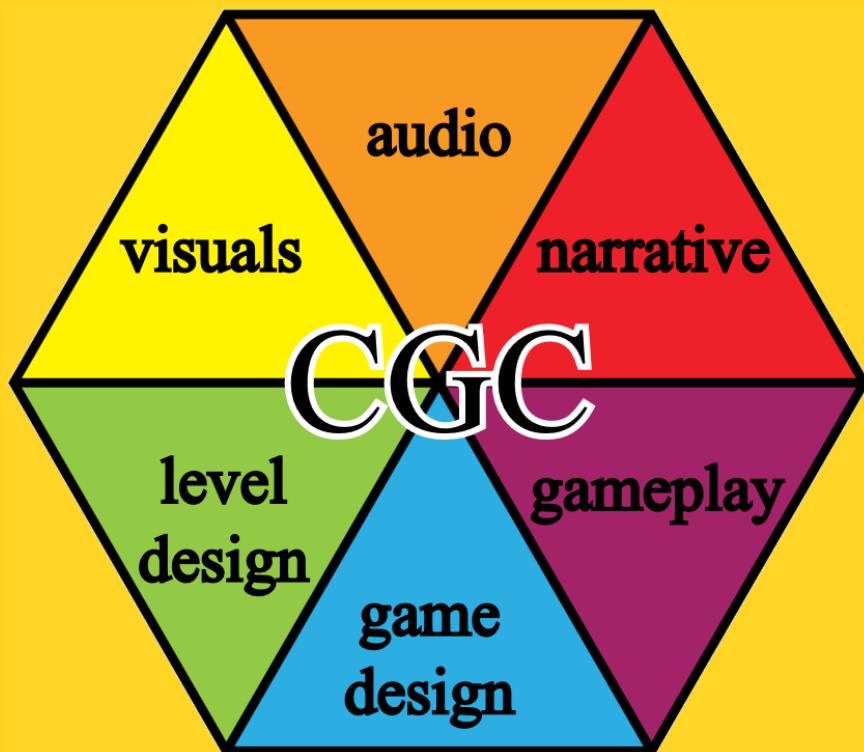
What is Diablo 3: "[previous] games established the series' hallmarks: randomized levels, the relentless onslaught of monsters and events in a **perpetually fresh** world, [...]"

"Experience Daylight, a procedurally generated psychological thriller for your PC."



Games are multifaceted

- **Games are art – and more!**
 - Creating games is a highly creative activity.
 - Notions of *typicality*, *novelty* and *quality*.



Ritchie, G. 2007. Some empirical criteria for attributing creativity to a computer program. *Minds and Machines* 17:76–99.



visuals



CORE
FIRE_ (2X)
ARM
ARM
ARM
ARM
ARM
ARM
FIRE_ (5X)



Properties - Level 2

Complete mode

- Generation
- Colors
- Geometry Types
- Random Seeds
- Wind Drive
- Logarithm
- Scale
- Simulation
- Branch
- Texture Coordinates
- Materials
- Deployment

Branch

Source	Value	Min	Max
Amount	1	0	1
Amount	1	0	1
Amount	1	0	1
Other	1	0	1
U Min	1	0	1
V Min	1	0	1
U offset	0	0	1
V offset	0	0	1

Can

Source	Use material	Min	Max
Amount	0	0	1
U offset	0	0	1
V offset	0	0	1
UV Min	1	0	1
Angle	0	0	1

Ambient Occlusion


Level of Detail

Wind

Physics

Spine Generator

The Spine Generator is responsible for generating [spines](#). A "spine" defines the center line of a branch or trunk, as both branches and trunks are part of the spine generation.



