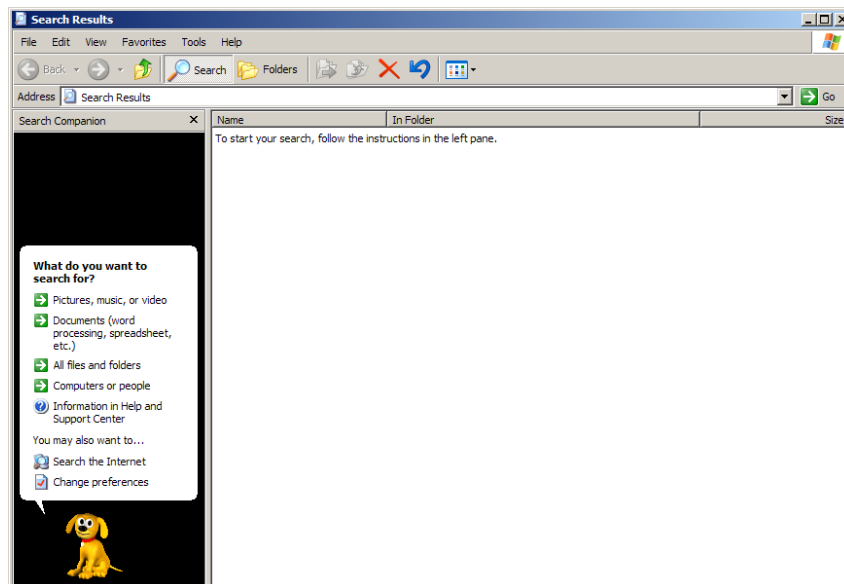
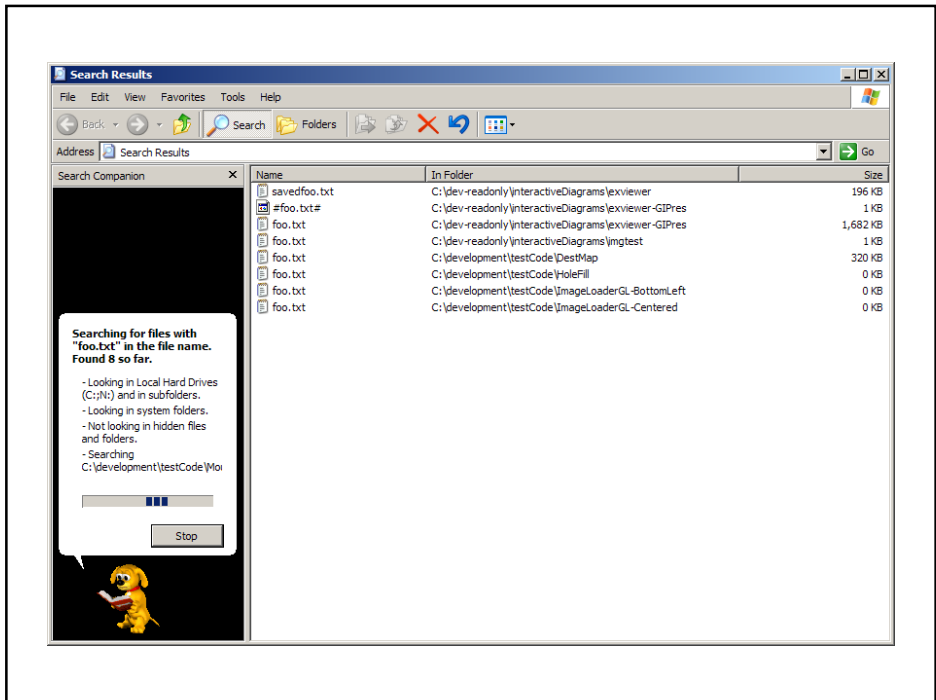
