

Game Design

CIS 487/587

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Computer Games

- Provides a completely new form of entertainment
- Game can create new worlds for users to play in
- Players may be allowed to take on a new persona

Approaching Design

- Computer games are an art form
- Game design practices can be taught
- Design is a technical discipline like music, film, poetry
- Design is the art of making dynamic models

Game Technologies

- Representing and animating physical objects
- Providing world dynamics
 - Physics
 - Artificial intelligence
- Supporting user interaction
 - Graphics
 - Sound
 - Input devices
 - Networking

Game Expectations

- Create experience for players
- Player will usually be in some environment
- Environment has rules for interaction
- Rules exists and there is a defined criteria for success
- Computer will manage player interaction

Game Analysis Exercise

- Need: paper, pencil, 2 players
- Draw 3 dots on the paper
- First player draws a line between 2 dots and places a new dot any where on that line
- Second player draw a line and a new dot

Game Analysis Exercise

- Restrictions
 - New line must start and end on a dot
 - No dot can have more than 3 lines
 - New line cannot cross another line
 - New dot must be placed on the new line
 - A line can start and end at the same dot if it does not cross another line
- Game ends when a player cannot move

Game Analysis Exercise

- What is the game objective?
- What is each player required to do?
- What limits player actions?
- What conflict is present in this game?
- Are the boundaries of the game physical or conceptual?
- What game outcomes are possible?

Game Analysis Exercise

- What creates the game challenge?
- Is there a sense of play in the game rules?
- Does the game involve a premise, characters, or story?
- What dramatic elements might add to the game experience?

The next 16 slides come from the
Rabin text

Models Represent Things

- Mental/Cognitive
 - Concepts
 - Beliefs
 - Maps
 - Locations
 - Relationships
- Mathematical
 - Equations
 - Formulas
 - Algorithms

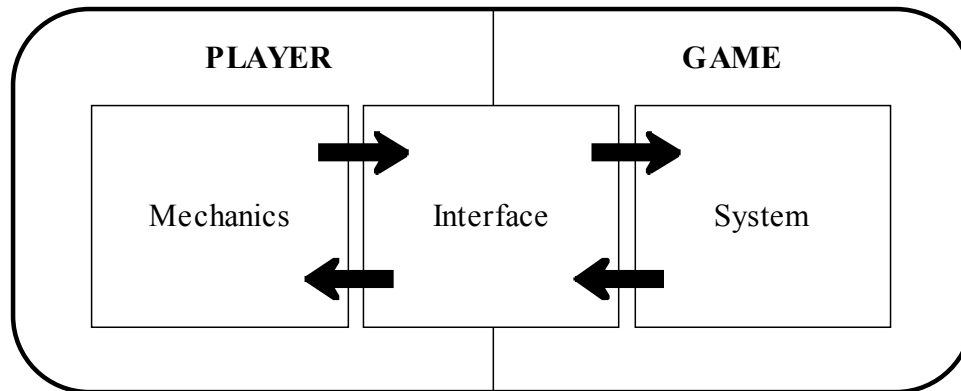
Approaching Design

- **Abstract model**
 - Conceptual and idealized
 - A tool for investigating specific questions
 - Simplifies thinking to help understand problems
 - May include assumptions thought to be false
- **Abstract game**
 - One rule
 - *The piece is moved to the open square*