Done

Render



Output

- ↳ Subgraph is evaluated 1 time, 0s
- ↳ All rights reserved
- ↳
- ↳
- ↳ This evaluation frame requires 0 steps
- ↳
- ↳ Ready

Quadranoïd [208]

37993 Heuridium Isotop

37993 37993

37993

37993

Drone

37993

37993

37993

208000000

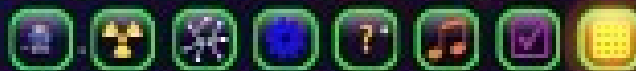
Heuridium

MISSION AVAILABLE

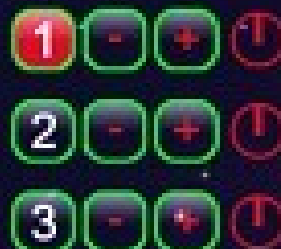
Ship



Astral Projection
Level 110
XP: 6661 / 66000
Credits: 880232
Toiva Aphid II
Shield: 147 / 7470
Armor: 3267 / 14905
HP: 18380 / 18380



Weapons



Target



Quadranoïd [208]
Faction: Geonoid
Level: 208
Health: 4414 / 52000
Smart Warheads:

FPS:57
DPS:6068 XPS:666
Radar



Edit Geometry Generator

Polygons : 29479 (60 per sec)

VArray Blocks : 1759

CommitCalls : 0





12,324

3

BONUS

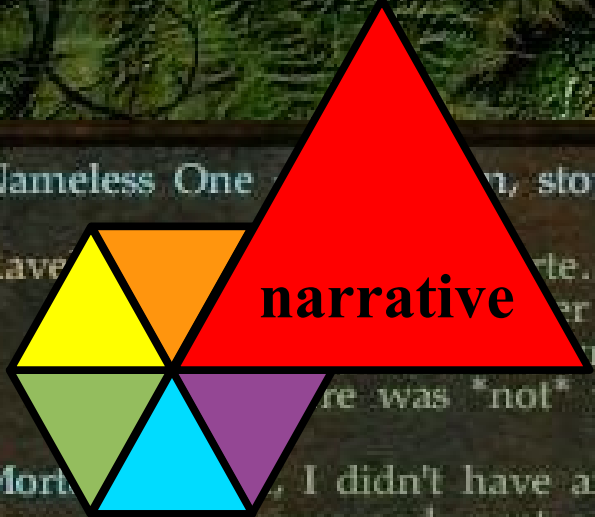
MENU

Orange Gem	Blue Gem	Purple Gem	Purple Gem	Orange Gem	Explosion	Blue Gem	White Gem
Orange Gem	Yellow Gem	White Gem	Yellow Gem	Yellow Gem	Explosion	Yellow Gem	Red Gem
Red Gem	Orange Gem	Blue Gem	Green Gem	Green Gem	Explosion	Orange Gem	Red Gem
Red Gem	White Gem	Orange Gem	White Gem	Orange Gem	Explosion	Green Gem	Blue Gem
Yellow Gem	White Gem	White Gem	Yellow Gem	Red Gem	Explosion	Red Gem	Purple Gem
Explosion	Explosion	Explosion	Explosion	Explosion	Explosion	Explosion	Explosion
Yellow Gem	Green Gem	Purple Gem	Purple Gem	Blue Gem	Explosion	Blue Gem	Green Gem
Purple Gem	Orange Gem	White Gem	Blue Gem	Green Gem	Explosion	White Gem	Red Gem

430







Nameless One: "Morte, stop. This is between Ravel and I. Look, Ravel --"

Ravel: "Morte. "Skull, skull, skull..." Ravel clicks her tongue and her smile widens. "Your expression is difficult to trap, but I feel your FEAR from here. This was *not* your choice."

Morte: "I didn't have anything BETTER to do except go to one of the Ladies mazes and meet one of the vilest creatures ever to set foot in Sigil, so I said 'sure! Why n-?"

1. "Morte, be quiet. Ravel, I..."