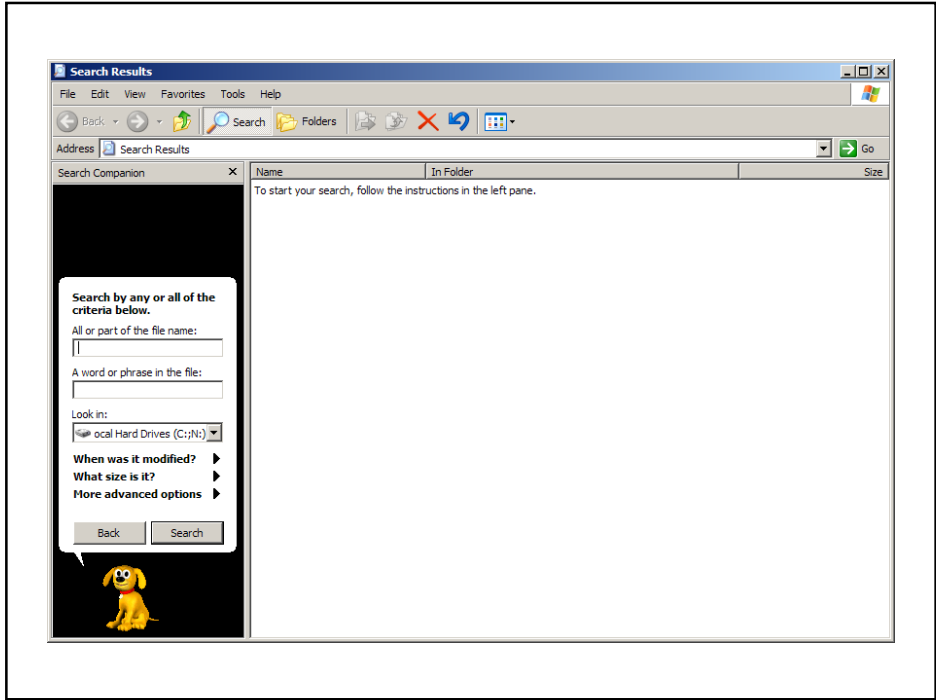
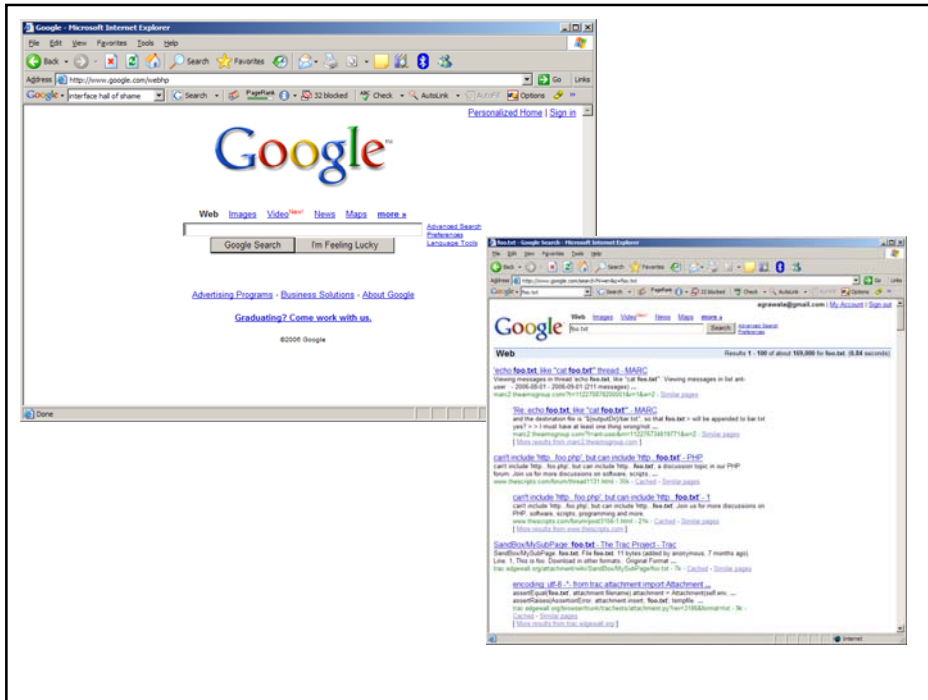


