Game Design

CSCI4120 Principle of Computer Game Software

What is game design?

1. Imagine a game
2. Defining the ways it works
3. Describing elements of the game (conceptual, functional, artistic, ..)
4. transmit the information to team members

- Contain both science and art elements

How to characterize it?

- Core Mechanics – game rules
- Storytelling – all games tell a story each
- Interactivity – user interface, presentations

Documents generated

- Important in modern game development as a development team consists of over 10 personnel in general.

1. High concept (2-4 pages)
2. Game treatment (10-20 pages)
3. Game Scripts (50 – 200 pages)

High Concepts

- Express spirit of the game to publisher or partners:
  1. Premise of the game
  2. Intended audience
  3. Its genre (if belongs to one)
  4. Target platform
  5. Overall storytelling
  6. Game play

Sample documents
Bioshock
Deus Ex
Diablo
Grim Fandango
Planescape
Torment Silent Hill 2

Premise of the game?

- a **premise** is a claim that is a reason for, or objection against, some other claim.

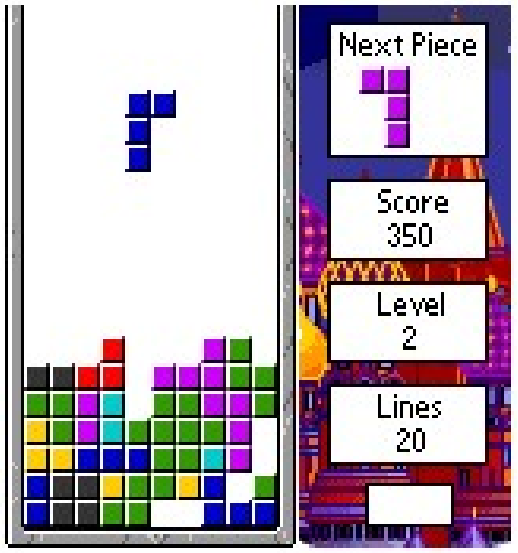
- Example of premise of game

  In World of Warcraft: The Burning Crusade, players will be able to advance their characters up to level 70, unlocking a world of power and possibilities along the way. Additional features coming in The Burning Crusade include two new playable races (the Blood Elves and the Draenei), flying mounts, new talents and abilities for all character classes, the new jewelcrafting profession, ……

