

# GAME DESIGN

SYSTEMS, GENRES, MECHANICS

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# PROBLEM DEFINITION

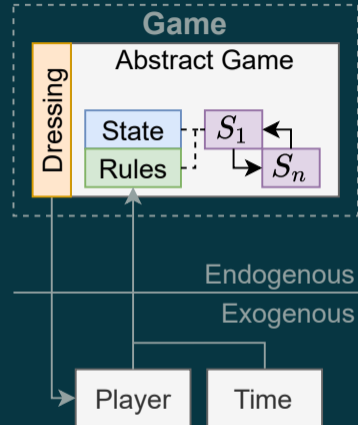
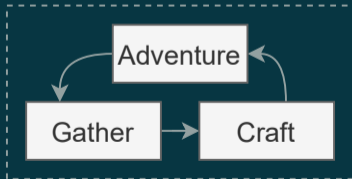
The focus of a game designer is designing game play, conceiving and designing rules and structures that result in an experience for players.

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Salen & Zimmerman  
Rules of Play - Game Design Fundamentals [8]

# REMINDER FROM LAST TIME

- Abstract Game = Formal System
  - ▶ State = Internal state, modified by interaction
  - ▶ Rules = A set of constraints and transitions
  - ▶ Structures = Entities with State and Rules
- Gameplay = Interactivity of Player ↔ Game
- Core Gameplay Loop = Flow of the Game



# SYSTEM DESIGN

# GAME SYSTEMS

- Implementation of Gameplay
- Engineer, Artist, and Designer

System	Technical		Functional
Input	Polling	vs	Feeling
Sound	Playback	vs	Feedback
Render	Fidelity	vs	Signalling
Physics	Simulation	vs	Interaction
AI	Decision	vs	Opposition
Network	Net-code	vs	Balance