# Game Design & Structure

CSI 60: User Interfaces  
Maneesh Agrawala and Jeffrey Nichols

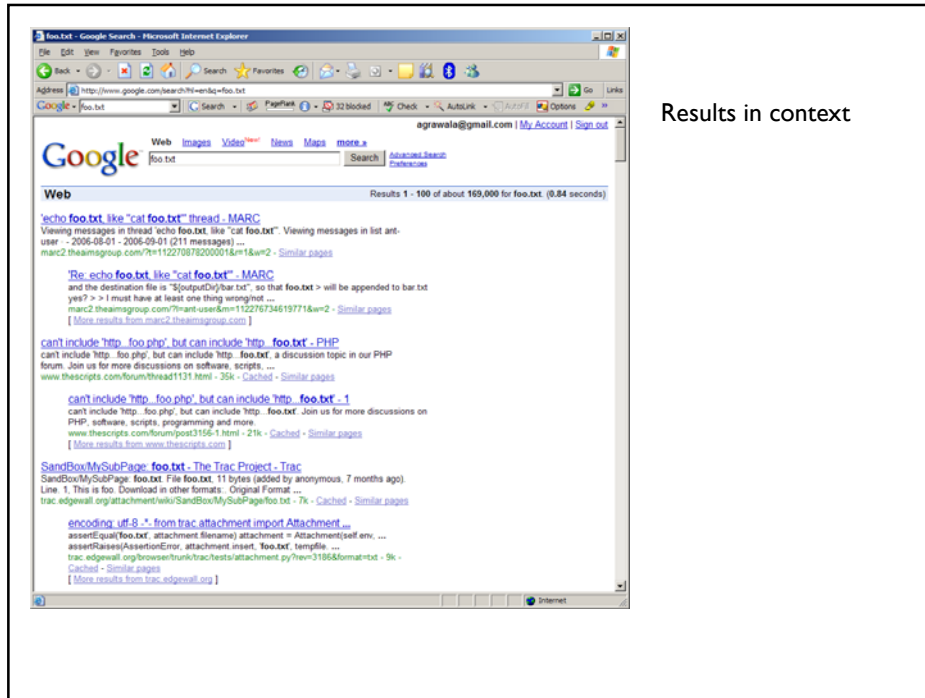






The image shows a screenshot of the Google homepage in Microsoft Internet Explorer. The search bar is empty, and the navigation links are visible.

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

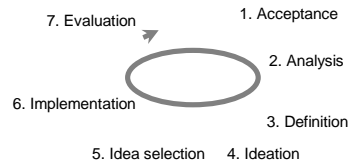


## Logistics + Q&A

- Course petition decisions will be made soon
- Wiki and assignments
  - Don't forget to create separate wiki pages for your assignments
  - Link those pages to the assignment page
  - We'll be checking timestamps on the wiki
  - We'll be lenient with the first assignments, but stricter from now on
- Lecture discussion questions

# Review

## The Design Cycle

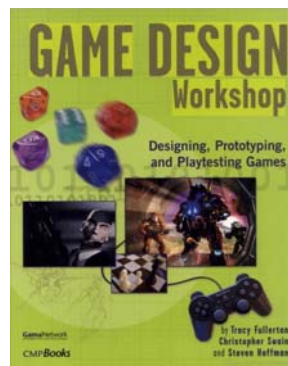


## Brainstorming



# Topics

- Games with a Purpose
- Game Structure
- Case Studies



# Games with a Purpose



# Games with a Purpose

Games that provide a benefit to the player

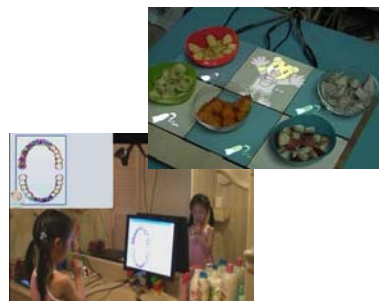


Games that solve a problem



## Benefit to the Player

- Educational
- Fitness
- Health



## Educational: Literacy

Teach literacy to children in developing countries through mobile phones [Kam 2008]



# Fitness: UbiFit

Combines sensors with a mobile display to help users track and monitor their physical activity [Consolvo 2008]

-  cardio
-  strength training
-  flexibility training
-  walk
-  "other"
-  primary goal met
-  alternate goal met



# Save the Planet: (Lil) Green Patch

Facebook app

- Send plants to friends
- Clean your friends gardens
- Drive traffic to the web page, which generates advertising revenue. Profit used to save rainforest.





## Save the Planet: (Lil) Green Patch

### Facebook app

- Send plants to friends
- Clean your friends gardens
- Drive traffic to the web page, which generates advertising revenue. Profit used to save rainforest.
- Is this a game?