Prototyping your game

Prototyping = Creating a portion of your game to test your ideas

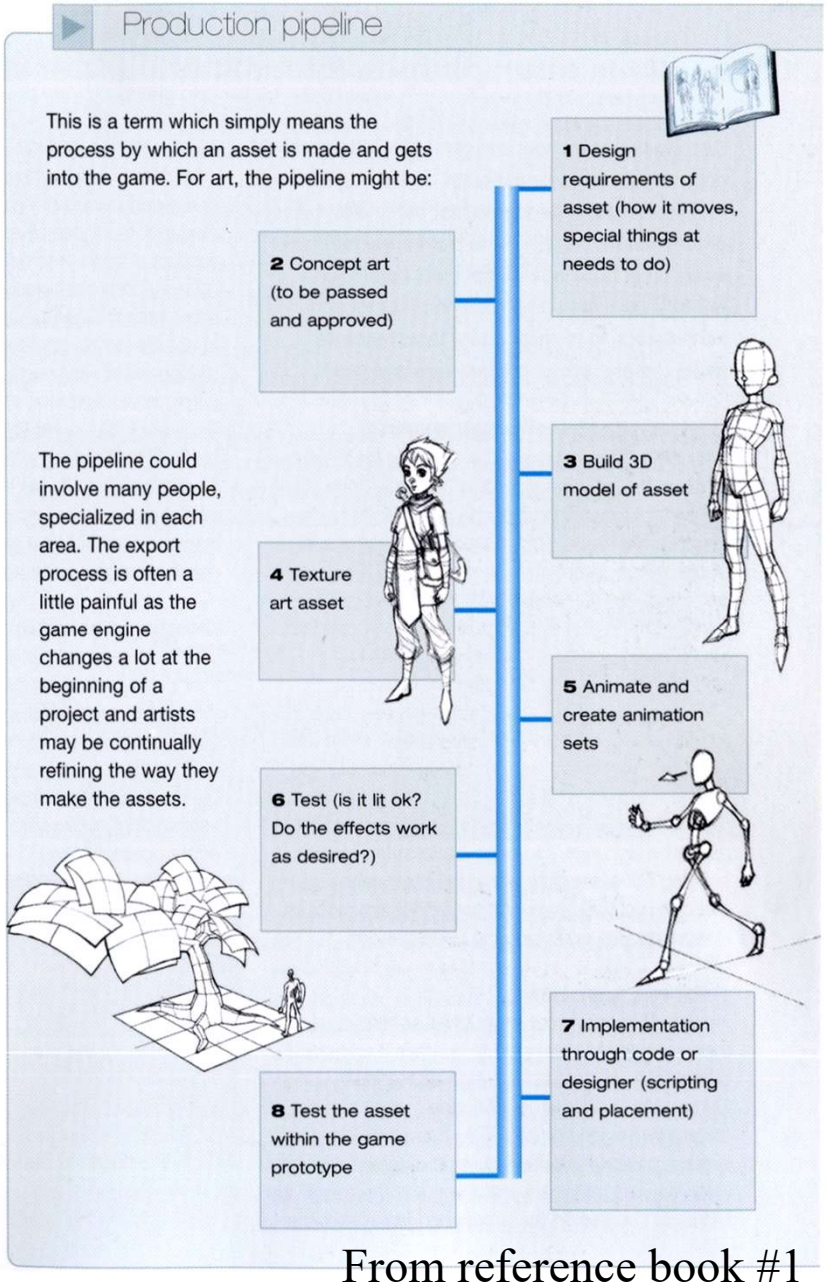
- Usually, immediately after high concept development
- Good for communication, e.g., a puzzle game like Tetris would be hard to communicate through paper work
- Rules in making prototype:
  - **Focus on the core game mechanics** such as main features and game character actions
  - **Keep it simple**; leave the artwork (pictures, textures, 3D models, animations, etc.) unless really necessary



Work out the Plan

Production Pipeline

1. Game Design
2. 3D modeling
3. Texture
4. Animation
5. Unit test
6. Implementation: coding
7. Test within game prototype
8. MISC: Audio, network, etc.



From reference book #1

Game Treatment

- Present in broad outline to publisher
- Fill in gaps and answer some questions left in high concept document
- Materials that is crucial to understand the game's look & feel

