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BA COMPUTER GAMES DESIGN

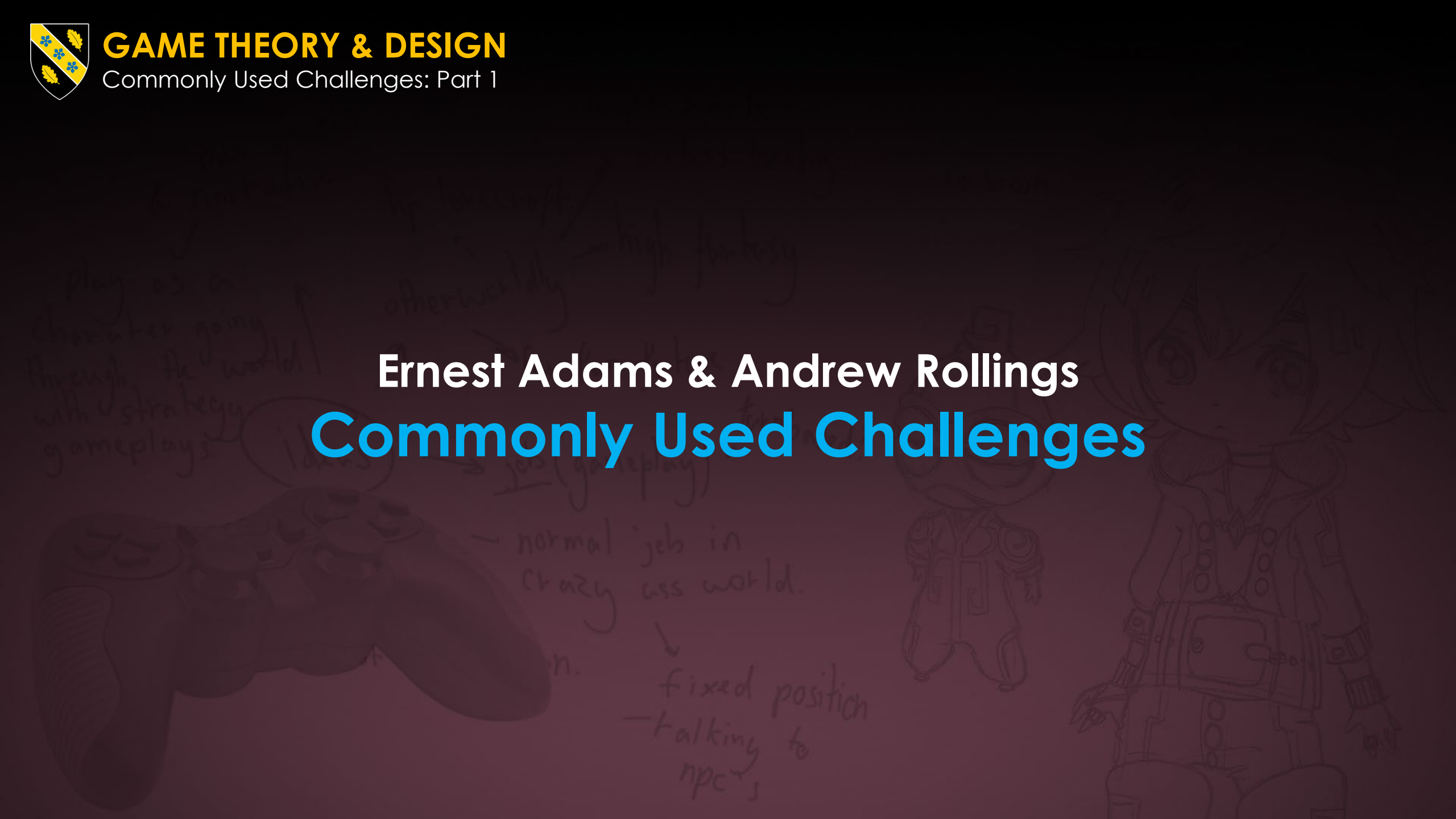
GAME THEORY & DESIGN

Commonly Used Challenges: Part 1

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- Physical Coordination Challenges
- Logic and Mathematical Challenges
- Races & Time Pressure
- Factual Knowledge Challenges
- Memory Challenges
- Pattern Recognition Challenges
- Exploration Challenges
- Spatial Awareness Challenges
- Locked Doors
- Traps
- Mazes and Illogical Spaces
- Teleporters





Ernest Adams & Andrew Rollings

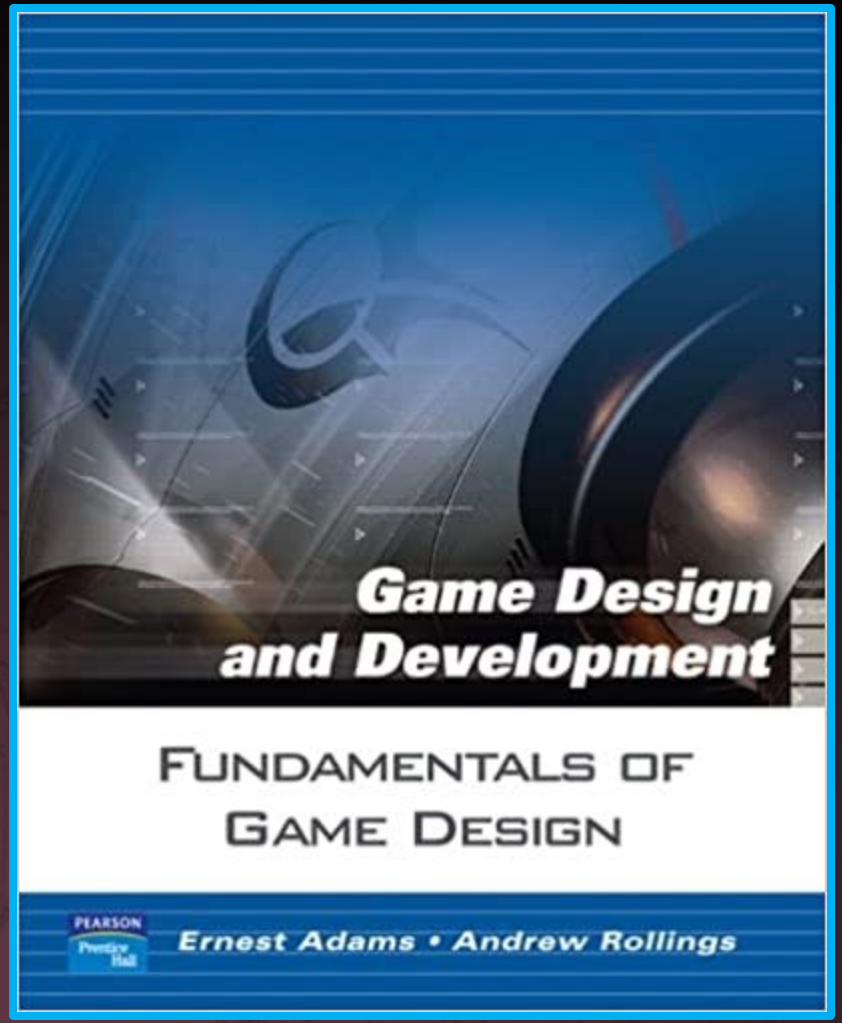
Commonly Used Challenges

Further reading:

Commonly Used Challenges

Ernest Adams & Andrew Rollings, Fundamentals of Game Design

(Available in Y Fforwm Library, SA1)



Commonly Used Challenges

"Players always appreciate innovative challenges; a beautiful setting or interesting overall concept only gets you so far.

Gameplay is in the challenges."

(Adams & Rollings, 2007:289)





Commonly Used Challenges

A game designer is free to design any type of challenge if it can be made to work.

Adams and Rollings have defined a list of commonly used challenges in *Fundamentals of Game Design* to help designers think about types of challenges they may wish to include in their game designs.