70898







Grace, are you angry at Trip?



www.fraps.com



You:FOLLOWSOMEONE:: Agent: DROPTOGRO

Medusa
Level 1

Swap Hero Options:

- 1 - Skeleton King
- 2 - Bristleback
- 3 - Faceless Void
- 4 - Shadow Shaman

Type **-swap #** to make a choice or **-swa** to cancel swap requests

[Allies] tosh_00 (Leoric): who want??
 [Allies] inferno90 (Bristleback): -swap 1
 [Allies] mPEscalibur (Rhasta): -swap 1
 [Allies] Bladebomber (Medusa): -swap



Allies: -swa



416 / 416

247 / 247

Medusa

Level 1 Gorgon



Damage:
44 - 50

Strength:
14



Armor:
2



Agility:
20

Intelligence:
19

Status:

Inventory





Yavalath & Pentalath
by Cameron Browne's LUDI

nestorgames

nestorgames

Yavalath & Pentalath
by Cameron Browne's LUDI



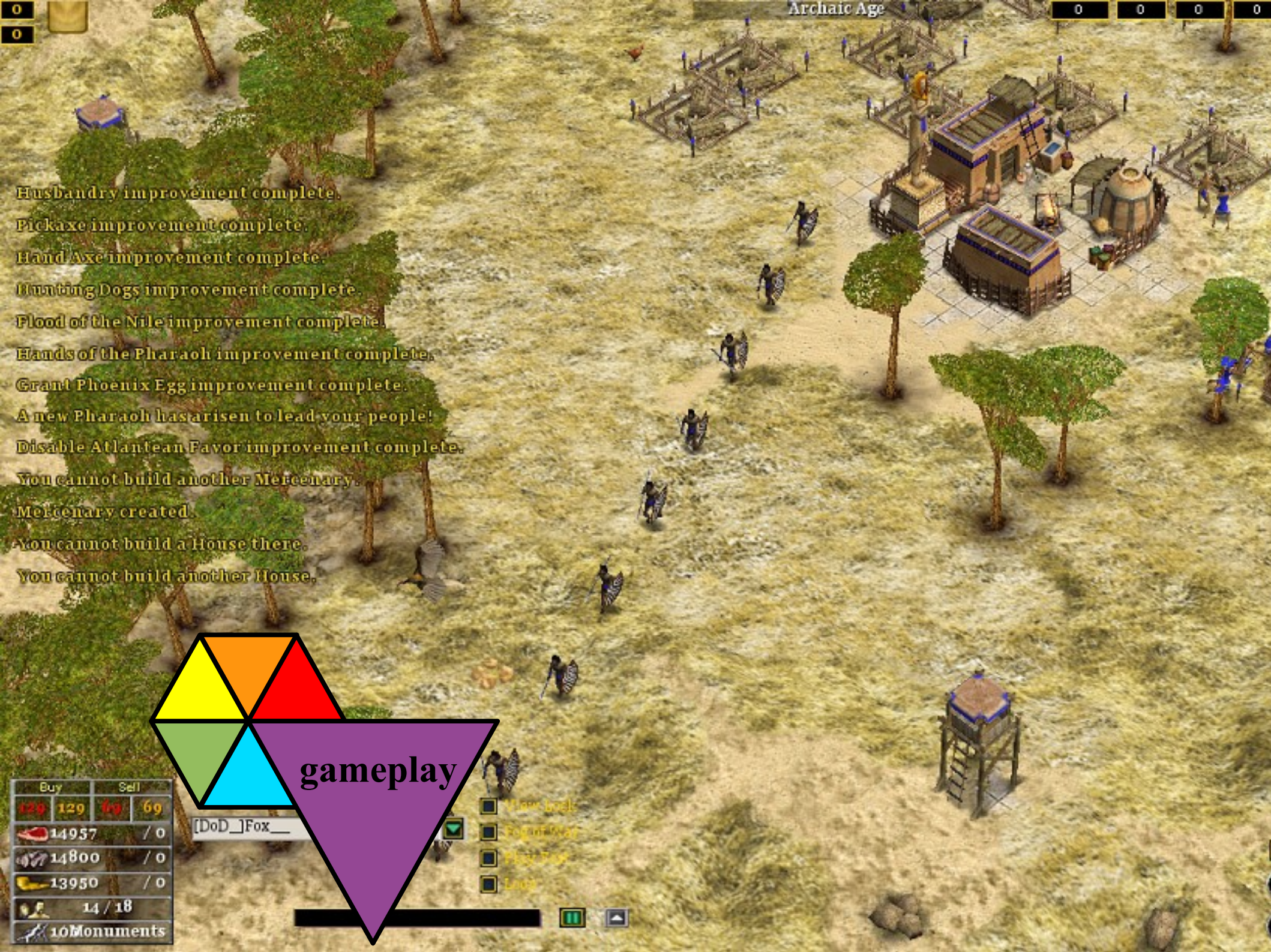
Husbandry improvement complete.
 Pickaxe improvement complete.
 Hand Axe improvement complete.
 Hunting Dogs improvement complete.
 Flood of the Nile improvement complete.
 Hands of the Pharaoh improvement complete.
 Grant Phoenix Egg improvement complete.
 A new Pharaoh has arisen to lead your people!
 Disable Atlantean Favor improvement complete.
 You cannot build another Mercenary.
 Mercenary created.
 You cannot build a House there.
 You cannot build another House.