A Player-Game Model

- A model of the player – game relationship



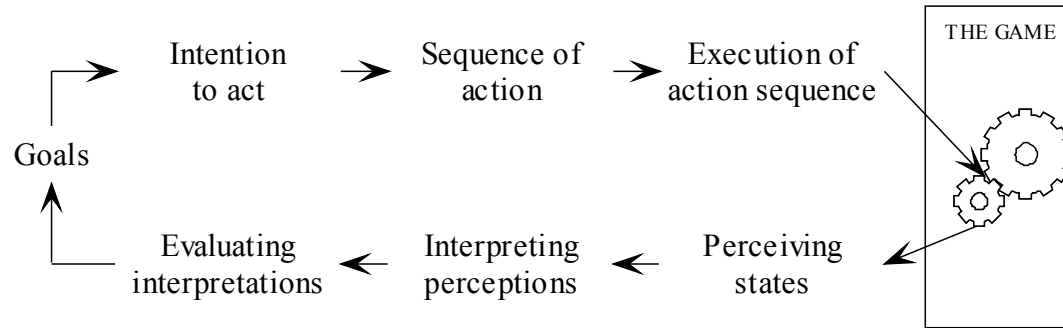
A Player-Game Model

- Mechanics
 - Things the player does
- Interface
 - Communication between player and game
- System
 - Underlying structure and behavior

Game Mechanics

- **Gameplay**
 - Feelings of playing a particular game
 - Activities engaged in a particular game
- **Game Mechanics**
 - Specific to game activities
 - “What the player does”

Seven Stages of Action



- Execution

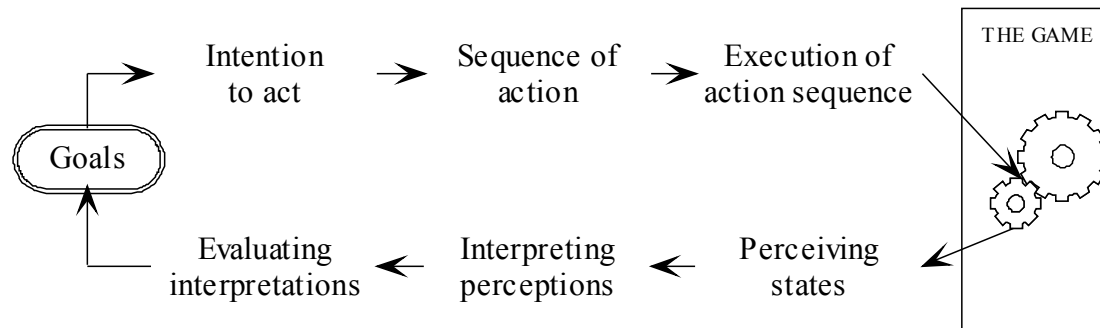
- Intention to act
- Sequence of action
- Execution of action sequence

- Evaluation

- Evaluating interpretations
- Interpreting perceptions
- Perceiving states

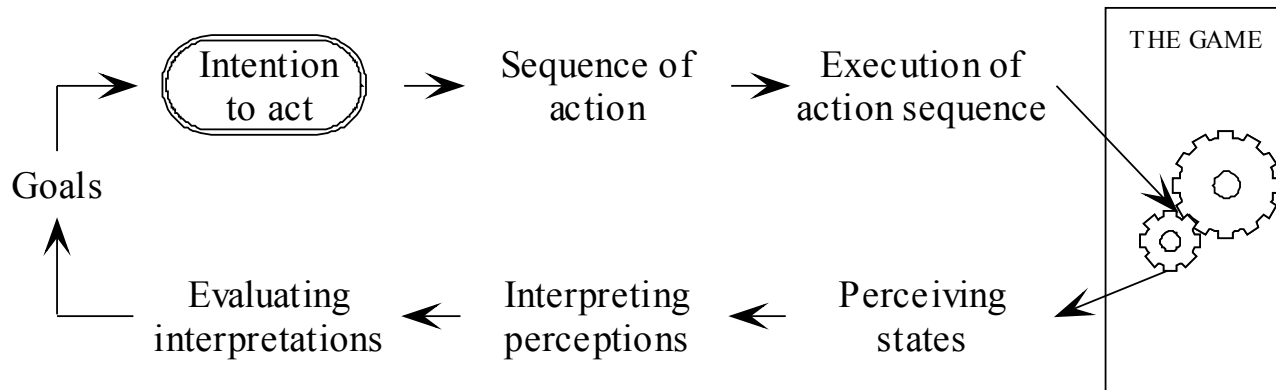
Seven Stages of Action

- A **goal** is formed
 - Models the desired state
 - The desired result of an action
 - Examples:
 - Have a glass of water in hand
 - Capture a queen
 - Taste ice cream



