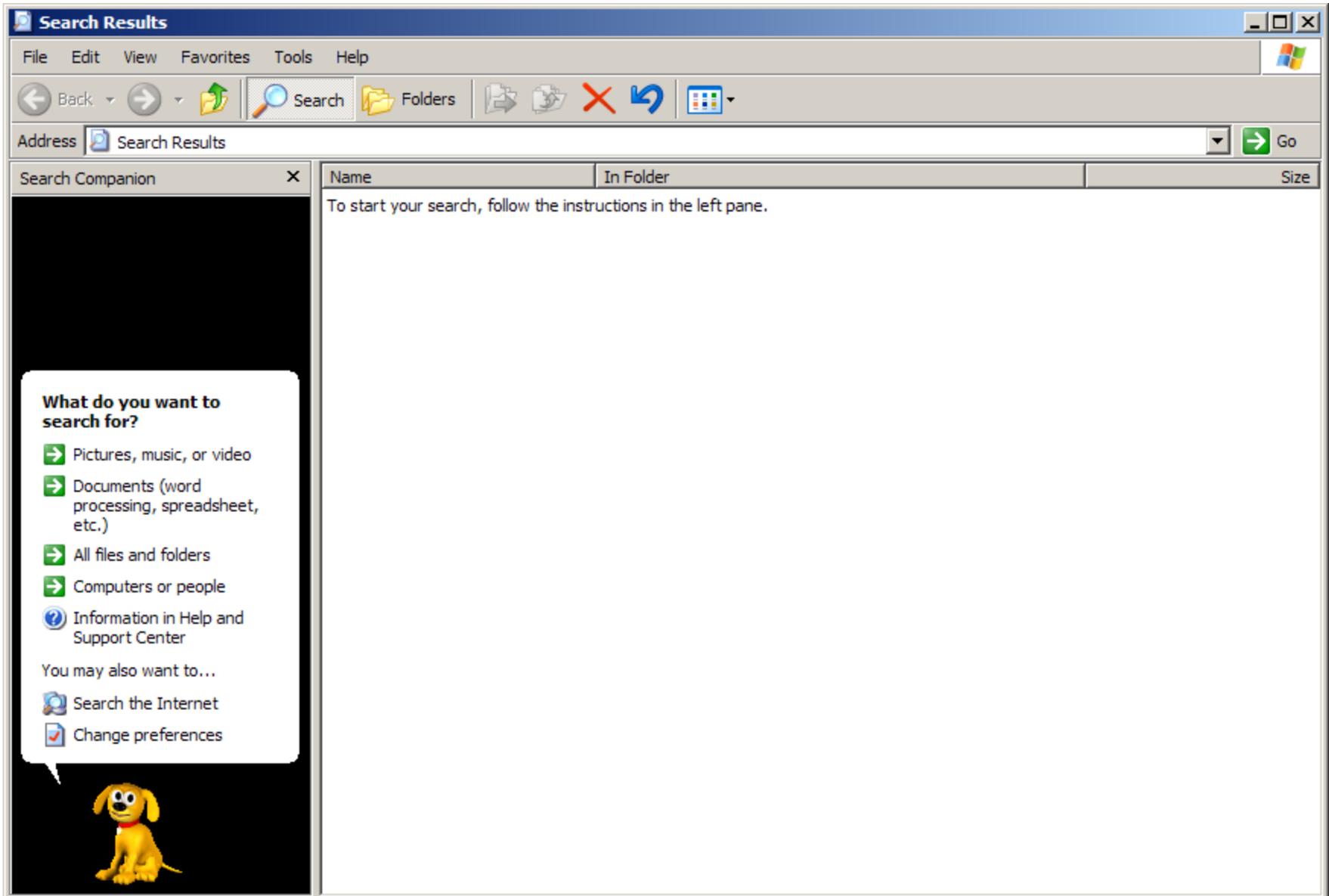


# **Game Design**

CSI 60: User Interfaces

John Canny

# Critique session



**Search Results** [min] [max] [close]

File Edit View Favorites Tools Help

Back Forward Home Search Folders Stop Refresh Home

Address Search Results [dropdown] Go

Search Companion	Name	In Folder	Size
<p><b>Search by any or all of the criteria below.</b></p> <p>All or part of the file name: <input type="text"/></p> <p>A word or phrase in the file: <input type="text"/></p> <p>Look in: <input type="text" value="Local Hard Drives (C;;N:)"/></p> <p><b>When was it modified?</b> ▶ <b>What size is it?</b> ▶ <b>More advanced options</b> ▶</p> <p>Back Search</p> 	To start your search, follow the instructions in the left pane.		

**Search Results**

File Edit View Favorites Tools Help

Back Search Folders

Address Search Results Go

Name	In Folder	Size
savedfoo.txt	C:\dev-readonly\interactiveDiagrams\exviewer	196 KB
#foo.txt#	C:\dev-readonly\interactiveDiagrams\exviewer-GIPres	1 KB
foo.txt	C:\dev-readonly\interactiveDiagrams\exviewer-GIPres	1,682 KB
foo.txt	C:\dev-readonly\interactiveDiagrams\imgtest	1 KB
foo.txt	C:\development\testCode\DestMap	320 KB
foo.txt	C:\development\testCode\HoleFill	0 KB
foo.txt	C:\development\testCode\ImageLoaderGL-BottomLeft	0 KB
foo.txt	C:\development\testCode\ImageLoaderGL-Centered	0 KB

**Searching for files with "foo.txt" in the file name. Found 8 so far.**

- Looking in Local Hard Drives (C;N;) and in subfolders.
- Looking in system folders.
- Not looking in hidden files and folders.
- Searching C:\development\testCode\Moi