Buy	Sell
129 129 69	69
14957	/ 0
14800	/ 0
13950	/ 0
14 / 18	
10 Monuments	

[DoD_]Fox_

- Mark Back
- Fog of War
- Play Day
- Load





E Take
Bucket

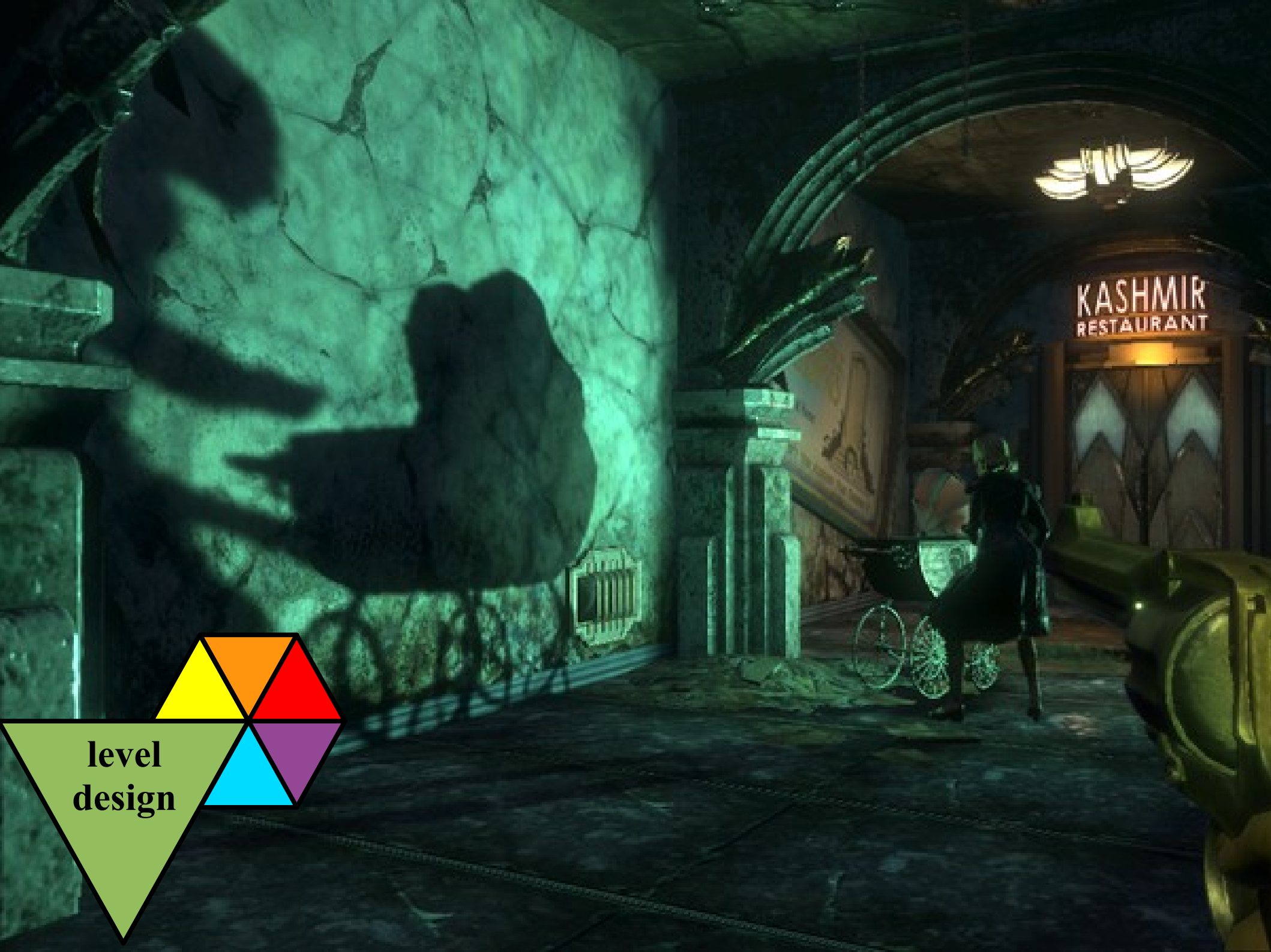
WEIGHT **0.5** VALUE **1**

Press Esc to exit full screen mode.