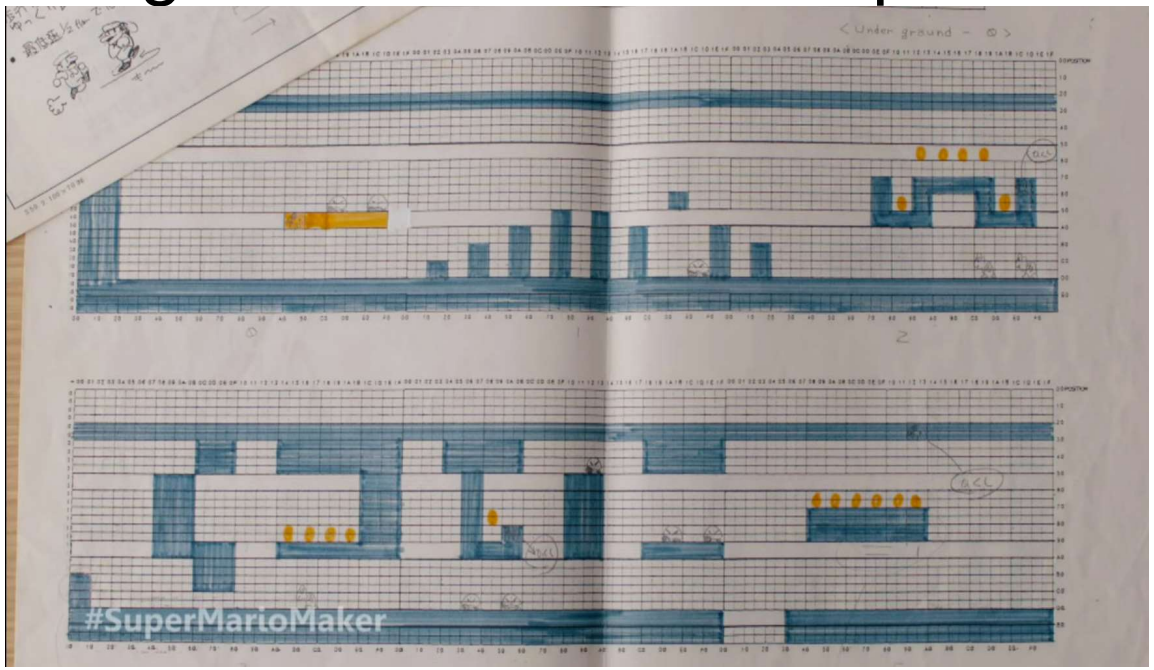
Game Scripts

- Document design decisions, documents the creative, conceptual, and functional aspects of the game

Concept art of Biohazard 2 Remake

Game Scripts

- Not technical design
- Should enable one to “play” the game i.e. specify the rules in enough detail that in theory could play the game without the computer



Design document of Super Mario

Game Concepts Development

- Earliest stage of game design
- Computers can simulate reality, even simulate dream i.e. something impossible in real world
- Ideas can come from other games or other media e.g. movies.
- Sometimes are just re-work of an old game e.g. *Frogger3D, Doom, SimCity etc*

The Design Theory

- Game Structure: Linear VS Sandbox
- Single-player VS Multiplayer
- Realism VS Abstraction
- 2D VS 3D Games
- Difficulty curves

Game Structure: Linear VS Sandbox

Linear

- Games that have a **single path** to follow
- Linear games have **explicit goals** that the player must achieve so as to progress: level 1, level 2, etc.
- Usually has a clear and defined **narrative sequence**, like watching movies or dramas

E.g., Resident Evil series, and most ACT games, etc.

Game Structure: Linear VS Sandbox

Sandbox (Non-linear, open world)

- **More freedom** – players can approach challenges in more or less **any order**
- Sometimes, sandbox games are **open-ended**

E.g., Sim City (most simulation games), etc.

Game Structure: Linear VS Sandbox

Why Linear?

- **Easier to produce and control** (by the game designers); hence lower the production cost

Why Sandbox?

- **More freedom** could bring more fun
- Designers have to handle all possibilities in games in the game design

Mixture: Linear in small quests

e.g., Most RPG e.g. Legend of Zelda: The Windwalker, & etc.

Single-player VS Multiplayer

Single-player

- A player competes or cooperates with non-player characters (NPC) and objects controlled by the computer

Multiplayer

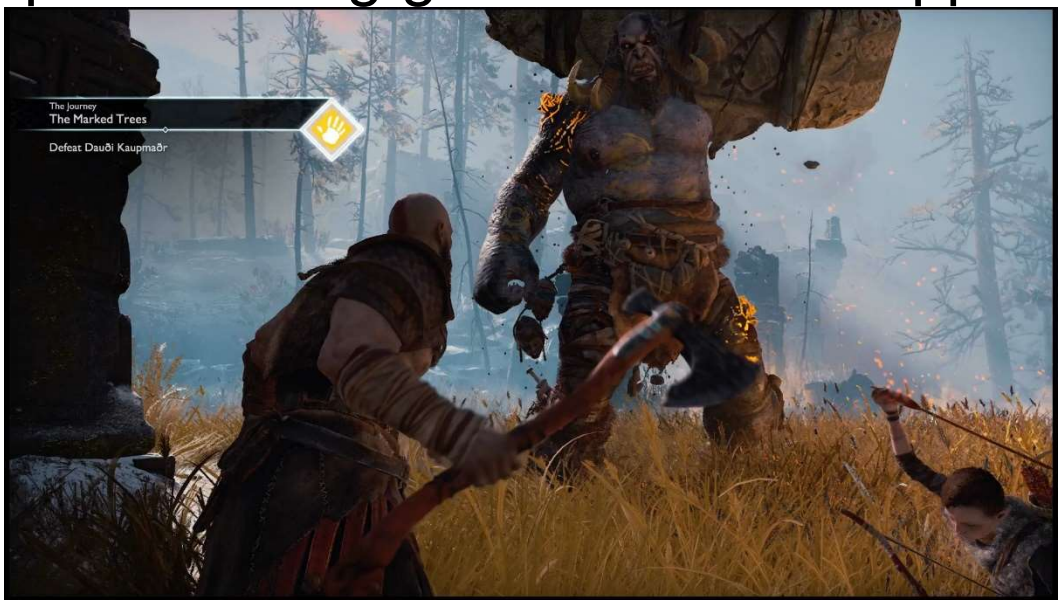
- A player plays against or with other human players, either on the same computer, a LAN, or the Internet