Progress bar: ████

Stop



Google - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites

Address http://www.google.com/webhp

Google interface hall of shame Search PageRank 32 blocked Check AutoLink AutoFill Options

Personalized Home | Sign in

# Google™

Web Images Video <sup>New!</sup> News Maps more »

Advanced Search  
Preferences  
Language Tools

Google Search I'm Feeling Lucky

Advertising Programs - Business Solutions - About Google

[Graduating? Come work with us.](#)

©2006 Google

Done

foo.txt - Google Search - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites

Address http://www.google.com/search?hl=en&q=foo.txt

Google foo.txt Search PageRank 32 blocked Check AutoLink AutoFill Options

agrwwala@gmail.com | My Account | Sign out

# Google

Web Images Video <sup>New!</sup> News Maps more »

foo.txt Search Advanced Search Preferences

Web Results 1 - 100 of about 169,000 for foo.txt. (0.84 seconds)

['echo foo.txt' like "cat foo.txt" thread - MARC](#)  
Viewing messages in thread 'echo foo.txt' like "cat foo.txt". Viewing messages in list ant-user - 2006-08-01 - 2006-09-01 (211 messages) ...  
[marc2.theaimsgroup.com/?t=112270878200001&r=1&w=2](#) - Similar pages

['Re: echo foo.txt' like "cat foo.txt" - MARC](#)  
and the destination file is "\$[outputDir]/bar.txt", so that foo.txt > will be appended to bar.txt yes? > > I must have at least one thing wrong/not ...  
[marc2.theaimsgroup.com/?t=ant-user&m=112276734619771&w=2](#) - Similar pages  
[ More results from marc2.theaimsgroup.com ]

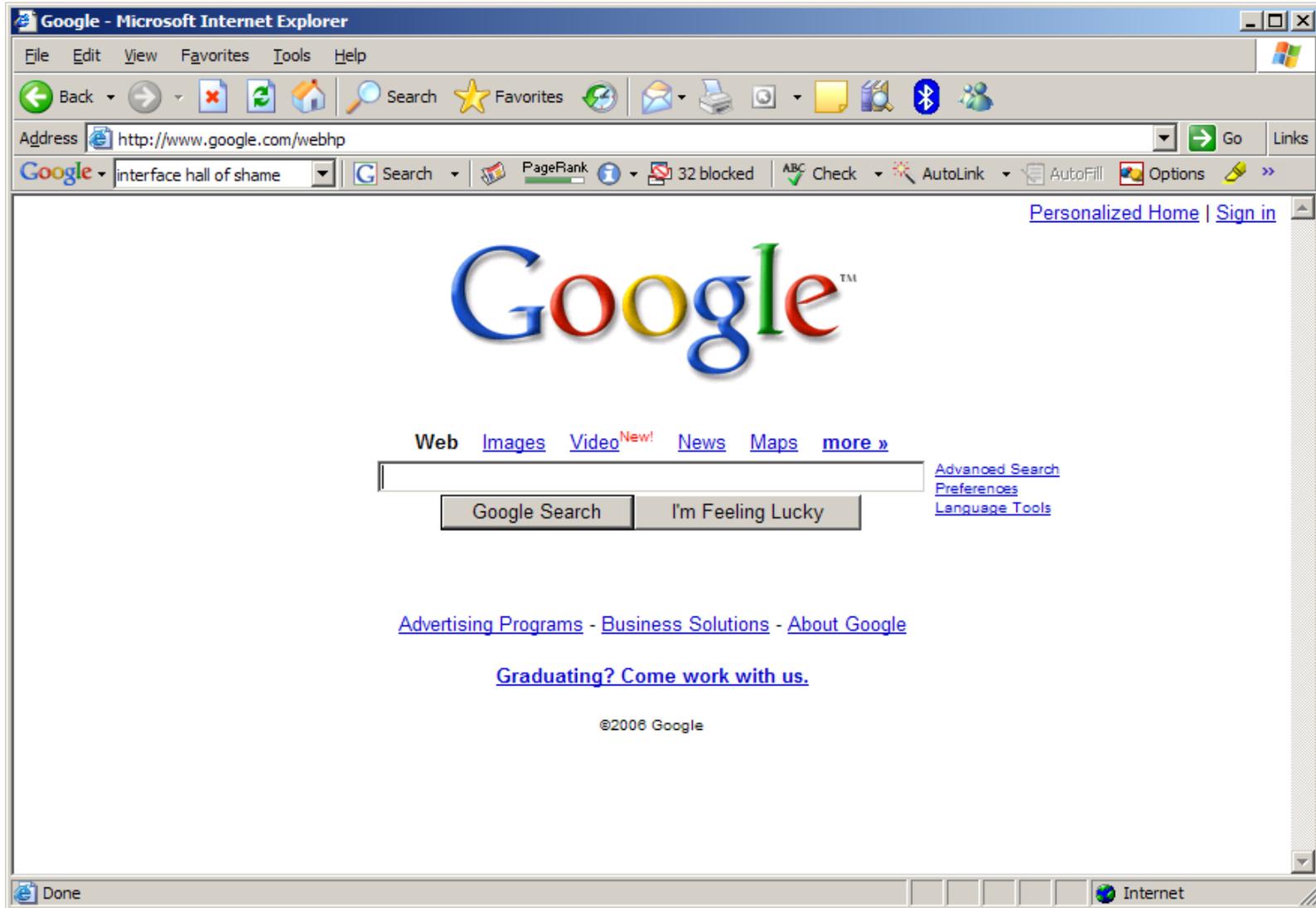
[can't include 'http...foo.php', but can include 'http...foo.txt' - PHP](#)  
can't include 'http...foo.php', but can include 'http...foo.txt', a discussion topic in our PHP forum. Join us for more discussions on software, scripts, ...  
[www.thescrpts.com/forum/thread1131.html](#) - 35k - Cached - Similar pages