Commonly Used Challenges

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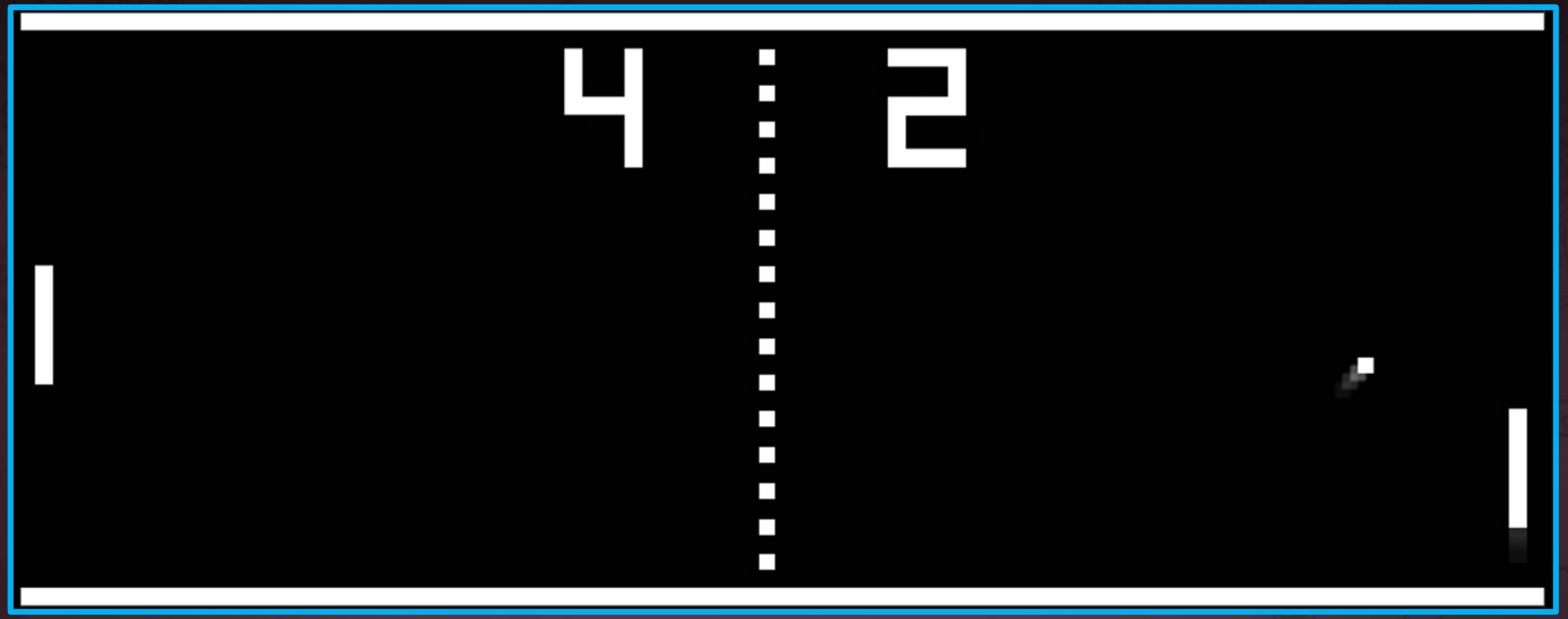
Commonly Used Challenges

Physical Coordination Challenges

Physical Coordination Challenges

Physical coordination challenges test a player's physical abilities, most commonly hand-eye coordination.

Pong required only this skill to win.



Physical Coordination Challenges



Speed and Reaction Time

Speed challenges test the player's ability to make rapid inputs on the controls and reaction time challenges test their ability to react quickly to events.

Both of these usually appear in combination with other types of challenges, most often other co-ordination challenges.

Physical Coordination Challenges

Speed and Reaction Time

Expect to find speed and reaction time challenges in platform games, shooters and fast puzzle games.



Speed and reaction-time challenges please those players that have the reflexes for them.

Physical Coordination Challenges

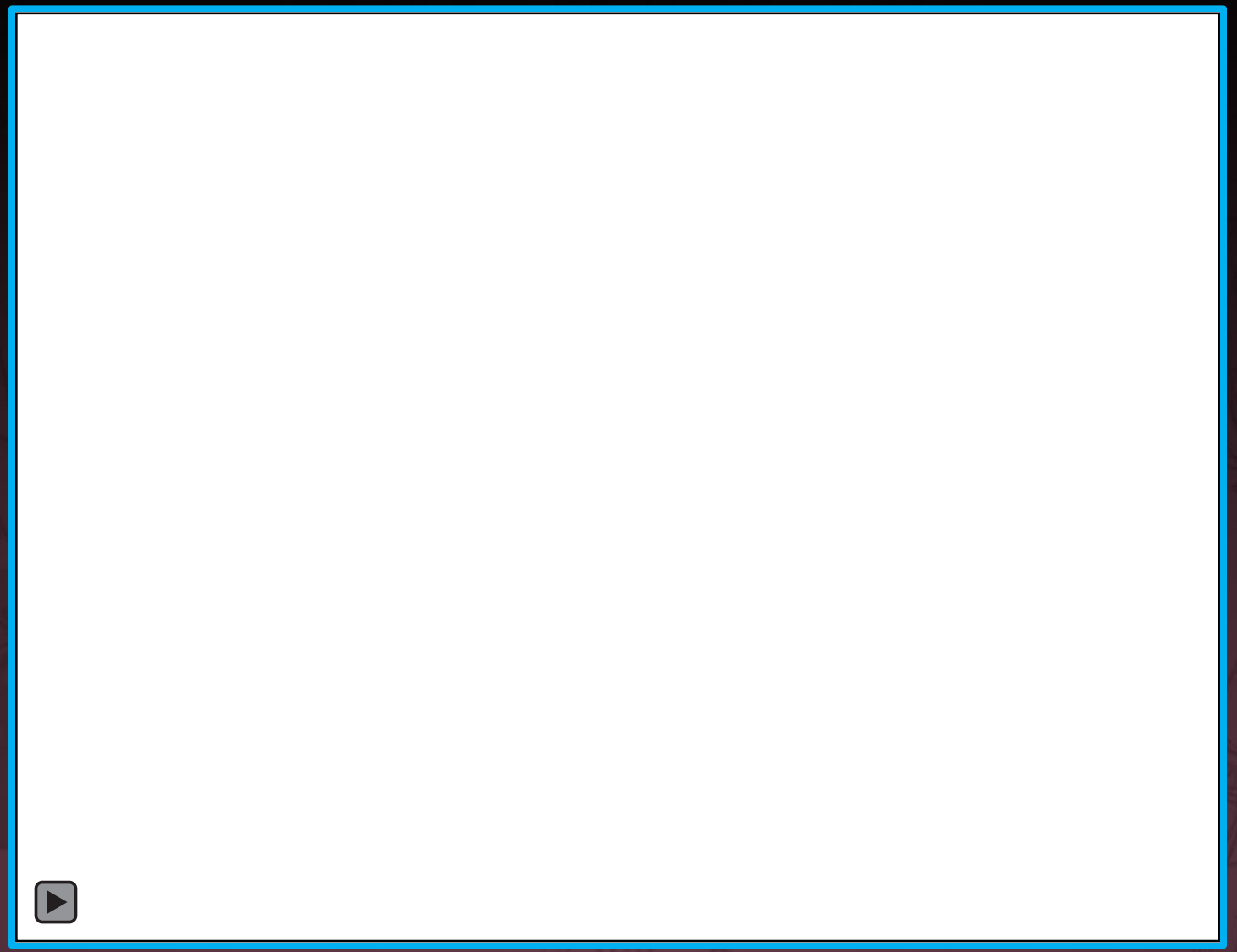


Accuracy and Precision

Steering or shooting comprise the majority of tests of accuracy or precision.

These challenges are usually found in action, action adventure, sports games and vehicle simulations.

Physical Coordination Challenges



Accuracy and Precision

Physical Coordination Challenges

Accuracy and Precision

Accuracy challenges do not need to take place within time limits.

Players can take as long as they want to line up a shot but still face a considerable challenge.



Physical Coordination Challenges

Accuracy and Precision

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Players can take as long as they want to line up a shot but still face a considerable challenge.

To make an accuracy challenge easier or harder, adjust the degree to which the physics engine in the game forgives errors in the inputs.



Physical Coordination Challenges

Intuitive Understanding of Physics

Vehicle simulations require more than just an ability to steer a vehicle.

Players must learn - through experience – a car's braking distance, acceleration rate and what rate it may take a turn without sliding out of control.

Learning and internalizing these features of the game world and vehicle constitute another challenge.

Physical Coordination Challenges

Intuitive Understanding of Physics

A game featuring these challenges must ensure that the physics involved remains consistent.