Single-player VS Multiplayer

Designing a single-player game

- **Focus** of the game designer is to **entertain the player**
- The designer can create **unbalanced opponents** (the player's enemies) controllable by the computer
- **Usually requires AI** for the control
- Need to make up an exciting game world and opponents

Troll in GoW



Single-player VS Multiplayer

Designing a multiplayer game

- Fairness: all players are **created to have relatively equal ability / tools**
- Relatively require **less AI**
- More development time on the **networking** and **game performance**

Destiny 2

Realism VS Abstraction

This is the presentation of the game, typically:

- Realism games
  - First-person shooting, simulation games, god games, etc.

    e.g., Microsoft Flight Simulator, Civilization, etc.
  - Usually more computation and graphics rendering powers

Realism VS Abstraction

- Abstract games
  - Inviting players to enter **cartoon/surreal/dream** worlds
  - Does not rely on a representation of the real-world
  - Common in RPG games like:

    e.g., Mario Bros., Legend of Zelda, etc.

Realism & Abstraction

- All games, no matter how realistic, represents an abstraction and simplification of real world
- Design decisions must serve the entertainment value while achieving overall degree of realism
- e.g. In typical FPS game, you can carry over 7 weapons together without even a bit of slowdown

In Doom 4, you move fast even though carrying 7 weapons

Immersiveness

- Holy grails of game design – make a player go inside the game world and temporarily make it reality (*suspend the disbelief*)

- Broken by poor design e.g. one of the character does something wildly out of character

Horizon: Zero Dawn -- innovates not via gameplay but gorgeous visuals and a refreshingly diverse, well-written story that explores the post-post-apocalyptic future

2D VS 3D Games

- What is a 2D game?
  - All actions and activities work in two-dimensions
  - Using only **2D graphics** and **2D camera movement**

    e.g., most old games, Zelda: The Minish Cap

2D VS 3D Games

- What is a 3D game?
  - **Takes place in three-dimensions** with **3D movements**
  - The Role of **camera** is very important in 3D games:

    how to place and how to control the camera so that it does **not interfere with the players' actions**, but also allow the player to see

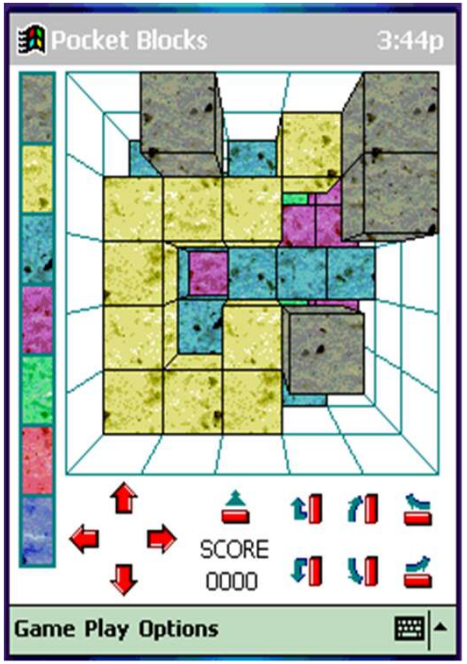
    what he/she wanted

Left for Dead

2D VS 3D Games

- Transitions from 2D to 3D
  - Some successful 2D games have been transited to 3D, e.g.,