[can't include 'http...foo.php', but can include 'http...foo.txt' - 1](#)  
can't include 'http...foo.php', but can include 'http...foo.txt'. Join us for more discussions on PHP, software, scripts, programming and more.  
[www.thescrpts.com/forum/post3156-1.html](#) - 21k - Cached - Similar pages  
[ More results from www.thescrpts.com ]

[SandBox/MySubPage: foo.txt - The Trac Project - Trac](#)  
SandBox/MySubPage: foo.txt. File foo.txt. 11 bytes (added by anonymous, 7 months ago).  
Line 1. This is foo. Download in other formats: Original Format ...  
[trac.edgewall.org/attachment/wiki/SandBox/MySubPage/foo.txt](#) - 7k - Cached - Similar pages

[encoding: utf-8 -> from trac attachment import Attachment ...](#)  
assertEqual('foo.txt', attachment.filename) attachment = Attachment(self.env, ...  
assertRaises(AssertionError, attachment.insert, 'foo.txt', tempfile ...  
[trac.edgewall.org/browser/trunk/trac/tests/attachment.py?rev=3186&format=txt](#) - 9k - Cached - Similar pages  
[ More results from trac.edgewall.org ]

Internet



- Clean interface
- Good defaults (guess meaning of query)

foo.txt - Google Search - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites RSS Print Mail News Groups

Address http://www.google.com/search?hl=en&q=foo.txt Go Links

Google foo.txt Search PageRank 32 blocked Check AutoLink AutoFill Options

agr awala@gmail.com | My Account | Sign out

Web Images Video<sup>New!</sup> News Maps more »

foo.txt Search Advanced Search Preferences

**Web** Results 1 - 100 of about 169,000 for foo.txt. (0.84 seconds)

['echo foo.txt, like "cat foo.txt"' thread - MARC](#)  
Viewing messages in thread 'echo foo.txt, like "cat foo.txt"'. Viewing messages in list ant-user - 2006-08-01 - 2006-09-01 (211 messages) ...  
[marc2.theaimsgroup.com/?t=11227087820001&r=1&w=2](#) - [Similar pages](#)

['Re: echo foo.txt, like "cat foo.txt"' - MARC](#)  
and the destination file is "\${outputDir}/bar.txt", so that foo.txt > will be appended to bar.txt  
yes? > > 1 must have at least one thing wrong/not ...  
[marc2.theaimsgroup.com/?l=ant-user&m=112276734619771&w=2](#) - [Similar pages](#)  
[ [More results from marc2.theaimsgroup.com](#) ]

[can't include 'http...foo.php', but can include 'http...foo.txt' - PHP](#)  
can't include 'http...foo.php', but can include 'http...foo.txt', a discussion topic in our PHP forum. Join us for more discussions on software, scripts, ...  
[www.thescripts.com/forum/thread1131.html](#) - 35k - [Cached](#) - [Similar pages](#)

[can't include 'http...foo.php', but can include 'http...foo.txt' - 1](#)  
can't include 'http...foo.php', but can include 'http...foo.txt'. Join us for more discussions on PHP, software, scripts, programming and more.  
[www.thescripts.com/forum/post3156-1.html](#) - 21k - [Cached](#) - [Similar pages](#)  
[ [More results from www.thescripts.com](#) ]

[SandBox/MySubPage: foo.txt - The Trac Project - Trac](#)  
SandBox/MySubPage: foo.txt. File foo.txt, 11 bytes (added by anonymous, 7 months ago).  
Line. 1, This is foo. Download in other formats: Original Format ...  
[trac.edgewall.org/attachment/wiki/SandBox/MySubPage/foo.txt](#) - 7k - [Cached](#) - [Similar pages](#)

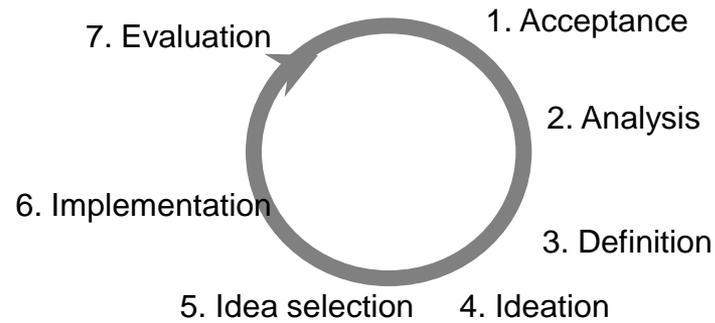
[encoding: utf-8 -\\* from trac.attachment import Attachment ...](#)  
assertEqual(foo.txt, attachment.filename) attachment = Attachment(self.env, ...  
assertRaises(AssertionError, attachment.insert, 'foo.txt', tempfile. ...  
[trac.edgewall.org/browser/trunk/trac/tests/attachment.py?rev=3186&format=txt](#) - 9k - [Cached](#) - [Similar pages](#)  
[ [More results from trac.edgewall.org](#) ]

Internet

Results in context

# Review

## The Design Cycle



## Brainstorming



# Topics

- Game Structure
- Dramatic Elements

# Game Structure

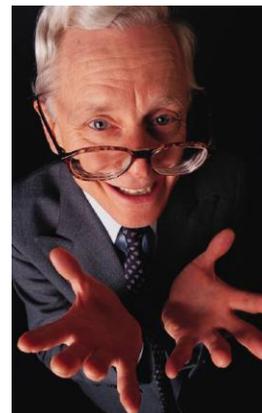
- Players
- Objectives
- Procedures
- Rules
- Resources
- Conflict
- Boundaries
- Outcome

# Players

Deciding on the target players is probably the most important step in designing a game.