## Solving Machine Learning Problems

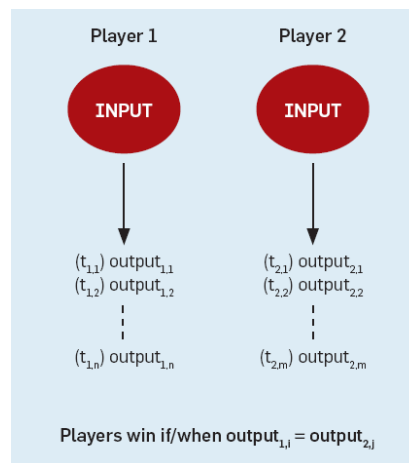
### GWAP.com games

- Generate meaningful labels for images (ESP Game)
- Locate particular objects within images (Peekaboom)
- Annotate images with paragraph (Phetch)
- Collect common sense facts (Verbosity)
- Tag music and improve music recommender systems (Tag a Tune)

# ESP Game



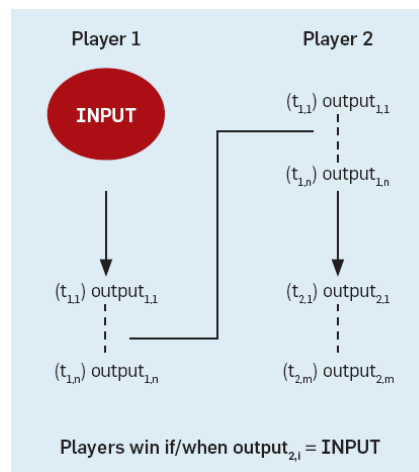
# Output-Agreement Game



# Verboesity



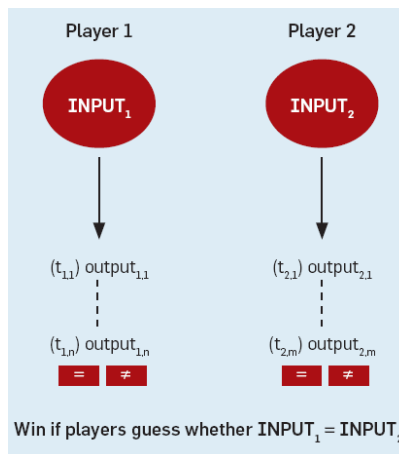
## Inversion-Problem Game



# Tag a Tune



# Input-Agreement Game



## Common Elements?

- Players working cooperatively
- More than one player
- Restricted information
- Convergence to a correct solution
- Random players
- Time limit and score
- Cooperative/competitive
- High score list (rankings)
- Textual input
- Two players for now (but probably works with more)
- Inversion-problem game would be more fun with more players
- Always a guessing game

## Common Elements

- Two non-collocated players
- Asymmetrically shared inputs/outputs
- Player outputs are often words
- Time is a factor
- Scores accumulate and feed into tiered ranking system

## Game Structure

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

## Players

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.



# 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



# 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 (Second Life)



# Objectives

Social objectives:

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

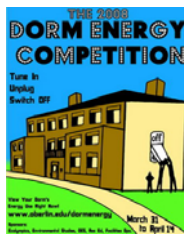




## Games with a Purpose Objectives

These games may bring external objectives into game play:

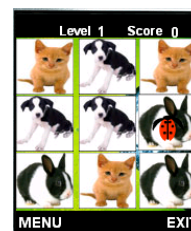
- Learning
- Fitness
- Saving energy
- Eating healthy...



## Games with a Purpose 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.



## Games with a Purpose Objectives

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

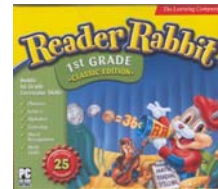
Sims 2 already supports many languages, a registry edit can change an English installation to any of these. Additional language can be added to the game with mod'ing tools

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



## Games with a Purpose 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.

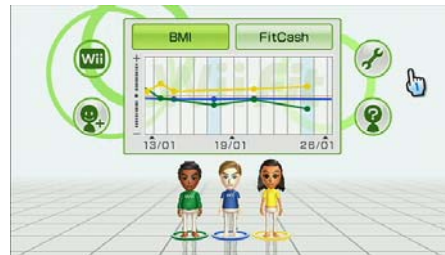


“Talking Walls” - Edmark

## Games with a Purpose 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.



## Games with a Purpose Objectives

Sometimes the objective of the players differs from the objective of the game system

Objectives of the Player:

- Collect Points
- Improve Rank

Objective of the System:

- Learn meaningful labels for images



# 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:

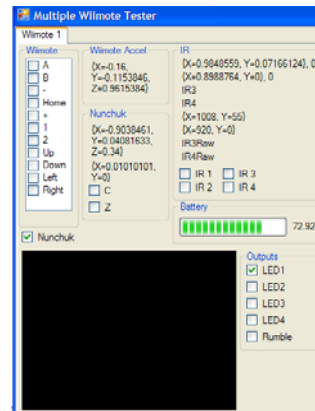


## Procedures and the UI

Current hardware offers very rich control.