    Mario, Zelda, etc.
  - Two major challenges:
    - Navigation control in 3D (moving in the 3D world)
    - Camera Control
  - Unsuccessful case: 3D Tetris



Difficulty Curves

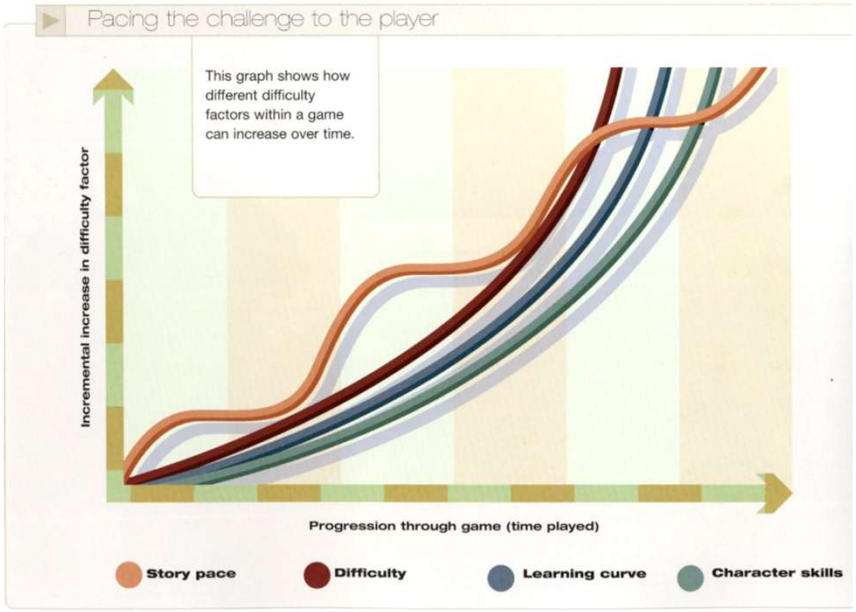
How to setup the level of difficulty in a game?

- General rule:
  - **Start Easy and End Hard**

Why?

- At the beginning, players need to **learn** possible moves of his/her game character or the rules in the games

Difficulty Curves



- **introduce dips** (no change in difficulty level) to allow the players to relax and be prepared for the next rise: more satisfying feeling
- Since game designers know their games too well, it is easy to make early levels to be too hard => **Quality Assurance** (**QA**) is the team for game test, etc.
- QA team help to fine-tune the game difficulty
- **Tutorial levels** in early stages of a game

Elements of a Game

- *Features*
- *Gameplay*
- *Settings*
- *Interface*

Features

- What make your game different from other games

1. Vital to make the game work e.g. use of joystick input in Street Fighter series.

Street Fighter 2 – only proper use of joystick can trigger special move

Features

2. Enhance enjoyment of game only e.g. interfaces changes according to your species in *Starcraft*

Gameplay

- *Rules* define *actions* that the player may make, and may not make
- Rules also define the *challenges* the player must overcome
- Together they define the **game play**

Settings

- **Settings & World** – the environment of the game legitimate to the player

- Examples

Games	*World*
Football games	Field, clock
Card game	Desktop

Settings

- Fictional components, e.g. you are the space marine on Mars base in *Doom*,
- The more a game depends on its core mechanics to entertain, the less its setting matters
  e.g. You won't bother with whether shape of a chess match with its medieval age when playing