Your design has to match players’:

- Interests
- Skills
- Education
- Taste/Personality
- Time available



# Players

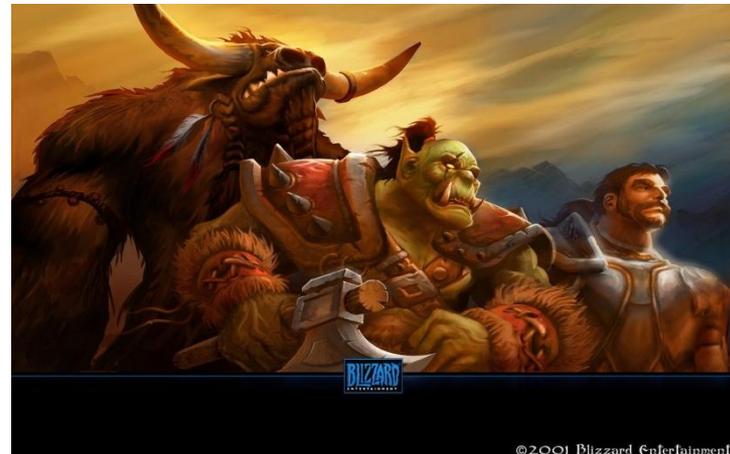
Traditional e-game genres are gender-biased:

First-person shooter, almost entirely male.

Racing, sports, Action, target male audiences.

MMORPG (Massively Multiplayer Online  
Role-Playing Games) Everquest, WoW,  
Final Fantasy,... 85% male

Source: [Daedalus project](#)



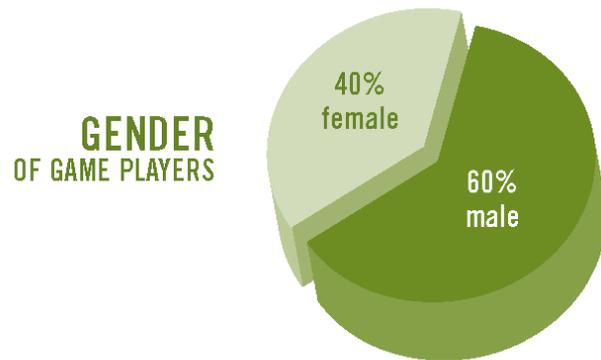
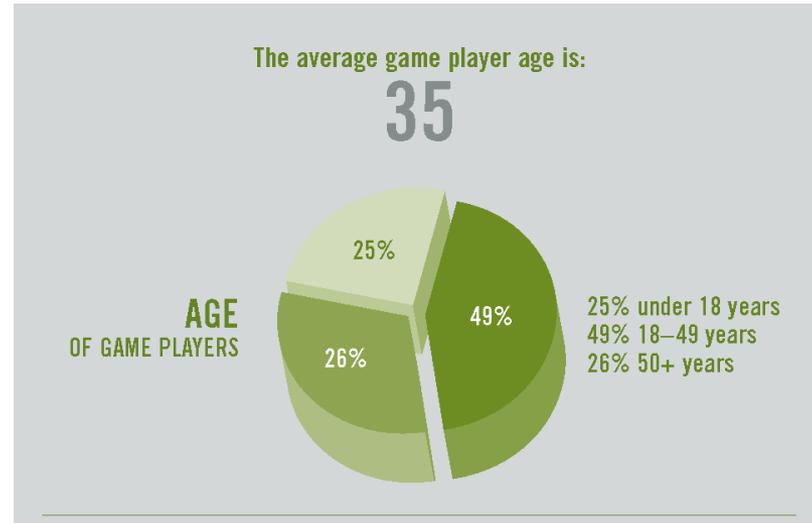
# Players

Life Simulation: The SIMS, most successful  
PC game ever, players 82% female



# Players

Gamers are diversifying:  
Average age 35 now



About 40% of gamers are women

Source: Entertainment Software Association [Essential Facts 2008](#)

# Players

But be careful, the diversification of gamer demographics seems to be due more to growth in targeted products (for women, families) than to “universal games”.

Games with broad appeal:

- Board games, Backgammon, Chess,...
- Card games
- Puzzles
- “Casual games” (Wii + Wii Fit)??

Nintendo’s demographics: 80% of Wii owners are male, but 45% of other household members who use it are female??

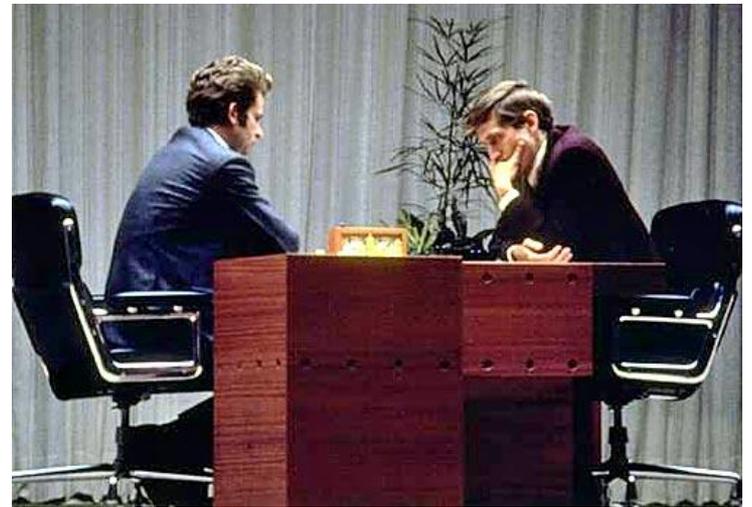
Is there a “console bias”?