Wiimote + nunchuk gives:

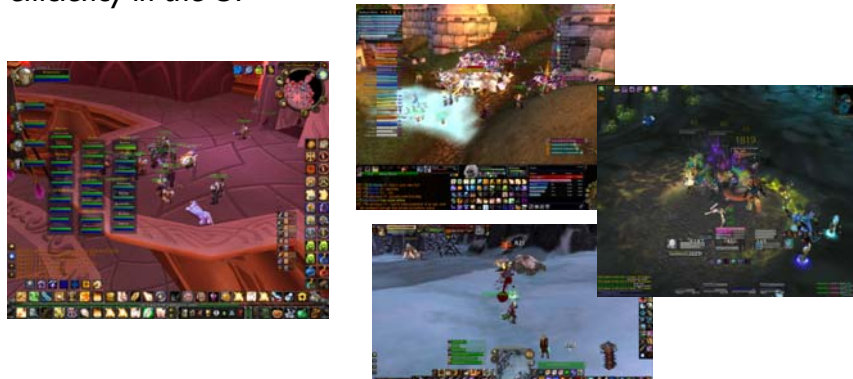
- 6 acceleration/gravity values from two units
- 2 pointing axes
- 2 joystick axes
- 13 buttons
- 4 output LEDs
- Rumble output
- Speaker



## Procedures and the UI

Complicated game interfaces need to address both learnability (for novice users) and efficiency (for experts)

Customizability is one way to accommodate learnability and efficiency in the UI



## 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 often 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...

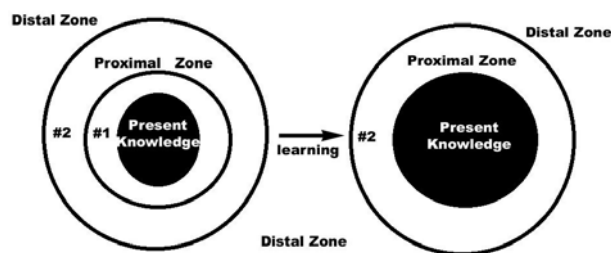


# Conflict in learning

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”

Some 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, and some 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

## 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.



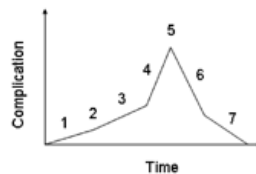
# Character

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.



1. Exposition
2. Inciting incident
3. Rising action
4. Crisis
5. Climax
6. Falling action
7. Denouement

# 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



# Game Structure and Design

## Formal Elements

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

## Engaging Elements

- Challenge
- Play
- Premise
- Character
- Story

# ESP Game

## Formal Elements

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

## Engaging Elements

- Challenge
- Play
- Premise
- Character
- Story



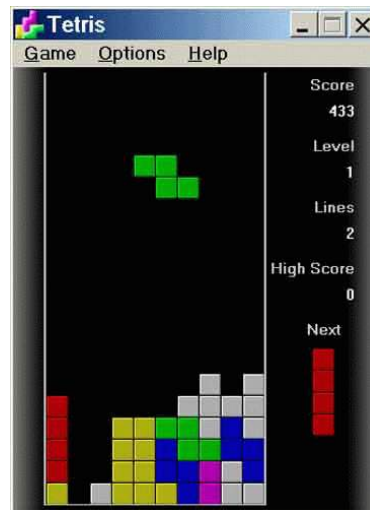
# Tetris

## Formal Elements

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

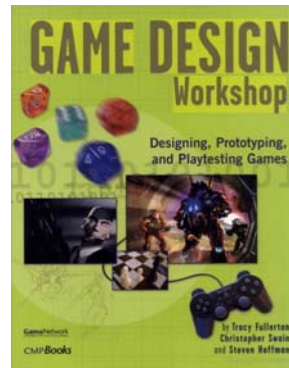
## Engaging Elements

- Challenge
- Play
- Premise
- Character
- Story



# Summary

- Games with a Purpose
- Game Structure
- Case Studies



# Next Time

## Individual Project Proposal Due Before Class

- Create a page for your assignment
- Link to that page from the assignment page

## Lecture Topic: Sketching & Storyboarding

- Readings will be posted soon

## Don't forget!

- Read, then write a comment on the wiki