- Encapsulation × Interaction
- Endogenous & Exogenous Processes

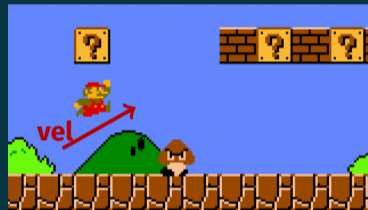
## Input

### Technical



```
if (gp.dpad.right.isPressed()) {  
    m.vel += speed * Vec2(1, 0);  
}
```

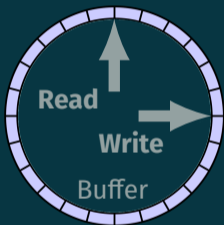
### Functional



$$vel = 1 - 2 (t_{air} - 0.5)^2$$

## Sound

Technical



```
buffer[wrtIdx++] = sin(omega * t)
```

Functional



Source: Half-Life 2



## Render

Technical



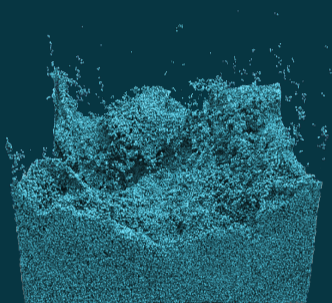
Functional



Source: Borderlands 2

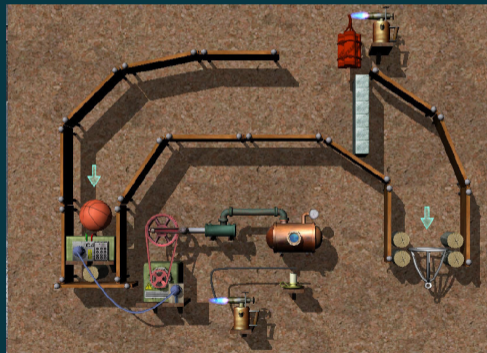
## Physics

### Technical



Source: Particle-Based Fluid Simulation  
Ting-Chun Sun

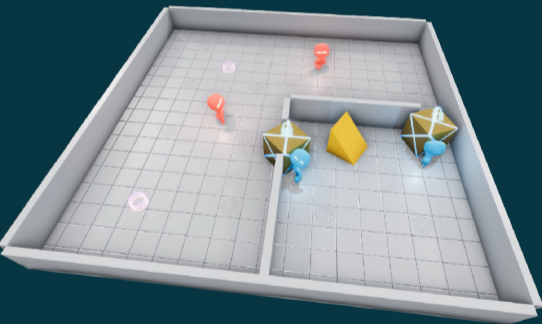
### Functional



Source: Crazy Machines

## Artificial Intelligence

Technical



Source: OpenAI

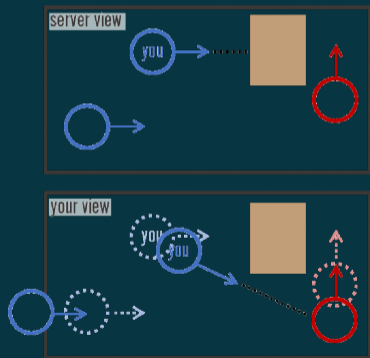
Functional



Source: Assassin's Creed Unity

## Network

### Technical



Source: Riot Games

### Functional



Source: Valorant

# GAME SYSTEMS

- Implementation of Gameplay
- Engineer, Artist, and Designer

System	Technical		Functional
Input	Polling	vs	Feeling
Sound	Playback	vs	Feedback
Render	Fidelity	vs	Style
Physics	Simulation	vs	Interaction
AI	Decision	vs	Opposition
Network	Net-code	vs	Balance

- Encapsulation × Interaction
- Endogenous & Exogenous Processes

# GAME GENRES

# CATEGORIZATION OF GAMES

- Game studies → Ludology
- Ludology × Narratology <sup>1</sup>
- Game Genres
- Tools of Evaluation
- No Single Game Taxonomy

... the computer game for all practicality can not tell stories – the computer game is simply not a narrative medium ...

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Jasper Juul  
A clash between game and narrative [5]

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<sup>1</sup>See Apperley [1], Csikszentmihalyi [2], Frasca [3, 4], Juul [5, 6]

# GAME GENRES I

## Action

### Fighter



Source: Street Fighter II (1987)  
Mortal Kombat (1992)  
Super Smash Bros. Ultimate (2018)

### Shooter



Source: Ultimate Doom (1995)  
[Half-Life (1998, 2004)] Call of Duty (2003)  
Crysis 3 (2013)

### Platformer



Source: Super Mario Bros. (1985)  
SMB (2010) Fez (2012)  
Hollow Knight (2017)



# GAME GENRES II

## Adventure

Text

Graphic

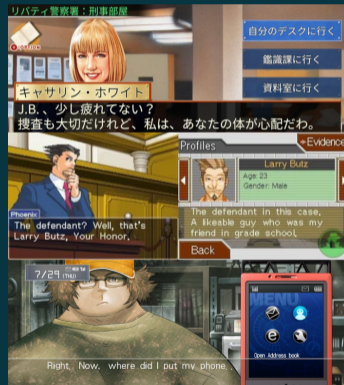
Visual Novel



Source: Zork (1980)  
Sorcery! (2013)  
Cragne Manor (2018)



Source: Secret of Monkey Island (1990)  
Myst (1993)  
Thimbleweed Park (2017)



Source: J.B. Harold Murder Club (1991)  
Phoenix Wright: Ace Attorney (2001)  
Steins;Gate (2009)

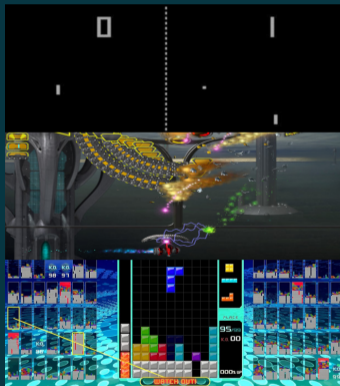
## Sports

### Racing



Source: Super Mario Kart (1992)  
Need for Speed: Underground (2003)  
Dirt Rally (2015)