# Players playing

When players play, they agree to adopt the rules and objectives of a game.

Voluntary choice is a key part of game play. Sometimes players need to negotiate the rules before they agree...

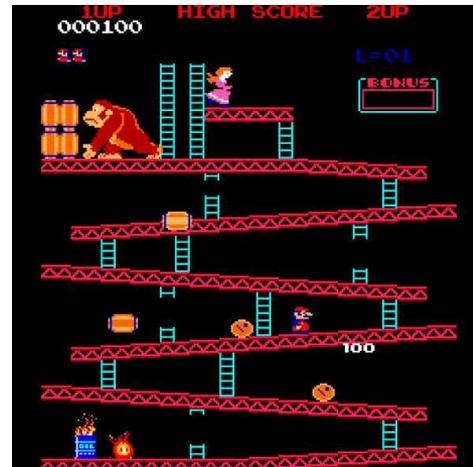
Choice allows players to “get into the game” and enjoy the experience.



# Objectives

What players try to do in the game:

- Capture opposing pieces (Chess, Checkers) while not losing your own.
- Reach a higher level (Donkey Kong)
- Hit the ball in the right place.



# Objectives

Open-ended games:

- Keep your charges healthy and happy (Tamagotchi, Pleo, Sims 2).
- Customize your world (Pleo, Sims 2)
- Make something (WoW add-ons, Sims 2 mods etc.).



# Objectives

Social objectives:

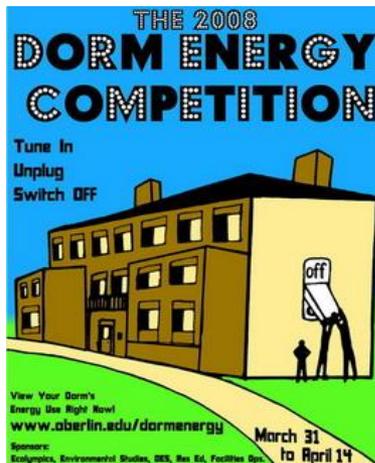
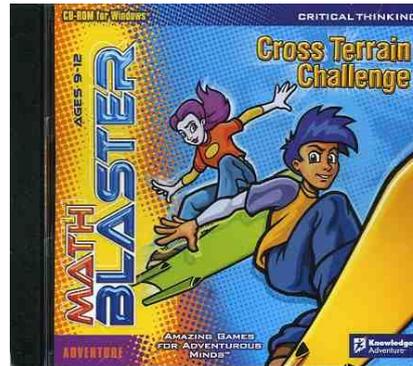
- Play in a community (WoW Guilds).
- Exchange or sell your work (Sims 2).



# Serious Game Objectives

Serious games bring external objectives into game play:

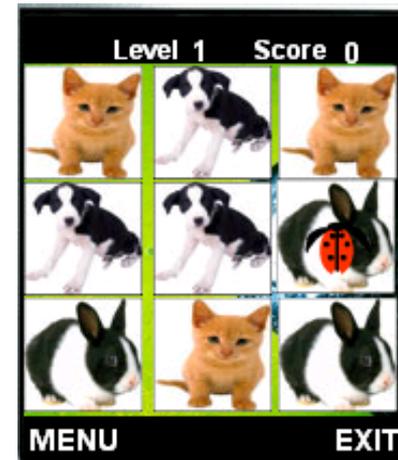
- Learning
- Fitness
- Saving energy
- Eating healthy...



# Serious Game Objectives

Learning can be injected into many existing games as an objective independent of other game objectives.

e.g. players need to recognize a vocabulary word to take the right action.



# Serious Game Objectives

An interesting example is a Sims 2 [foreign language class](#).

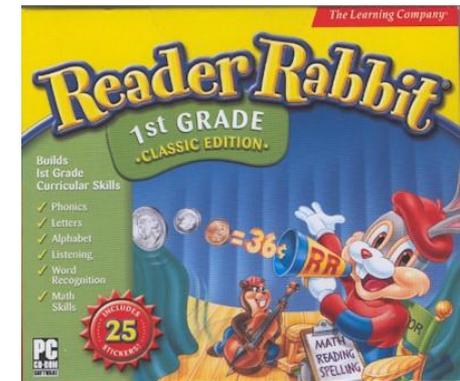
Sims 2 already supports many languages, a registry edit can change an English installation to any of these. Additional language can be added to the game with mod'ing tools

A teacher carefully plans the lessons using the Sims – open-ended games do not seem good for self-learning.



# Serious Game Objectives

Or, the game can be designed so that learning objectives relate more directly to game objectives. These games are designed from the ground up as learning games.

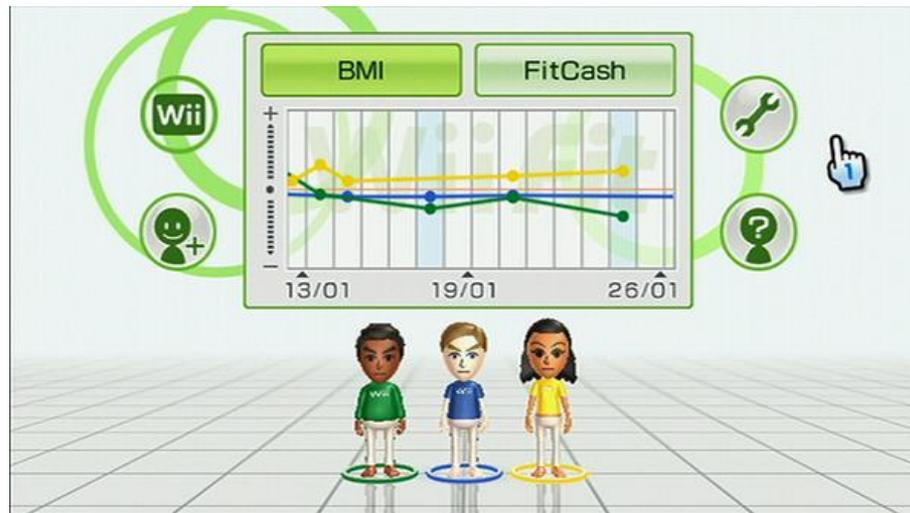


“Talking Walls” - Edmark

# Serious Game Objectives

Wii fit uses estimates of calorie burn and measurements of weight and balance to track fitness.