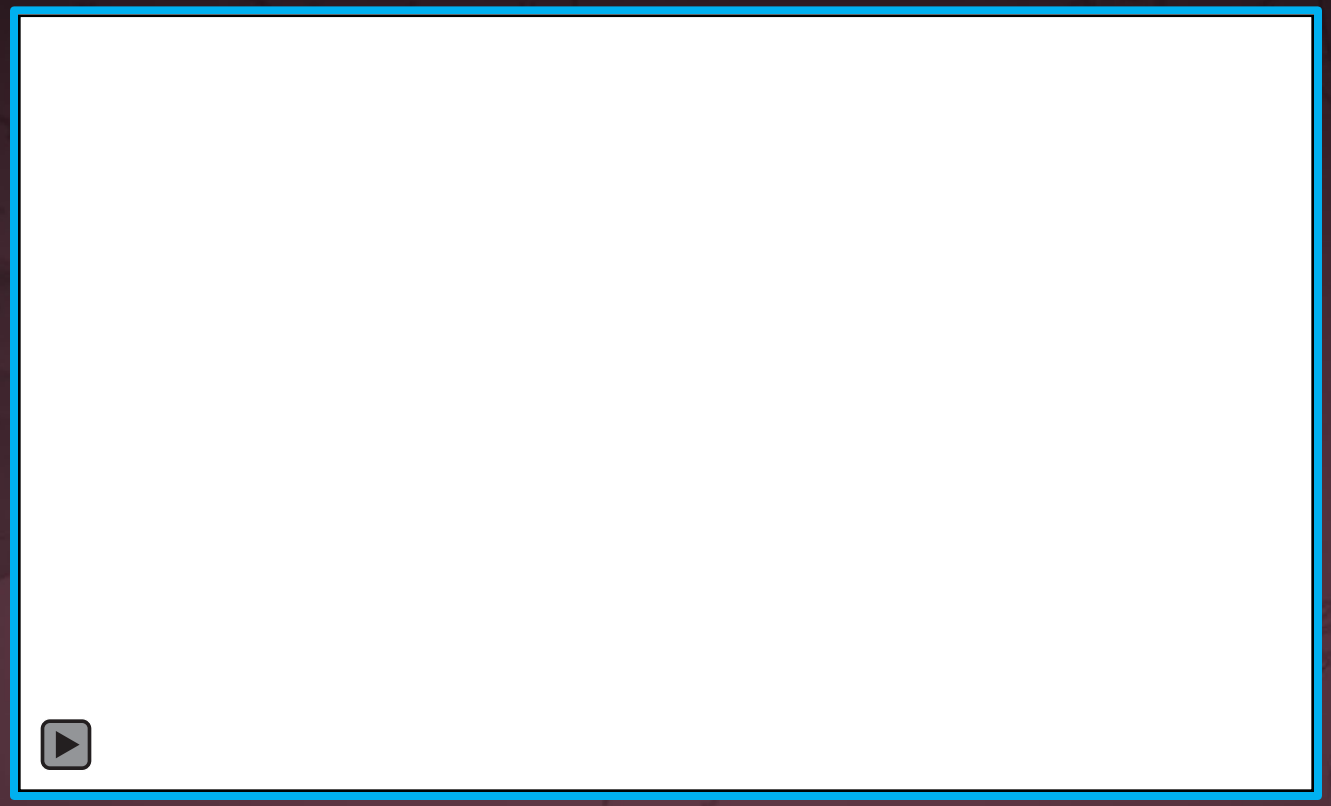
The simpler the physical model of the world, the easier it will be for the player to develop that intuitive understanding.

Sports games often simplify their physics to help the player get used to the game quickly.

Physical Coordination Challenges

Timing and Rhythm

Side-scrolling action games rely heavily on timing challenges, in which the player learns to dodge swinging blades and attack predictable enemies.



Physical Coordination Challenges

Timing and Rhythm

Rhythm challenges – tests of the player's ability to press the right button at the right time – feature in dance and other music based games.



Physical Coordination Challenges

Combination Moves

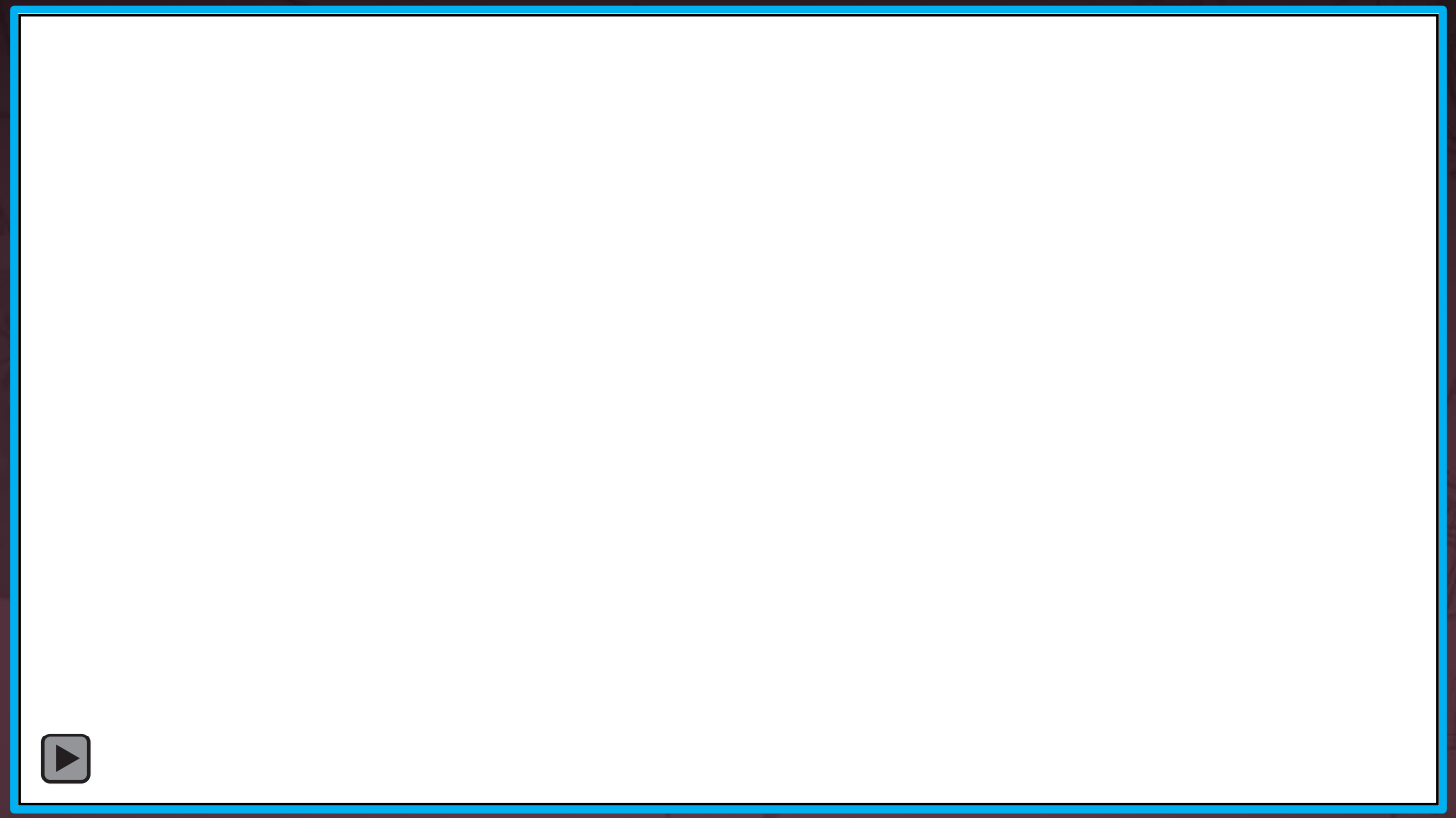
Many fighting games require complex sequences of joystick moves and controller-button presses that, once mastered, allow the player's avatar to perform some especially powerful feat.



Physical Coordination Challenges

Combination Moves

Executing a combo move requires speed, timing and a good memory. Combo moves can be made easier by shortening them, requiring fewer inputs.