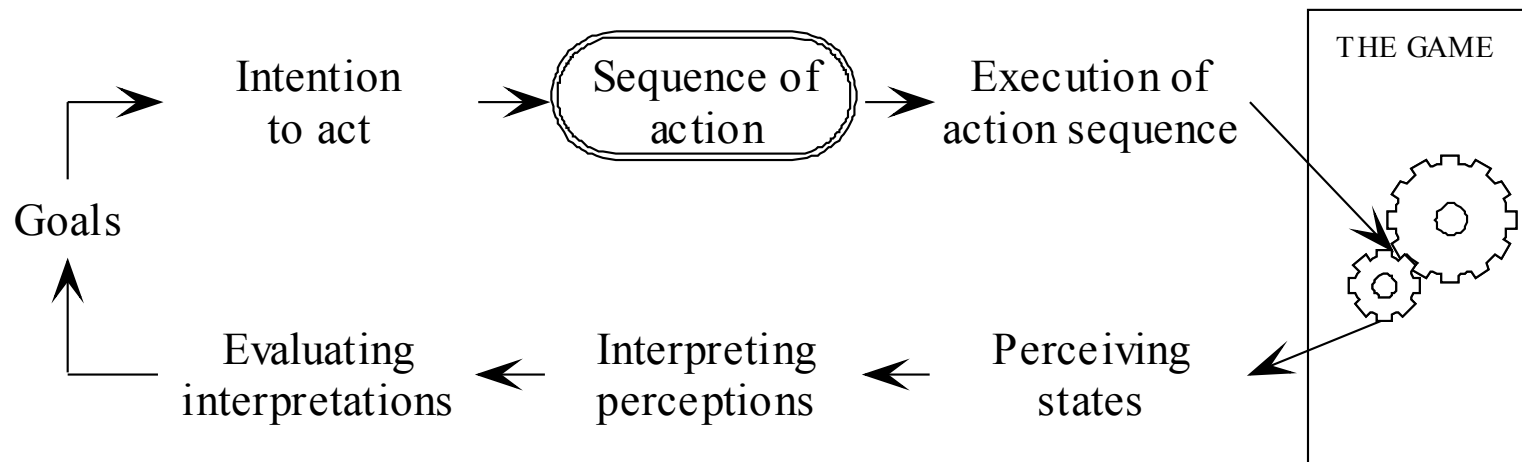
Seven Stages of Action

- Goals turned into **intentions** to act
 - *Specific statements of what is to be done*