It also asks players to set weight loss goals by specific date.



# Procedures

“The actions or methods of play allowed by the rules”

Chess: move one piece at a time

Go Fish: dealing cards, ask for card, pick up from deck,...

Quake: list of allowable actions,...

Procedures are of great interest to game UI designers, since they have to be achieved through the interface.

# Procedures and the UI

Fast action games usually need the common procedures mapped directly to game controller buttons. Its best to follow conventions for button semantics.



PC games have more flexibility, but may opt for a virtual controller anyway. Sims 2 character control:



# Procedures and the UI

Current hardware offers very rich control.

Wiimote + nunchuk gives:

- 6 acceleration/gravity values from two units
- 2 pointing axes
- 2 joystick axes
- 13 buttons
- 4 output LEDs
- Rumble output



Multiple Wiimote Tester

Wiimote 1

**Wiimote**

- A
- B
- 
- Home
- +
- 1
- 2
- Up
- Down
- Left
- Right

**Wiimote Accel**

{X=-0.16, Y=-0.1153846, Z=0.9615384}

**Nunchuk**

{X=-0.9038461, Y=0.04081633, Z=0.34}

- C
- Z

**IR**

{X=0.9848559, Y=0.07166124}, 0  
{X=0.8988764, Y=0}, 0

IR3  
IR4  
{X=1008, Y=55}  
{X=920, Y=0}

IR3Raw  
IR4Raw

- IR 1
- IR 2
- IR 3
- IR 4

**Battery**

72.92

Nunchuk

**Outputs**

- LED1
- LED2
- LED3
- LED4
- Rumble

# Rules

Are the heart of games. They define how the game can be played, how difficult it is, how fair it is, etc.

Chess: allowable moves for each piece

Go Fish: What card actions can be done and when

In casual games, players accept and follow the rules themselves

Competitive games rely on referees to keep and apply the rules

# Rules

In digital games, rules are enforced by software. The challenge is to educate users about the rules, which can be very complex.

## Approaches:

- Build tutorials (e.g. by tracing actual play) to show what can and cannot be done in various situations.
- Show a set of legal moves at any point in the game.
- Try to keep rules consistent across different parts of the game.
- Give users help messages if they attempt illegal actions.

# Resources

Game elements that enhance a player's success, but are scarce.

e.g. weapons, shields, energy, keys, etc.

They are the game's currency. They can often be traded for real or virtual money.

They tend to keep players in a game over long periods of time.



# Resources

Open-ended games often encourage players to build their own resources.

Creators earn status in the community based on what they build.



# Conflict

Games need to challenge in order to entertain. Conflicts exist:

- Between competing players in multiplayer games
- Between individual players objectives and the game's rules and procedures.
- Between the current task and player's current skill level.
- It seems almost impossible for users to enjoy success without a struggle first...

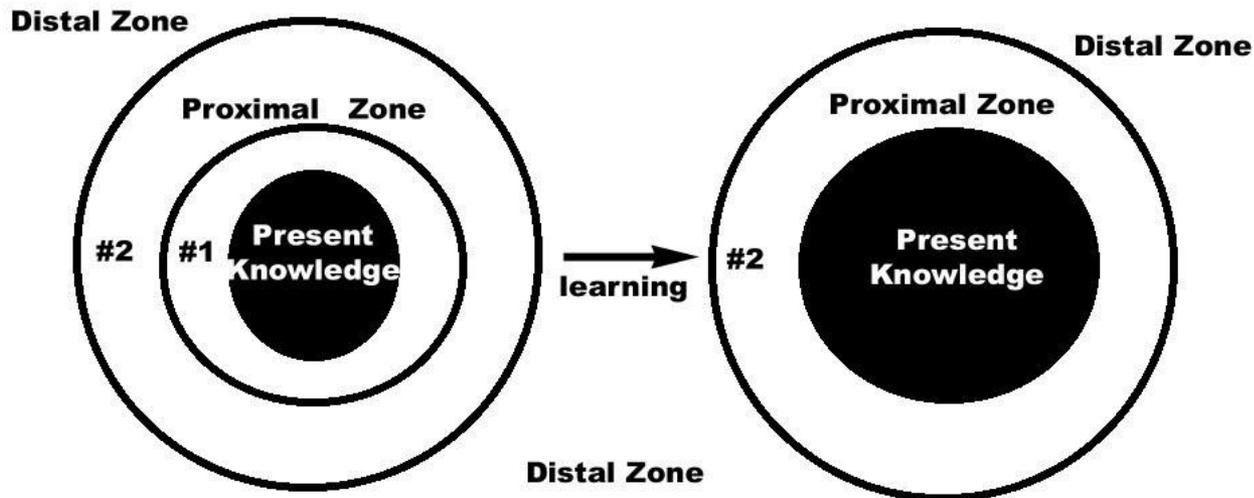


# Conflict in learning

Human learners learn best in the “Zone of Proximal Development”.