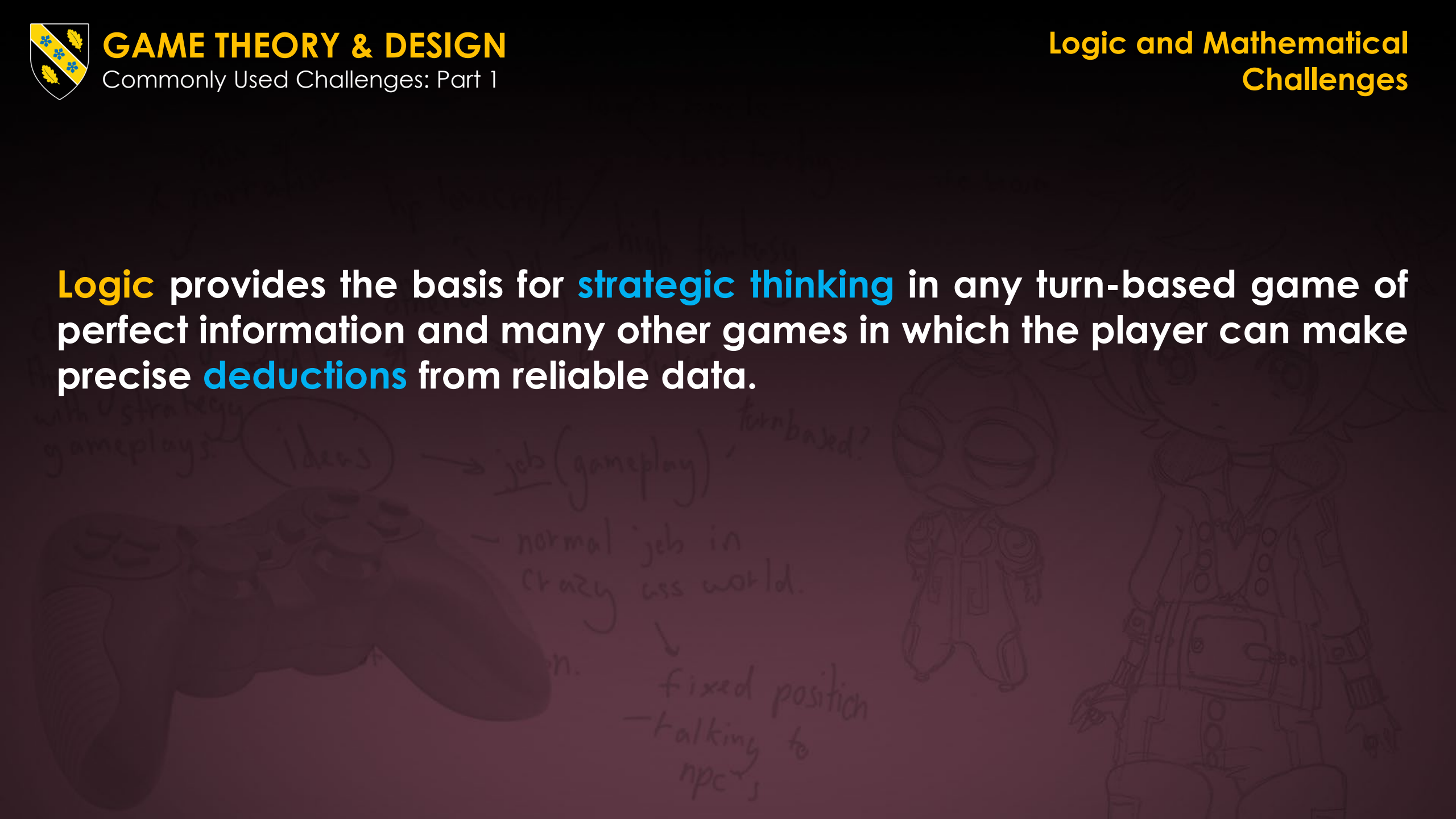
Ernest Adams & Andrew Rollings

Commonly Used Challenges

Logic and Mathematical Challenges

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Mathematics underlies all games in which **chance** plays a role or the player **does not have reliable data** and so must reason from probabilities.

Logic and Mathematical Challenges





Any game that includes numeric relationships offers a mathematical challenge.

The player must learn how those relationships work.

Formal Logic Puzzles

A puzzle is a mental challenge with at least one specific solution.

Formal logic means classic deductive logic in which the definition of the puzzle contains, or explains, everything the player needs to know to solve the puzzle.

A formal logic puzzle can be solved by reasoning power alone. It should not require any outside knowledge.

Formal Logic Puzzles

A logic puzzle typically presents the player with a collection of objects related in ways that are consistent but not directly obvious.

To solve the puzzle, the player must put the objects into a specified configuration.



Formal Logic Puzzles: *Assassin's Creed 4*



Formal Logic Puzzles

Players normally get all the time they need to solve puzzles.

Different people bring different amounts of brainpower to the task – requiring players to solve a puzzle within a time limit might make the game impossible for some.



Formal Logic Puzzles

Some games do not make the correct solution clear at the outset of the puzzle.

The player not only has to understand how the puzzle works but also guess at the solution they must try to achieve.

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The player not only has to understand how the puzzle works but also guess at the solution they must try to achieve.

This is bad game design.

It forces the player to solve the puzzle by trial and error alone because there's no way to tell when they're on the right track.

Formal Logic Puzzles

AVOID TRIAL AND ERROR PUZZLES

"Solving most logic puzzles requires a certain amount of experimentation, but the player must be able to make deductions from their experiments.

Do not make puzzles that can only be solved by trial and error."

(Adams & Rollings, 2007: 292)

Mathematical Challenges

Games don't usually test the player's mathematical abilities explicitly but often do require the player to reason about probabilities.



Mathematical Challenges

Many games include an element of chance or require the player to make educated guesses about situations of which they have only an imperfect knowledge.



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Commonly Used Challenges

Races and Time Pressure

Races and Time Pressure

In a race, the player attempts to accomplish something before someone else does.



Time pressure discourages careful strategic thought and instead encourages direct, brute-force solutions.



Races and Time Pressure

Time pressure increases the stress on a player and changes the feeling of the gameplay considerably.

Sometimes this is for the better, other times for worse.





Races and Time Pressure

In a car racing game, time pressure is an essential part of the experience.

However, be careful when adding time pressure to challenges that aren't ordinarily based on time constraints.





Races and Time Pressure

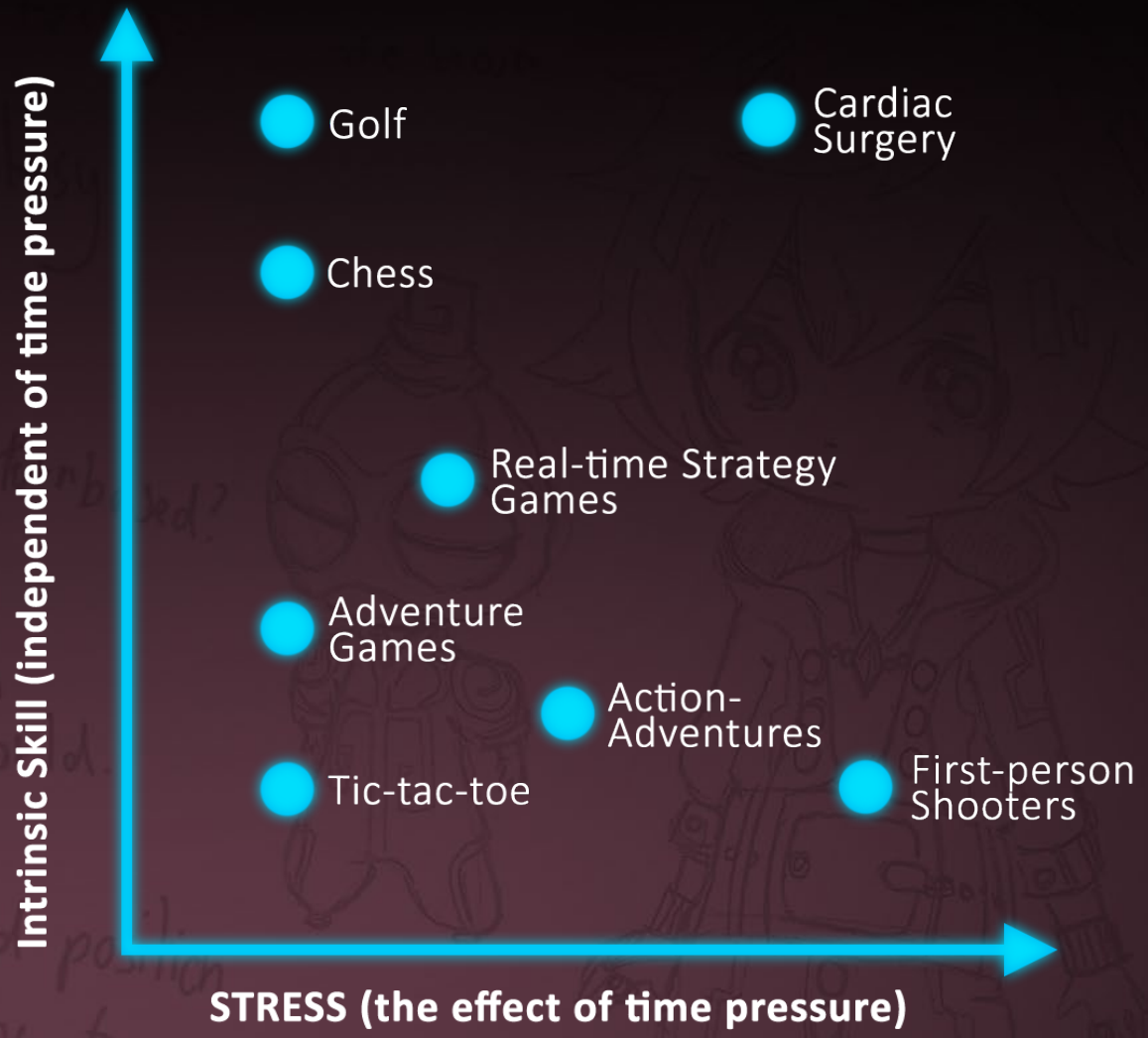
You will deter some players entirely and make the challenge more difficult.





Races and Time Pressure

Whenever you increase the time pressure on a player you should also reduce the amount of intrinsic skill required.



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Commonly Used Challenges

Factual Knowledge Challenges

Factual Knowledge Challenges





Direct tests of the player's knowledge of factual information generally occur only in trivia and quiz games.

It isn't fair to require the player to come up with some obscure fact from the real world in order to make progress through the game – doing so detracts from full immersion.

Factual Knowledge Challenges



Alex Kidd in High Tech World (Sega 1989)

Factual Knowledge Challenges

REMEMBER:

"If your game requires factual knowledge from outside the game world to win, you must make this clear to the player in advance."