Monster Hunter World

Settings

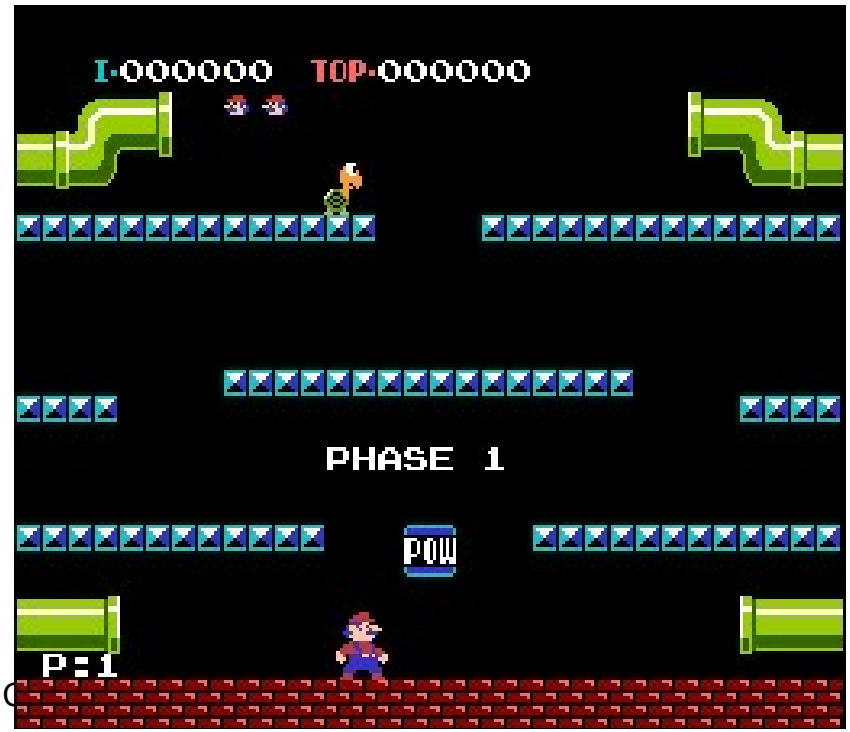
- Graphics also create the setting
- Rules with the user interface define the game play
- **Graphics** and **game play** must work together to produce the total play experience

Interface

- **Interaction models** – the way the player interact with the game world.

- *Avatar* : controlling a single character that represents a player and influence the local area around him; e.g. *Mario*, *Doom*, ..

Mario Bros



Interface

- *omnipresence* : has ability to take actions at many places, e.g. *Warcraft*, *SimCity*, ..

Interface

- Perspectives – how the player actually sees the world.
- First person view (*Bioshock*)
  - Limited field of view (30-50 degree)

Interface

- Perspectives : Third person - follow behind your character in 3D world (Fallout 4)
- Widened FOV (~120 degree)

First-Person VS Third-Person

Advantages and disadvantages:

- First-Person view
  - More immersive feeling, more excitement
  - The game character is not visible and makes players hard to perceive the whole world; game players need to switch to other view modes or need to see mini-maps constantly
- Third-Person view
  - Less immersive feeling
  - Allows players to clearly see the entire game world

Or delivers both views in your game?

Interface

- Isometric : 30- or 45 degree angle from vertical with landscape rotate 45 degrees w.r.t. bottom of screen

Diablo

Interface

- Side-scroller : simple in both programming and design

吞食天地

Motivations that Influence Designs

- Market-driven games
- Designer-driven games
- License Exploitation
- Technology-driven games
- Art-driven games

Market-driven games

- *Market-driven* games – certain elements are generally thought to be popular

Serious Sam

- Scantily-dressed women, big guns and spectacular explosions considered popular among teenage boys

GTA III

Market-driven games

- Interesting characters, rich plots and clever puzzles thought to be popular among girls & women
- Market driven games tend to look all alike, thus no one becomes blockbuster

Cooking Mama, a popular game played by female

Designer-driven games

- Designers retains all creative control and takes personal role in every creative decision
- Sometimes will be harmful as the creation is designed to be fun only according to the designer

Civilization IV

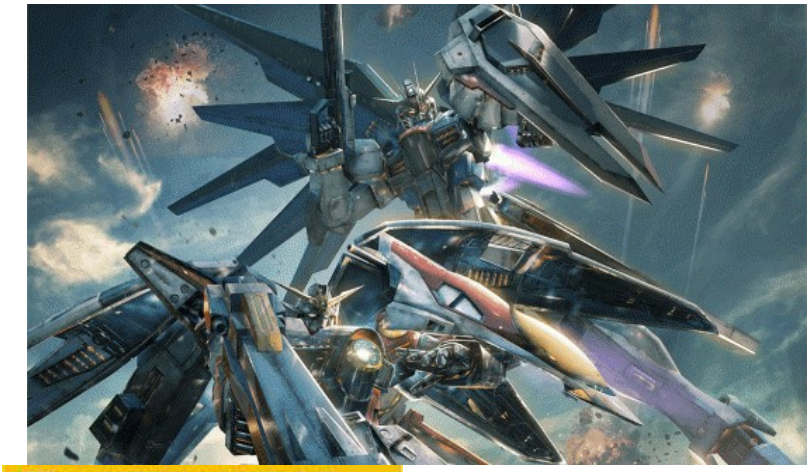
Designer-driven games

- Only few designers can do so e.g. Will Wright (SimCity, Sims) & Sid Meier (Civilization)