This is the set of tasks that they cannot do (or do easily) by themselves, but can do with a little help from someone else.

A similar “sweet spot” or difficulty conflict applies to games.



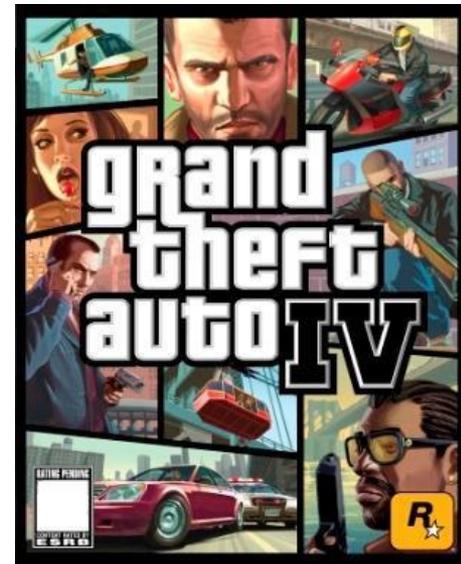
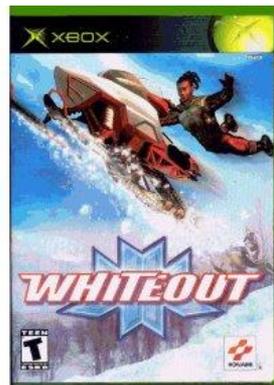
# Boundaries

Part of the attraction of games is their separation from reality.

“What happens in Vegas stays in Vegas”

Much of what happens in leading games is illegal or unsafe.

Exploration of these activities in the game is “safe” because the player knows they’re in the game.



# Outcome

What happens when the game is won or lost, or when it concludes.

- In Chess, at checkmate
- In Go Fish, the player with the most books
- In a shooting contest, at the end of the time limit



# Outcome

Many newer “games” are open-ended. There is no “end” of the game, and no easy way to define an outcome.

The Sims, Second Life, many MMORPGs fall in this category, and stretch the definition of “game”.

These games especially encourage creative work, and the players creations are arguably the main outcome of the game.



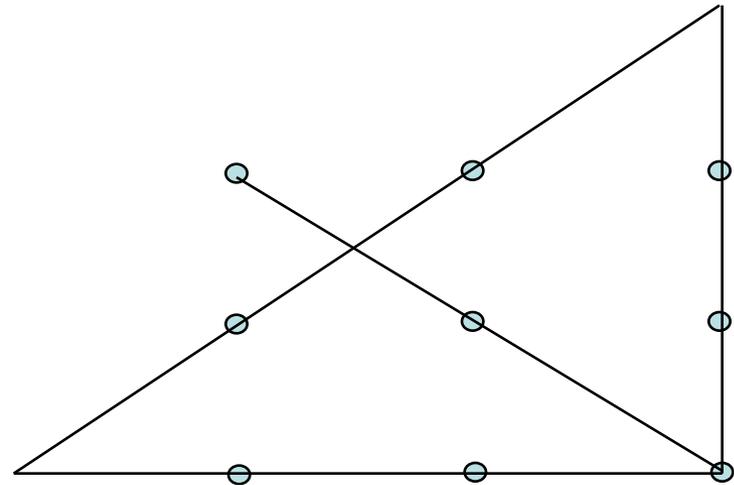
# Game Structure

- Players
- Objectives
- Procedures
- Rules
- Resources
- Conflict
- Boundaries
- Outcome

# Puzzles

Basic features:

- A puzzle is fun
- A puzzle has a right answer (and many wrong answers)
- A puzzle is challenging
- Puzzles are often surprising – they expose and break down our expectations
- Ex: draw four straight lines through these points w/o lifting pen from paper



# Puzzles

Puzzles often involve an explicit search of the space of legal solutions, e.g.

- Scrambled words
- Jigsaw puzzles
- Crossword puzzles

And the allowable actions may be awkward for the task, e.g. Rubik's cube.

Puzzles can benefit from mathematical analysis to simplify the search process (e.g. the group structure in Rubik's cube).

# Puzzles

Are normally solved just once and do not support extended play.

But can be used in the context of a larger game (e.g. Myst).

Some well-executed math education games rely on integrated puzzles.



# Engaging the Player

Is the magic formula for a successful game. Some elements:

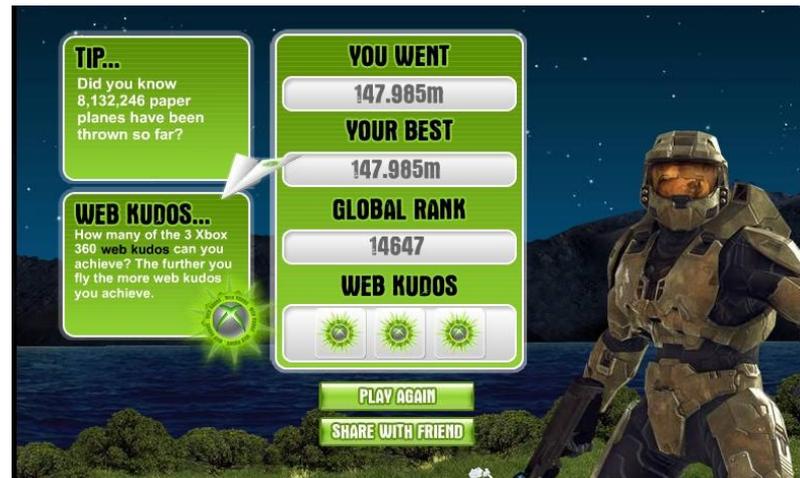
- Challenge
- Play
- Premise
- Character
- Story

# Challenge

Players always want to see improvement in their game, and to feel like they are acquiring new skills through game play.