(Adams & Rollings 2007: 294)

Ernest Adams & Andrew Rollings

Commonly Used Challenges

Memory Challenges

Memory Challenges

Memory challenges test the player's ability to recall things that they have seen or heard in the game.

Adventure games and role playing games often make use of memory challenges.

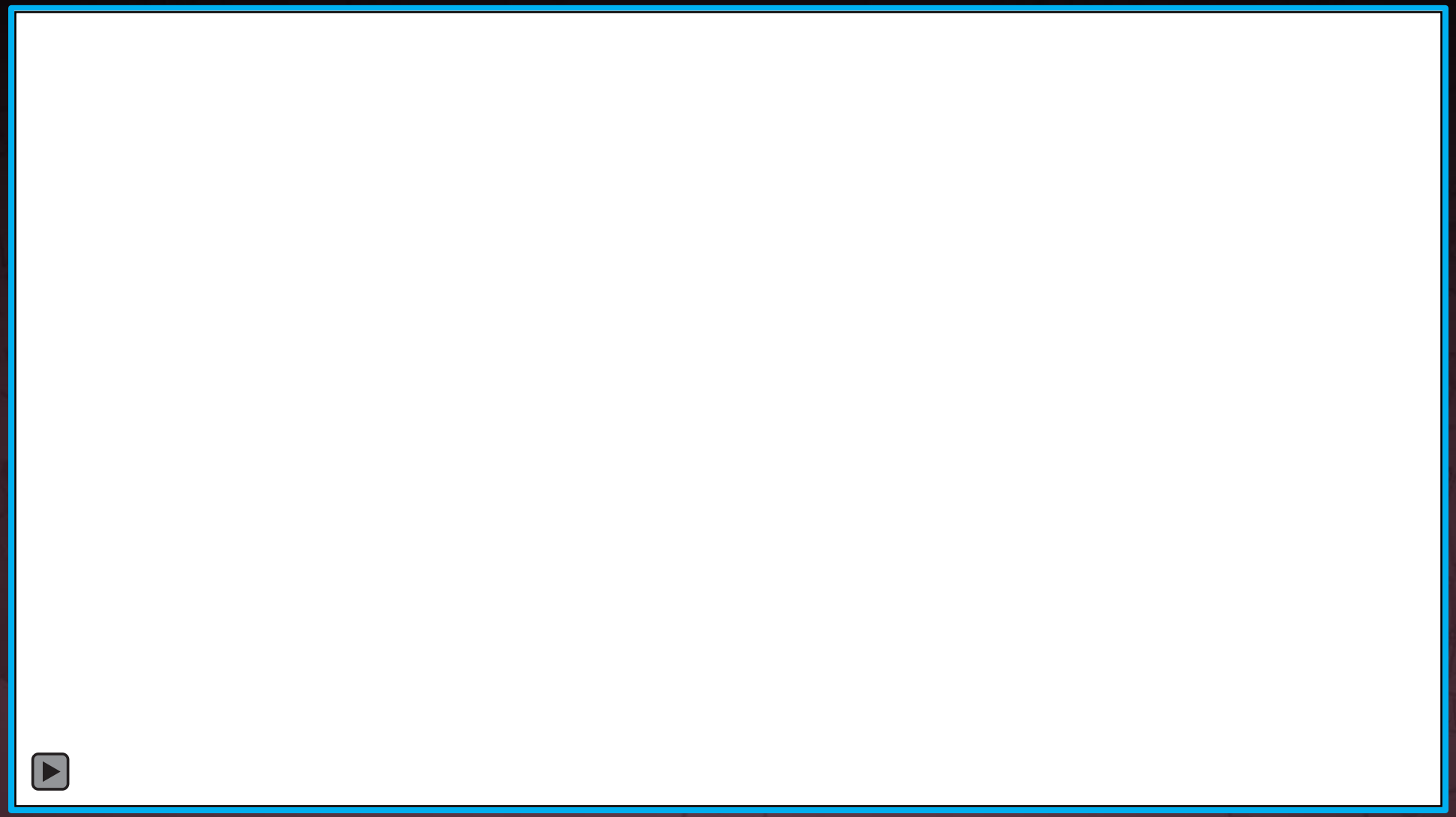
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Adventure games and role playing games often make use of memory challenges.

To make a memory challenge easier, give the player longer to memorize it and ask that they recall it soon after memorizing it rather than much later.

Memory Challenges: *Fallout 3*



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Commonly Used Challenges

Pattern Recognition Challenges

Pattern Recognition Challenges

Pattern recognition challenges test the player's ability to spot visible or audible patterns or patterns of change and behaviour.



Visual clues often appear in pattern recognition challenges.



Pattern Recognition Challenges

To make pattern recognition challenges easier, make the patterns shorter, simpler and more obvious.

Making them harder involves making the pattern longer, more intricate or more subtle.





Pattern Recognition Challenges: *DOOM* Secret Door



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Commonly Used Challenges

Exploration Challenges

Exploration Challenges

*"**Exploration is it's own reward.** Players enjoy moving into new areas and seeing new things, but exploration cannot be free of challenge or it becomes merely sightseeing. Design obstacles that make the players earn their freedom to explore."*

(Adams & Rollings 2007: 295)



Ernest Adams & Andrew Rollings

Commonly Used Challenges

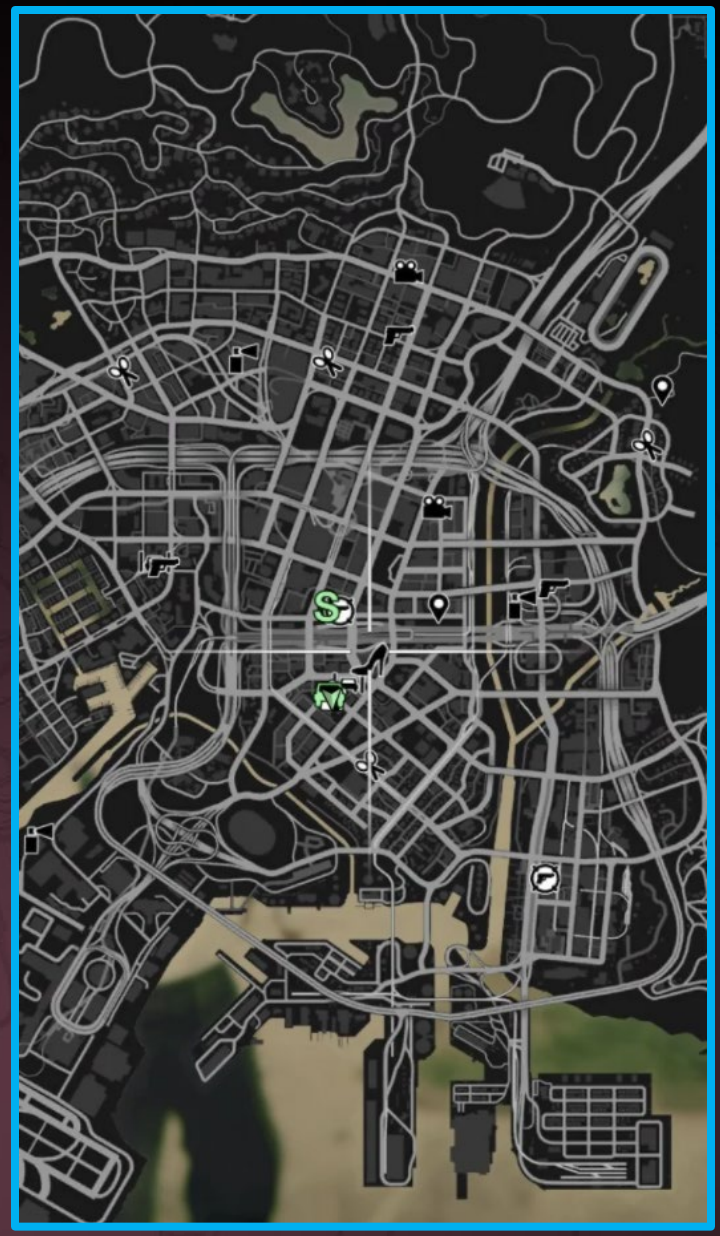
Spatial Awareness Challenges

Spatial Awareness Challenges

The most basic form of **exploration challenges** simply requires the player to learn their way around an unfamiliar and complicated space.