MARRY
ME







KASHMIR
RESTAURANT

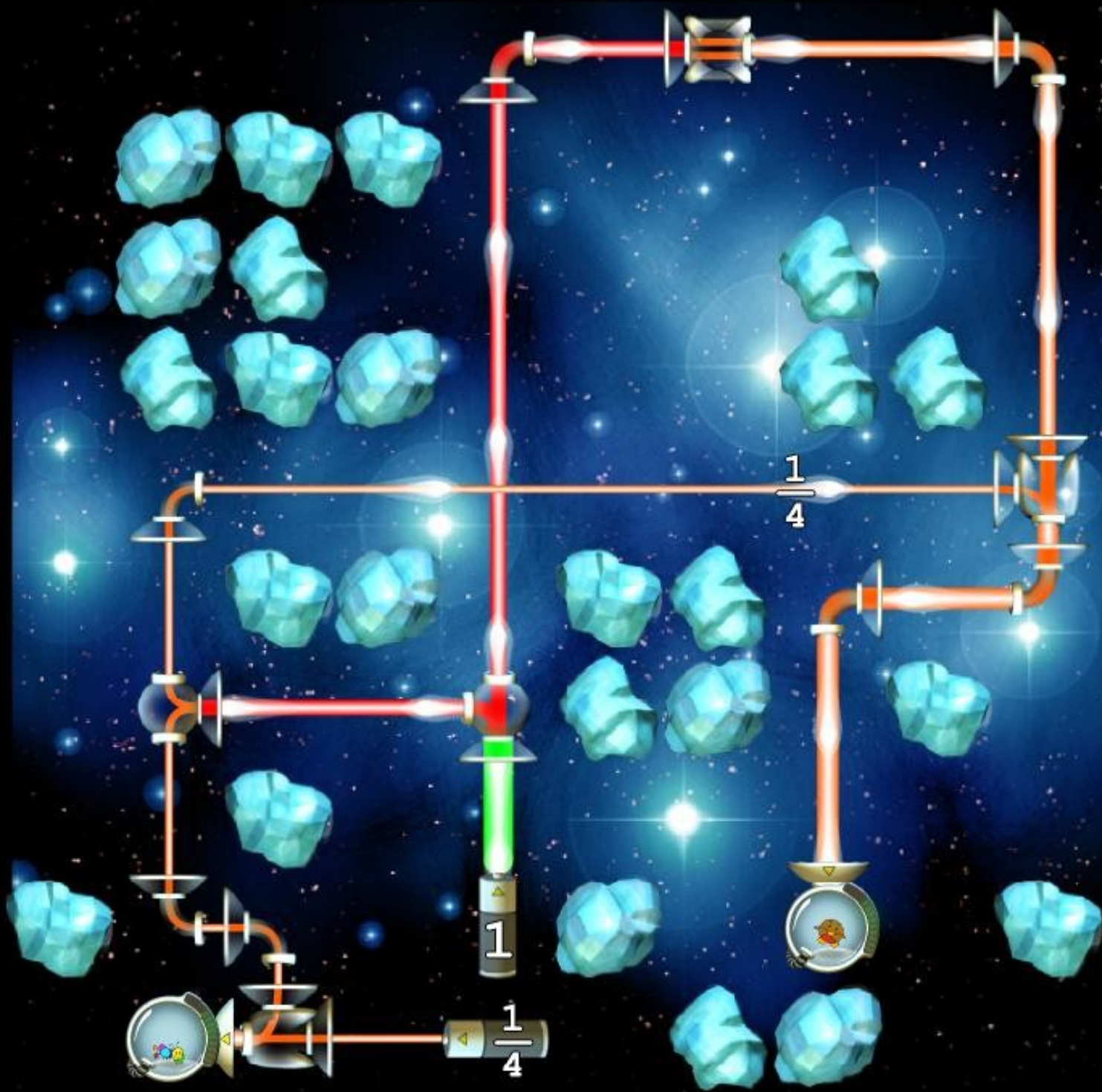
level
design







ADVANCE



MENU

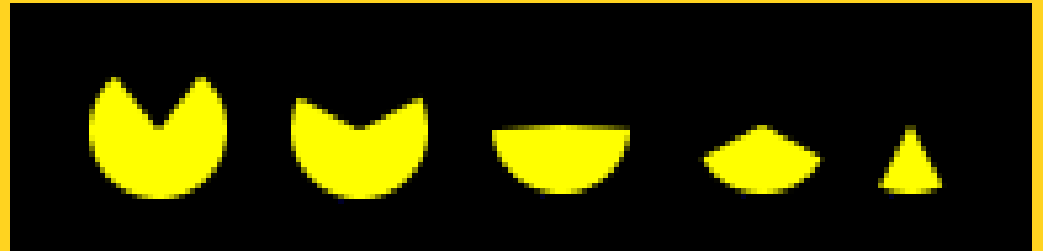
OPTIONS

Games: more than facets

Gestalt Game Creativity

Facet Orchestration

- One facet as **cause**, another facet as **effect**.
 - jump action → sound effect.



Facet Orchestration

- One facet as cause, another facet as effect.
- Usually, all facets **interweave** less clearly.
 - level design ↔ narrative ↔ game design



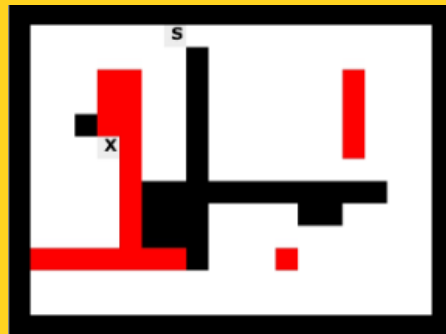
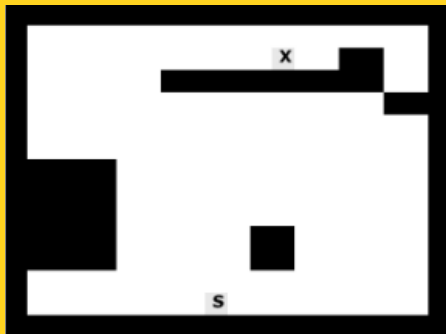
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game rules
+
level design



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game rules
+
narrative*
+
visuals



Facet Orchestration

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narrative
+
visuals
+
audio



Claims & Questions

**Computational Creativity
and Games**

CC and Games

- Creating (even playing) games, as a human, is a highly creative activity.
- A machine able to create games (or parts of games) should also be considered creative.