For games with clear outcomes, these should accept a wide range of player abilities – and provide challenge.

Players should be able to see their progress.



# Play(fulness)

“It’s a game, stupid!”

Most of the great game franchises are wonderfully playful.

No matter how complex the game play, they never seem to lose track of the absurdity of the player’s situation.



Sims 2 fight



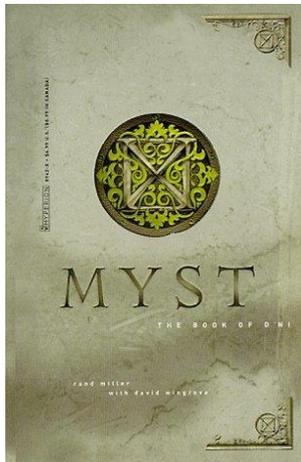
Wii Celebrity Mii

# Premise

A set of core assumptions about the world the players play in.

e.g. *Myst* is the aftermath of a feud between two brothers. The player has to explore an island to uncover the mystery.

In a racing game, the player is a driver participating in organized and/or illegal races.



# Character

Like any good book, great characters make a game memorable. Characters are a mix of qualities. They may have “triggers” from the story line that spring them into action. Characters should not be over-the-top, understated behavior adds interest and charm.

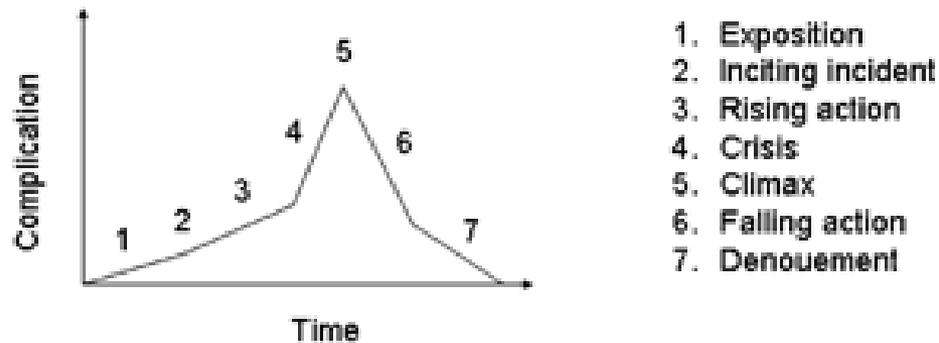


# Story

The story should move “somewhere” as play unfolds.

Ideally there is a “dramatic arc” as tension builds due to conflicts in the story, until it is relieved by a resolution of the conflict.

In open-ended games, there may be many such cycles during a period of play.



# Story

Not every game should have a real storyline (e.g. Wii tennis).

On the other hand, even a simple storyline can enhance a game:

- By playing someone else (Boundaries)
- By defining characters the player can explore
- By creating a stronger reason to play



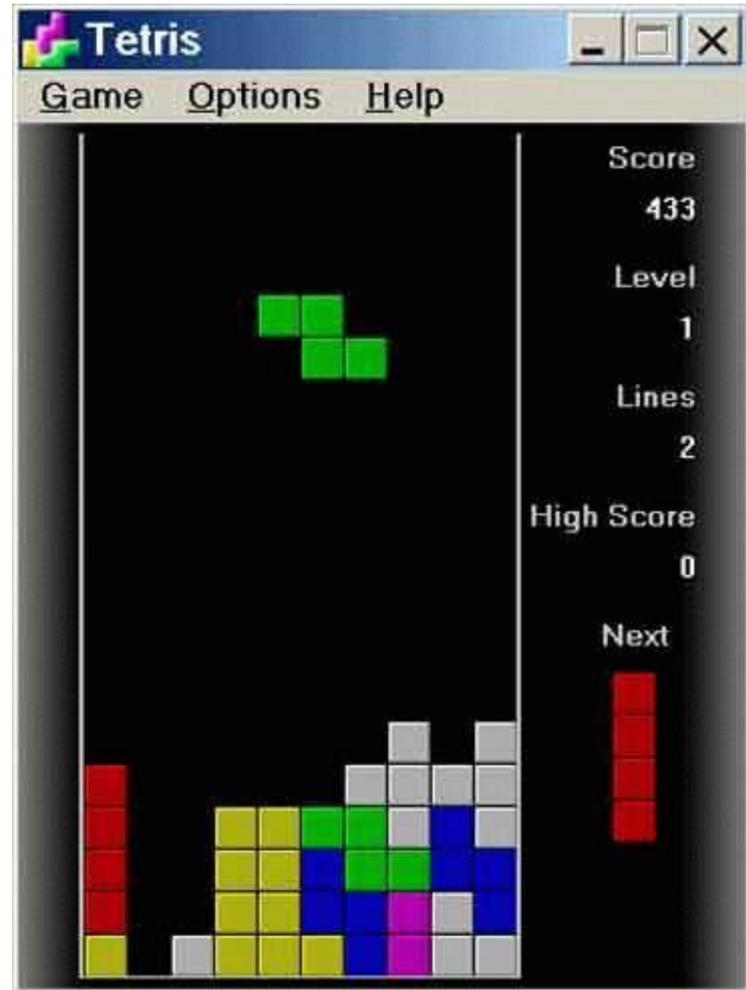
# Engaging the Player

Is the magic formula for a successful game. Some elements:

- Challenge
- Play
- Premise
- Character
- Story

# Then again...

- Challenge
- Play
- Premise
- Character
- Story



# Summary

- Game Structure
- Dramatic Elements