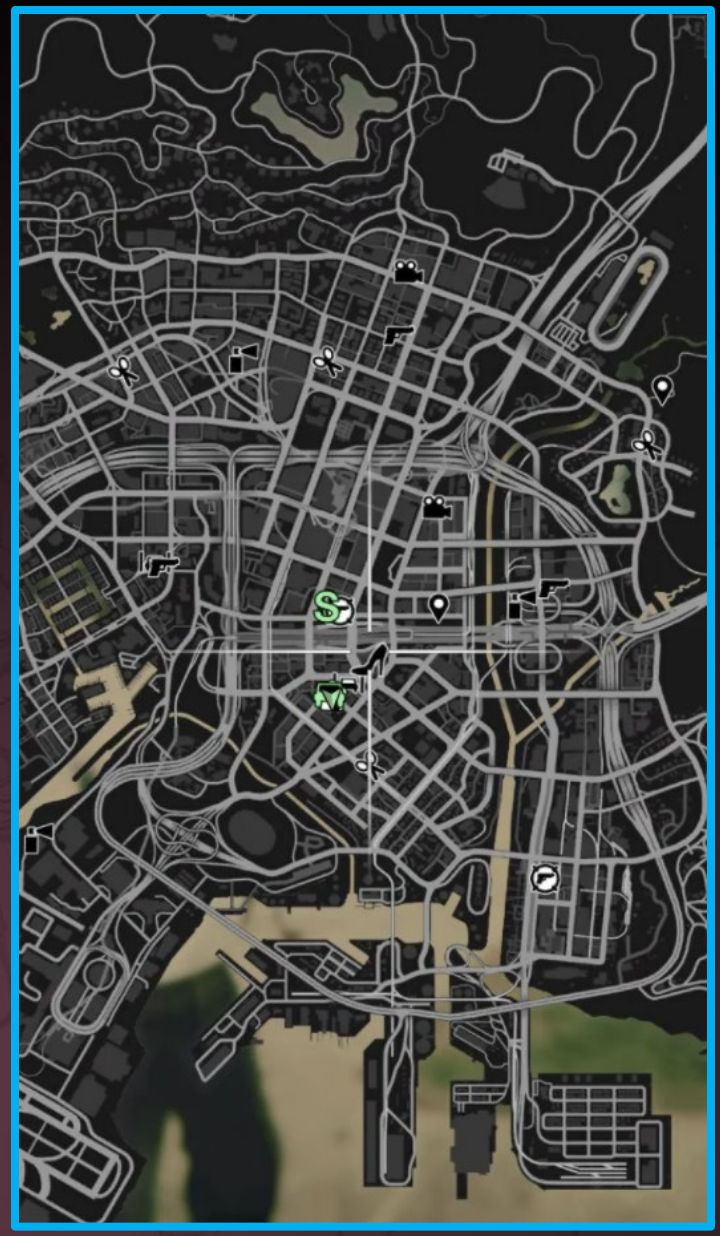
Unfamiliar architecture also challenges the player.

Navigation is easier when things look the way the player expects them to look.



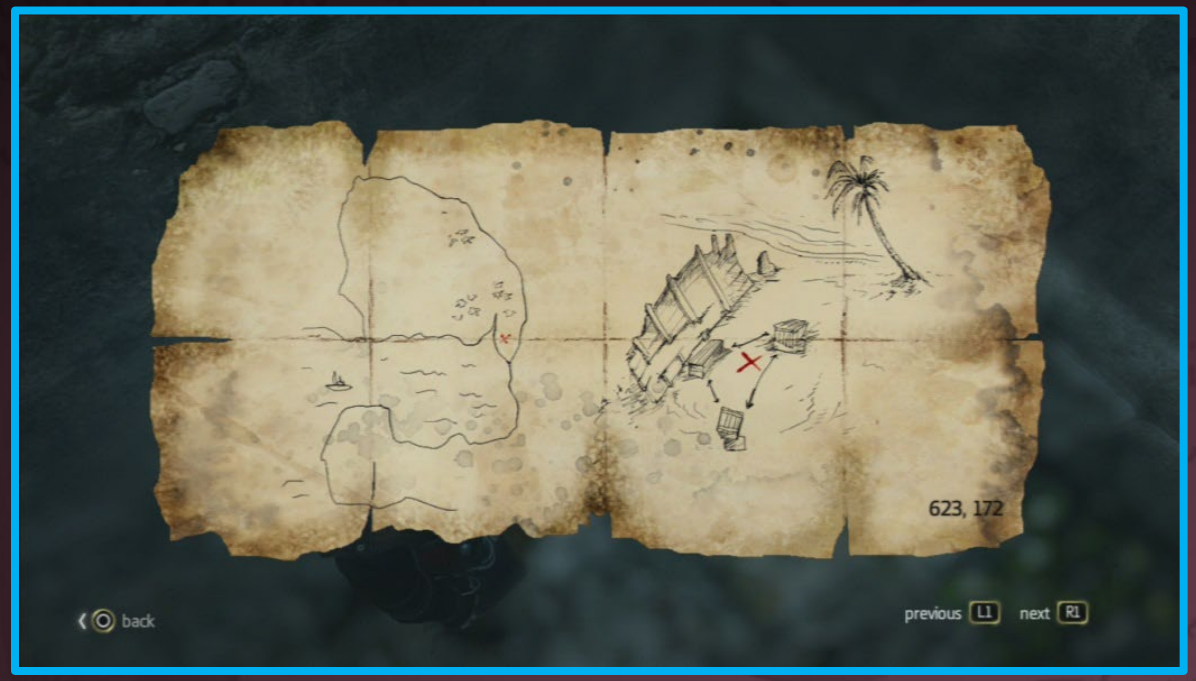
Spatial Awareness Challenges

To make spatial awareness challenges easier, give the player a map that always shows their location precisely within the game world.



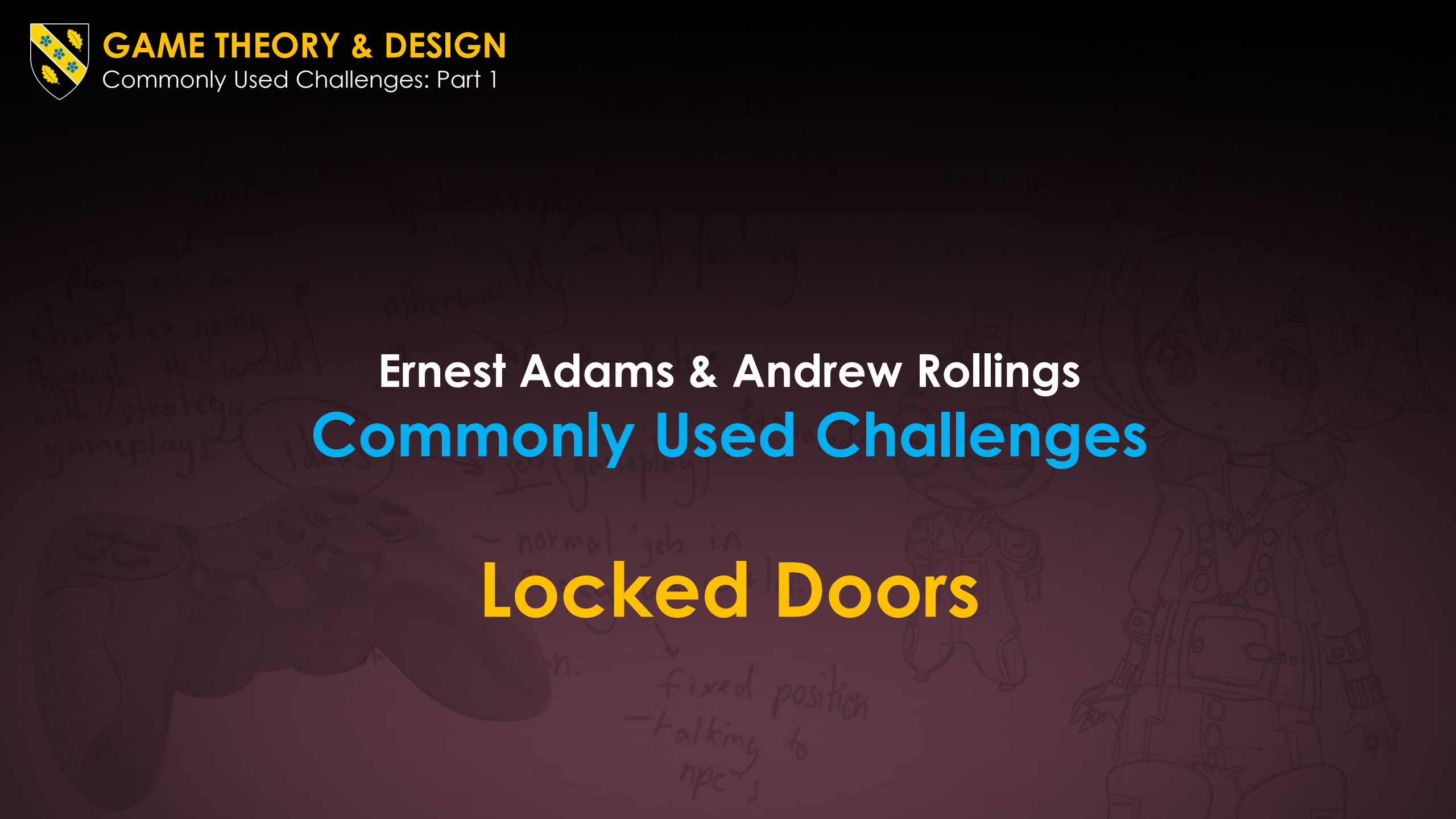
Spatial Awareness Challenges

If you want to give the player a map but make it slightly more difficult, give them a map of the game world that does not give their location so they have to work it out from landmarks.