### Arcade



Source: Pong (1972)  
Ricochet Infinity (2007)  
Tetris 99 (2019)

### Imitation



Source: Madden NFL 96 (1995)  
FIFA 2001 (2000)  
Wii Sports (2006)

## Simulation

### Driving



Source: F1 Racing Simulation (1997)  
Microsoft Flight Simulator X (2006)  
Euro Truck Simulator (2008)

### Fiction



Source: Elite (1984)  
X3: Reunion (2005)  
Star Citizen (????)

### Wargame



Source: Panzer General (1994)  
Dominions 3 (2006)  
Shadow Empire (2020)

## Role-Playing

### Sandbox



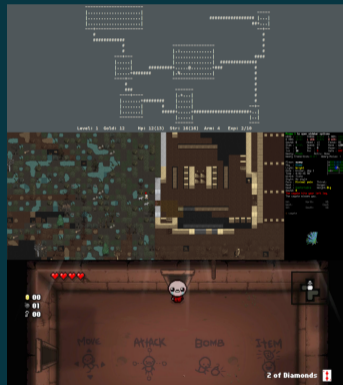
Source: The Elder Scrolls: Arena (1994)  
Baldur's Gate (1998)  
The Outer Worlds (2019)

### Action



Source: The Legend of Zelda (1986)  
Diablo (1997)  
Dark Souls (2011)

### RogueLike



Source: Rogue (1970)  
Cataclysm Dark Days Ahead (2013)  
Binding of Isaac: Rebirth (2014)

## Strategy

Real-Time



Source: Command & Conquer (1995)  
Age of Mythology (2002)  
Iron Harvest (2020)

Turn-Based



Source: Sid Meier's Civilization (1991)  
Heroes of Might and Magic III (1999)  
Endless Space (2013)

Management



Source: The Settlers (1993)  
Dwarf Fortress (2006)  
Anno 1404 (2009)

## Multiplayer

### Scope



Source: Halo 2 (2004)  
Team Fortress (2007)  
Guild Wars 2 (2012)

### Cooperative



Source: Eve Online (2003)  
Magicka (2011)  
Animal Crossing: New Horizons (2020)

### Competitive

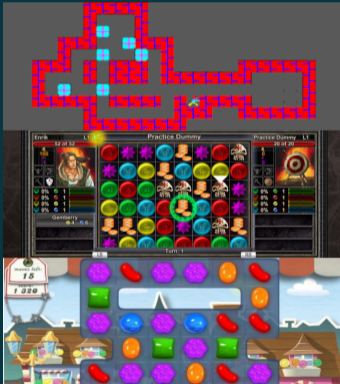


Source: Starcraft II (2010)  
Rocket League (2015)  
Legion TD 2 (2017)

# GAME GENRES VIII

## Casual

### Puzzle



Source: Sokoban (1982)  
Puzzle Quest (2007)  
Candy Crush Saga (2012)

### Gated



Source: FarmVille (2009)  
Clash of Clans (2012)  
Kittens Game (2016)

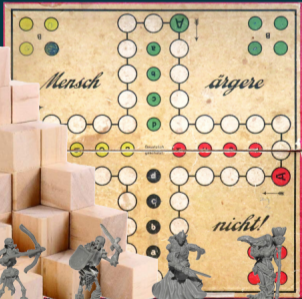
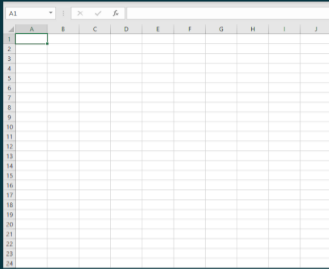
### Toy



Source: Line Rider (2006)  
Bartender: The Right Mix (2007)  
The Powder Toy (2008)