Will Wright's game after Sims -"Spore"

License Exploitation

- Tie-ins with highly recognized movies, books, etc.
- Downside: conform to rules laid down by original owners e.g. *Winnie the Pooh* never allow to hold a machine gun



Mobile Suit Gundam

Spider-man

Technology-driven games

- Showoff particular technology achievement
- Console manufacturer write technology-driven games when a new platform is released

Rise of Tomb Raider (2015)

Gran Turismo

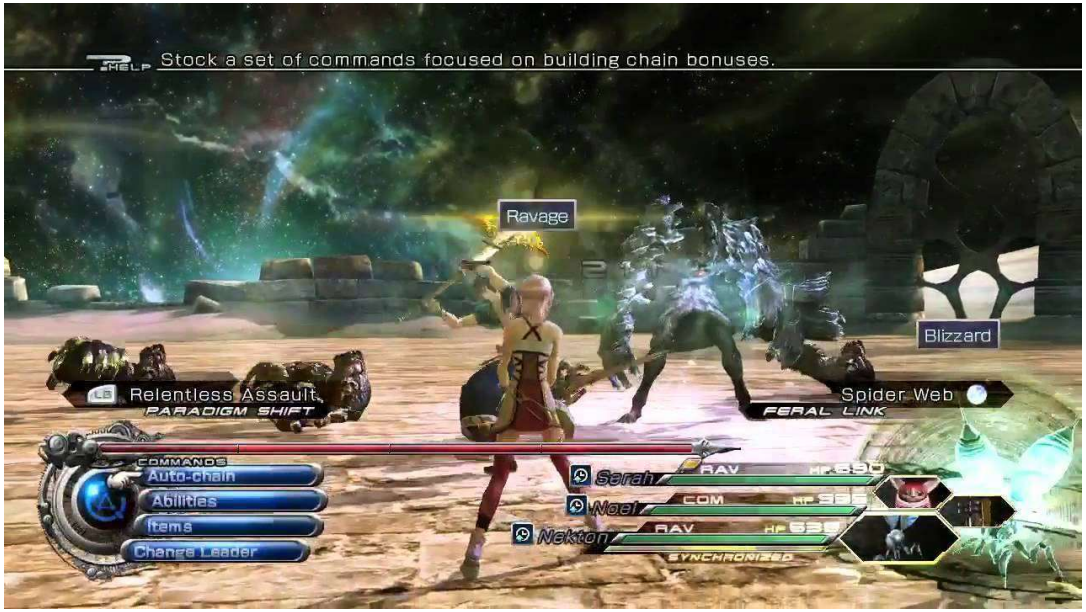
Art-driven games

- Showoff someone's artwork
- Designed by artists with strong visual sense but are new to game industry

愛神餐館 (火狗工房)

Art-driven games

- Need game play to continue the sales after the first few months (same situation as technology-driven ones)



Final Fantasy XIII

Design Input Sources

- gathering and assessing feedback is crucial for a modern game designer
- Feedbacks from:
  - Development team
  - Player(potential) community
- Designers need to decide on whether stick to their own design or bend to others requests

Team Inputs

- Pros:
  - Provide early feedback
- Cons:
  - Team had with the game for months, even years, easily blind to unintuitive mechanics or confusing UI
  - Might burnout on the game together and forget simple players experience when starting the game

Community Inputs

- Pros
  - Understanding of previous games mechanics even better than designer
  - provide features wish list from dedicated players
  - More exposure

- Cons
  - Difficult for a designer to face the criticism from players on their development choices
  - Difficult to assess what players say and what they actually do