CC and Games

- Games are artifacts stemming from creative activity because:
 - they fall into a large class
(possibly with subclasses, e.g. casual, shooter, RPG)
 - this class has somewhat fuzzy boundaries
 - this class has extensive human-based evaluations of quality

CC and Games

- Game content generation and CC theories:
 - novelty, quality and typicality
 - exploration, combination and transformation
 - FACE model

Open Questions

- How can you achieve/measure compound computational game creativity:
 - intended affective response?
 - intended message?
 - what about serendipity?

Open Questions

- Where is *computational* creativity in a highly interactive experience?
 - **ascribed** creativity



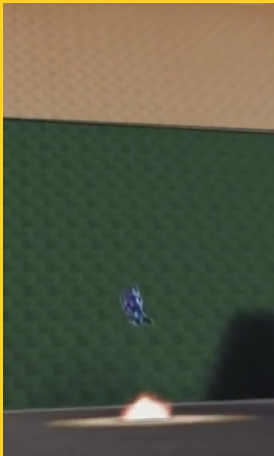
Open Questions

- Where is *computational* creativity in a highly interactive experience?
 - ascribed creativity
 - **"missed"** creativity



Open Questions

- Where is *computational* creativity in a highly interactive experience?
 - ascribed creativity
 - "missed" creativity
 - **human** creativity



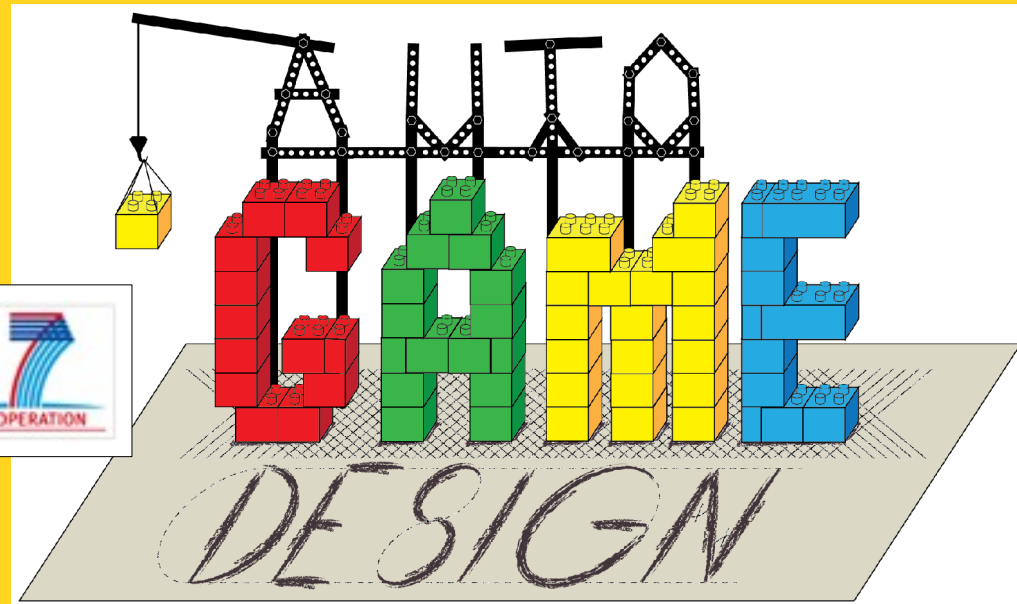
Resumé

- Games are the **ideal** canvas for CC.
 - popular, engaging, welcoming (to CC).

Resumé

- Games are the **ideal** canvas for CC.
 - popular, engaging, welcoming (to CC).
- Computational Game Creativity is **challenging**.
 - how to handle **multiple facets**?
 - how to handle player-computer (or designer-computer) **co-creativity**?

Our next moves



Procedural Content Generation in Games

A textbook and an overview of current research

Thank you!