# GAME DESIGN





# WHAT IS GAME DESIGN?

- History : From Hardware ↑
- Today: **Gameplay** from **Rules** and **Structures** [8]

## Designer's Lot



- Common Principles

# PROBLEMS AND SOLUTIONS

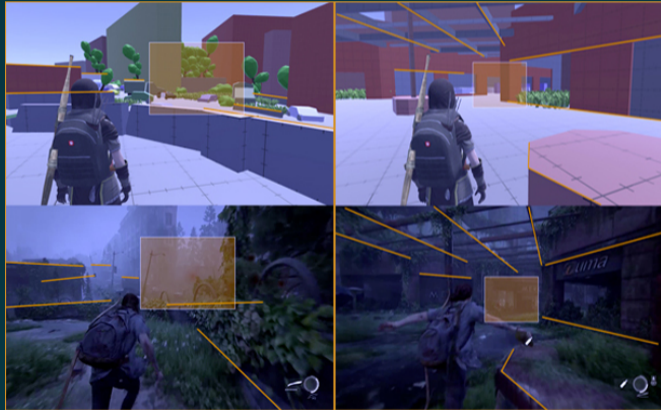
- Reaching the **Goal** (Experience)
- Systematic → Iterative Process
- Tools of the Trade
  - ▶ Skill × Strategy × Luck
  - ▶ Modes of Play
  - ▶ Goals & Rewards
  - ▶ Events
  - ▶ Time Flow
- **Experimentation** is Key!
- Video Game Design Disciplines
- Much More → Game Studies <sup>1</sup>



<sup>1</sup>See Game Studies course, and further literature, e.g., Salen [8, 7]

# ADDITIONAL RESOURCES

- [YouTube] Raph Koster: Practical Creativity
- [YouTube] Katherine Neil: Game Design Tools
- [Blog] Raph Koster's Website



Source: The Last of Us II Level Design Study

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Thanks For  
Your Attention!



ARMOR



100

HEALTH

Blood: Fresh Supply

5

AMMO

V1.6.10

0 0 0 0

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- [1] THOMAS H APPERLEY. **“GENRE AND GAME STUDIES: TOWARD A CRITICAL APPROACH TO VIDEO GAME GENRES”**. In: *Simulation & Gaming* 37.1 (2006), pp. 6–23.
- [2] MIHALY CSIKSZENTMIHALYI. **“DOES BEING HUMAN MATTER? ON SOME INTERPRETIVE PROBLEMS OF COMPARATIVE LUDOLOGY”**. In: *Behavioral and Brain Sciences* 5.1 (1982), pp. 160–160.
- [3] GONZALO FRASCA. **“LUDOLOGISTS LOVE STORIES, TOO: NOTES FROM A DEBATE THAT NEVER TOOK PLACE.”**. In: *DiGRA conference*. 2003, pp. 4–6.
- [4] GONZALO FRASCA. **“SIMULATION VERSUS NARRATIVE: INTRODUCTION TO LUDOLOGY”**. In: *The video game theory reader*. Routledge, 2013, pp. 243–258.
- [5] JESPER JUUL. **“A CLASH BETWEEN GAME AND NARRATIVE: A THESIS ON COMPUTER GAMES AND INTERACTIVE FICTION”**. In: *University of Copenhagen* (1999).
- [6] JESPER JUUL. **“THE DEFINITIVE HISTORY OF GAMES AND STORIES, LUDOLOGY AND NARRATOLOGY”**. In: *The Ludologist* (2004).

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- [7] KATIE SALEN, KATIE SALEN TEKINBAS, AND ERIC ZIMMERMAN. ***THE GAME DESIGN READER: A RULES OF PLAY ANTHOLOGY***. MIT press, 2006.
- [8] KATIE SALEN AND ERIC ZIMMERMAN. ***RULES OF PLAY: GAME DESIGN FUNDAMENTALS***. Boston: MIT Press, 2003. URL: <http://mitpress.mit.edu/catalog/item/default.asp?ttype=2&tid=9802>.