Assassins Creed: Black Flag (2013)



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Commonly Used Challenges

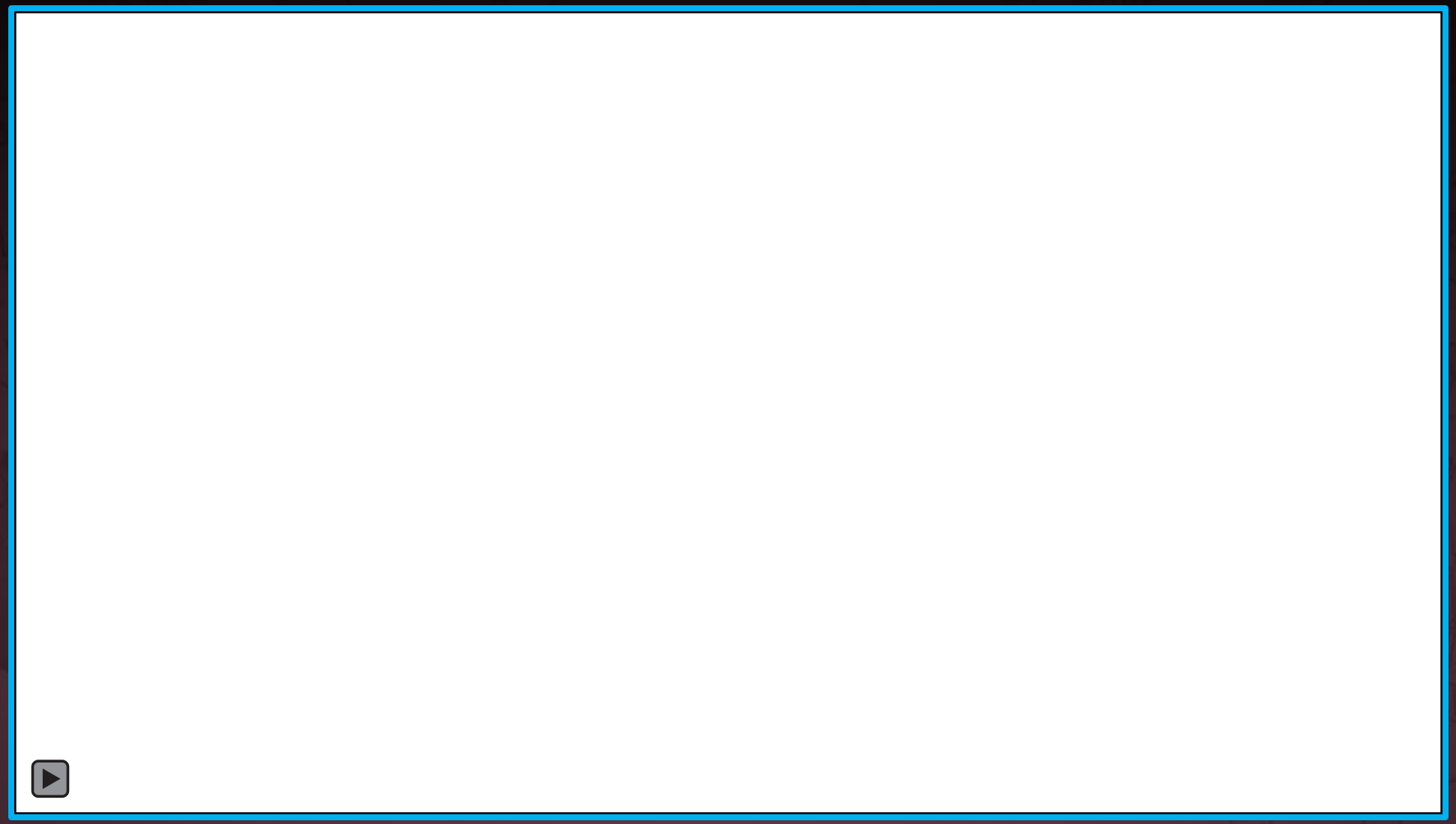
Locked Doors

Locked Doors

In this example, ***Locked Door*** is used as a generic term for any obstacle that prevents the player from proceeding through the game until they learn the trick for disabling it.



Locked Doors : *DOOM*'s Unmarked Switches



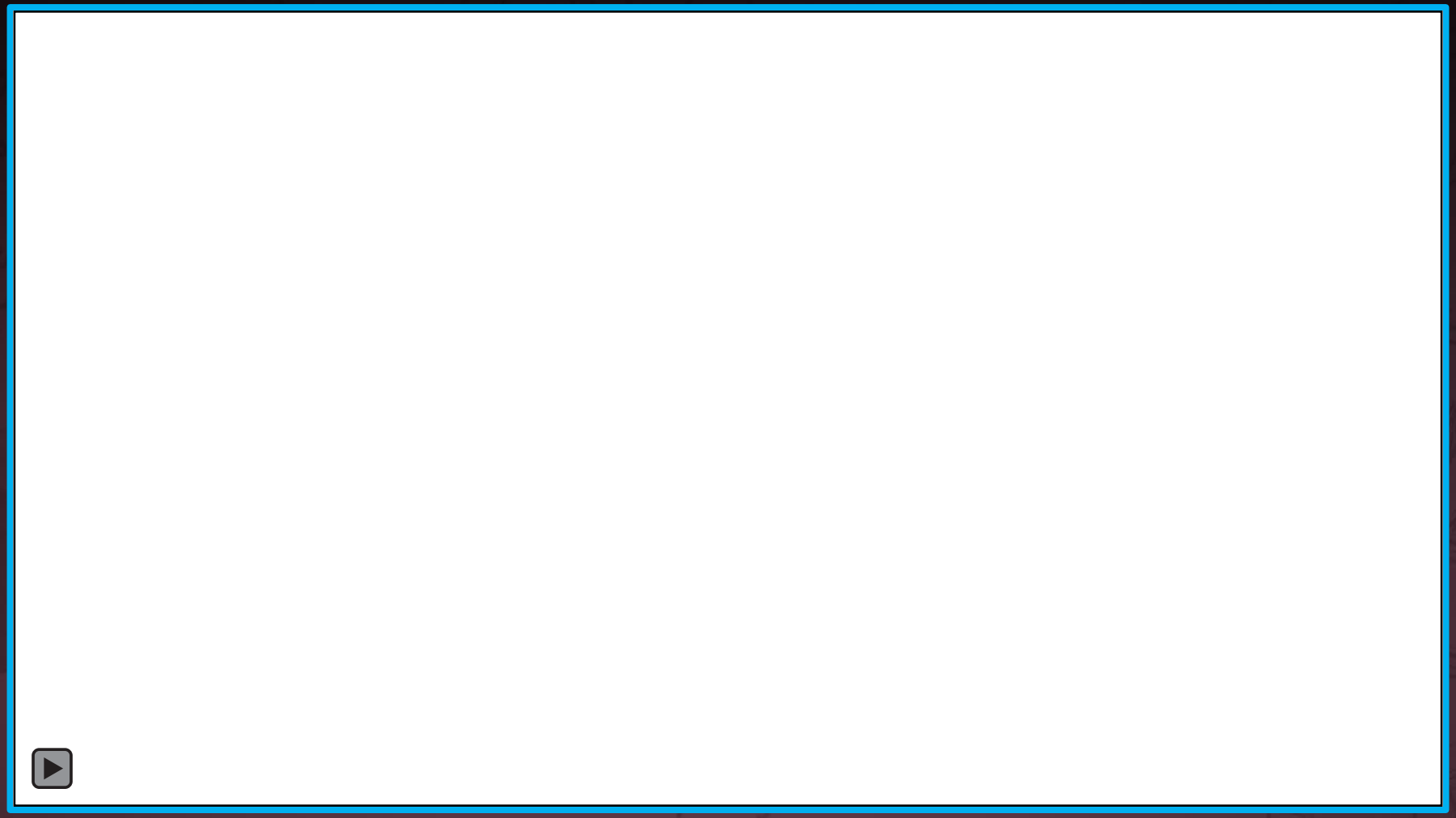
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Commonly Used Challenges

Traps

Traps

A trap is a device that harms the player's avatar when triggered – possibly killing them or causing damage.



Traps can take a variety of forms:



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- Some fire once and then are harmless

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- Some fire once and then are harmless
- Others fire once and require a certain rearming time before they can fire again

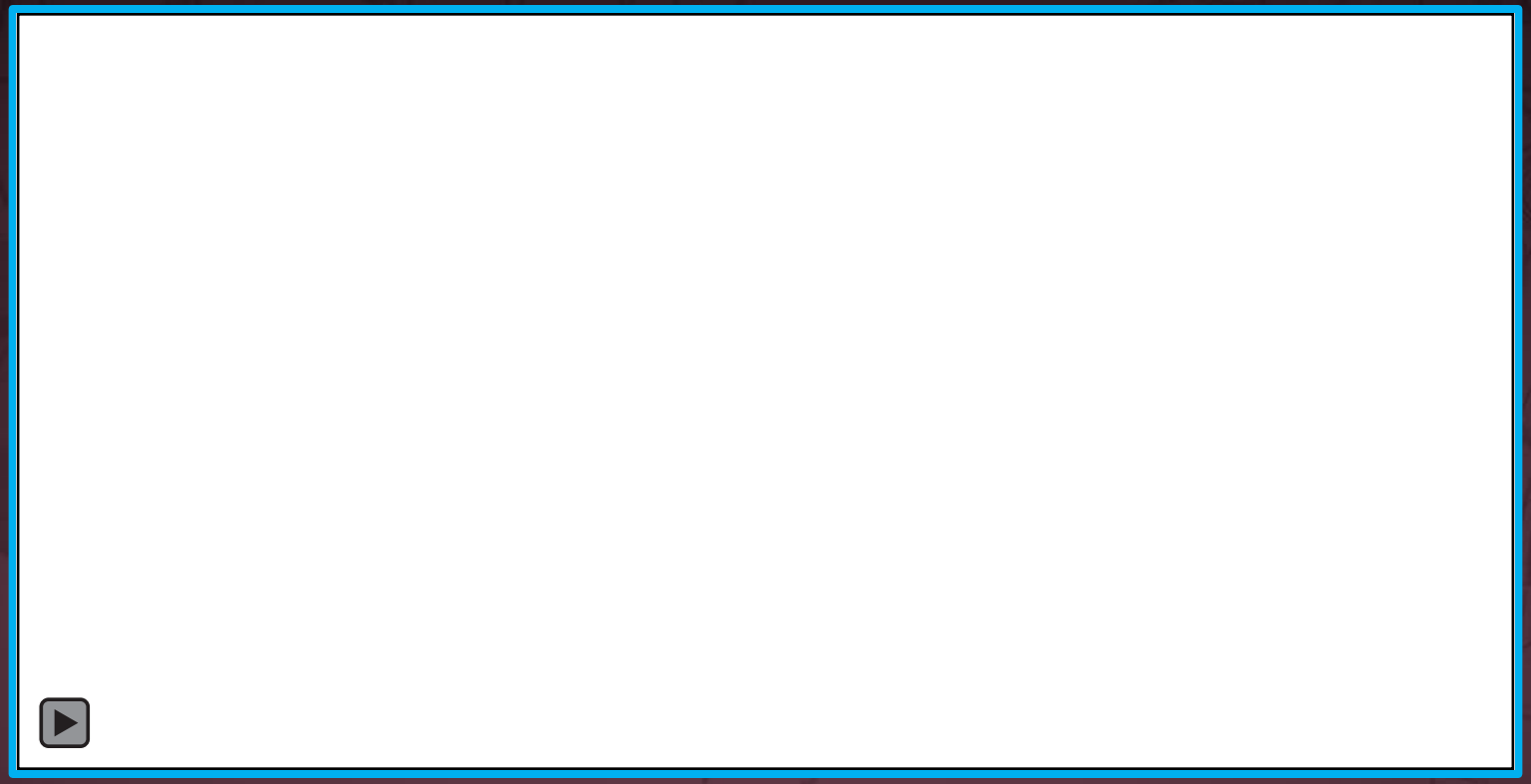
Traps can take a variety of forms:

- Some fire once and then are harmless
- Others fire once and require a certain rearming time before they can fire again
- Others respond to particular conditions but not to others and the player must learn what triggers the trap (and how to avoid triggering it)

Traps

A player may simply withstand some traps that don't do too much damage – they may disarm or circumvent other traps.

For players, the real fun comes in outwitting traps: finding and disabling them without getting caught.



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Commonly Used Challenges

Mazes and Illogical Spaces

Mazes and Illogical Spaces

A maze is an area in which every place looks alike, or mostly alike. To get out, the player must discover how the rooms or passages relate to each other, usually by wandering around.

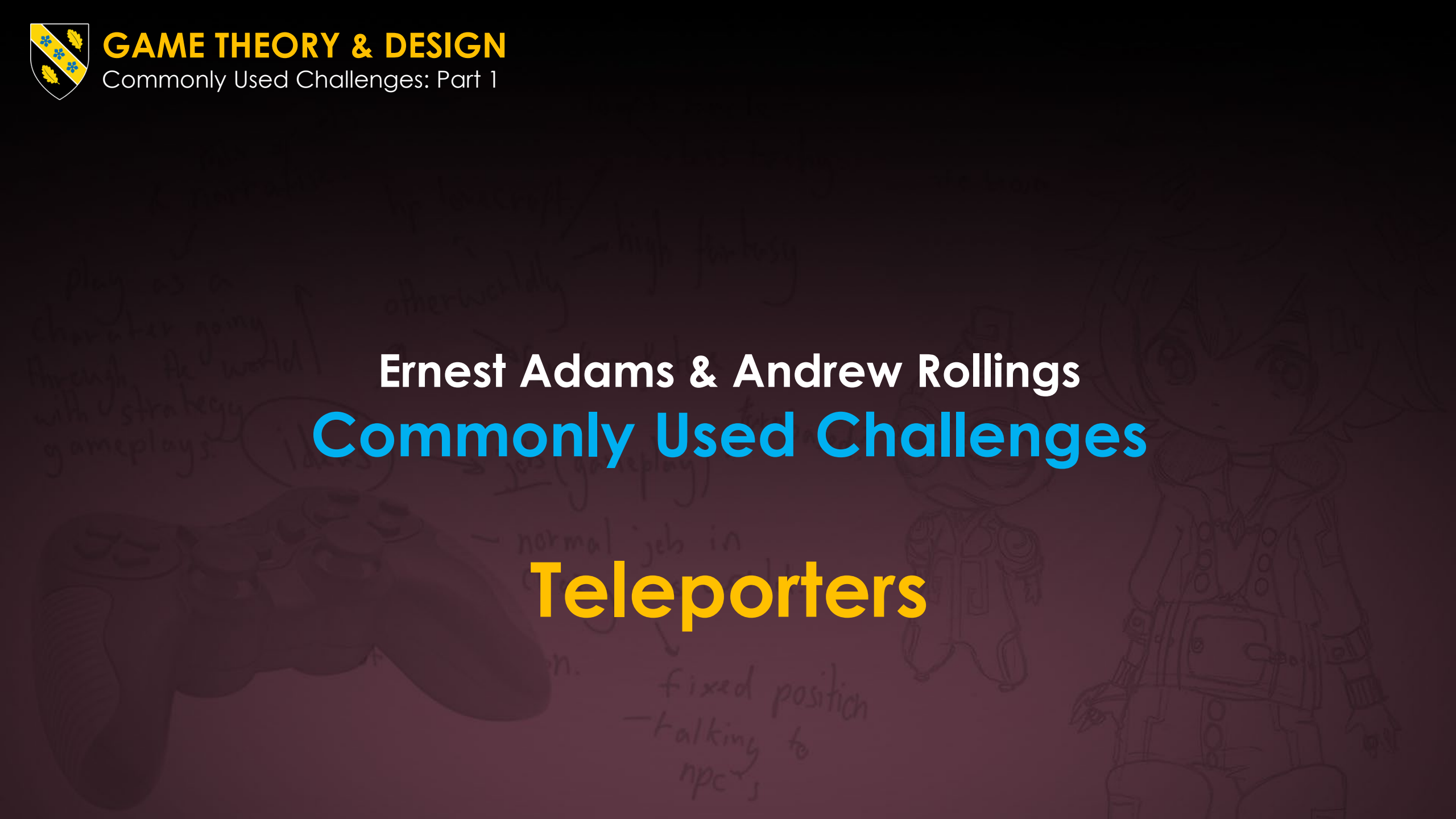
Good designers implement mazes as logic or pattern-recognition puzzles in which the player can deduce the organization of the mazes from clues found in the rooms.

Mazes and Illogical Spaces

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Good designers implement mazes as logic or pattern-recognition puzzles in which the player can deduce the organization of the mazes from clues found in the rooms.

Poor mazes offer no clues and make the player find the way out by trial and error.



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Commonly Used Challenges

Teleporters

Teleporters

A *Teleporter* is any mechanism that suddenly transports the player from where they are to another location, often without warning if the designer created no visual representation for the teleporter device.





Teleporters

To make exploration challenges created by teleports easier, make the teleporter predictable and reversible so the player can return at will to where they came from.





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Commonly Used Challenges

Summary

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Any questions?



Game Examples (Steam Library)

Examples of Commonly Used Challenges

- *DOOM* (id Software, 1993) – Spatial Awareness, Exploration, Pattern Recognition, Physical co-ordination

Bibliography

Books

Adams, E. & Rollings, A. (2007). *Fundamentals of Game Design*. Pearson Education Inc, USA.



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