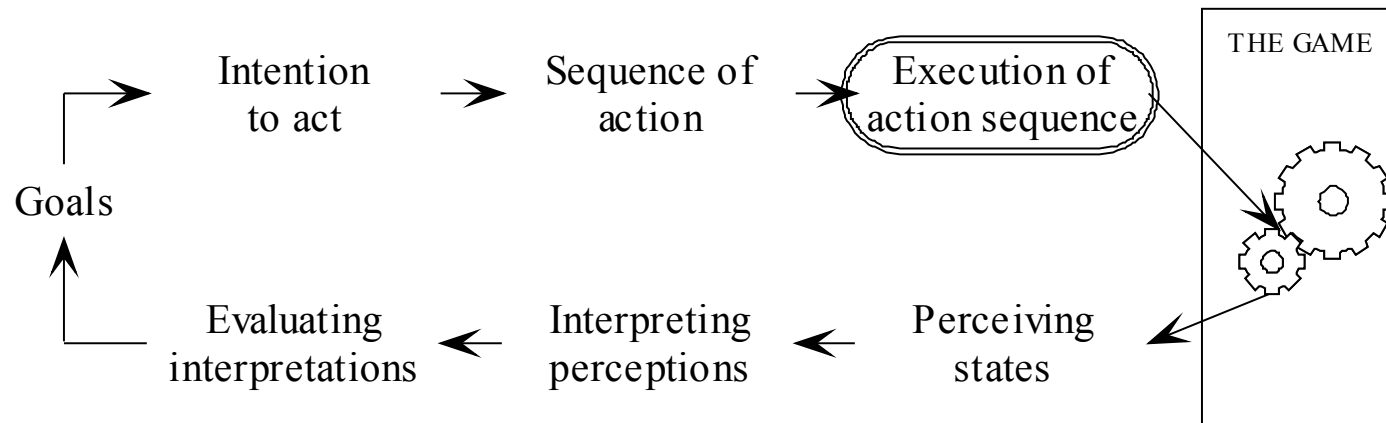
Seven Stages of Action

- Intentions put into an action **sequence**
 - The order internal commands will be performed



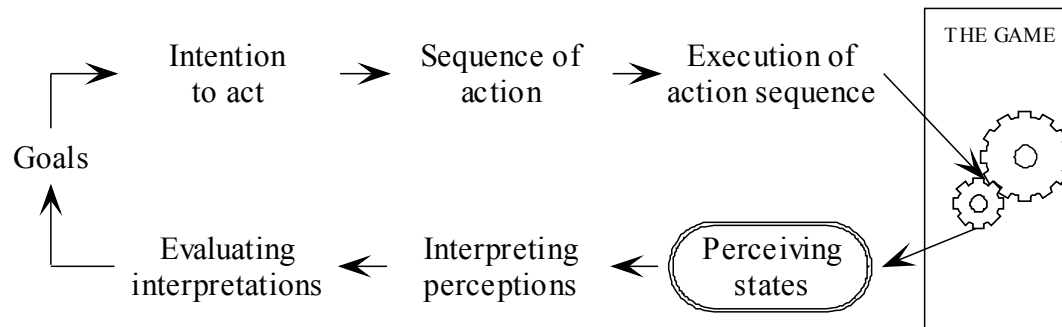
Seven Stages of Action

- The action sequence is **executed**
 - The player manipulates control variables



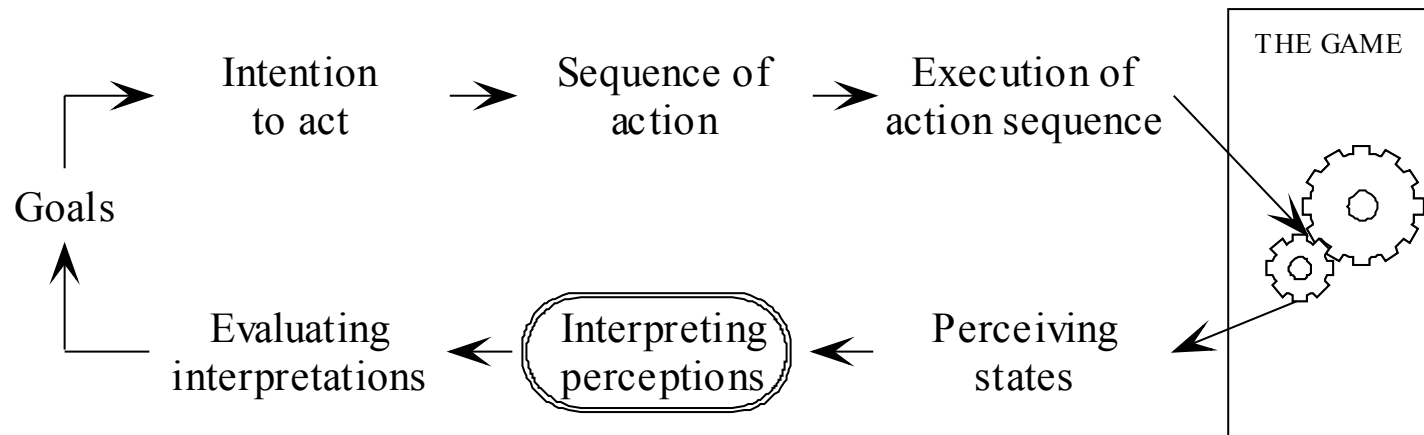
Seven Stages of Action

- The state of the game is **perceived**
 - State variables are revealed via the interface



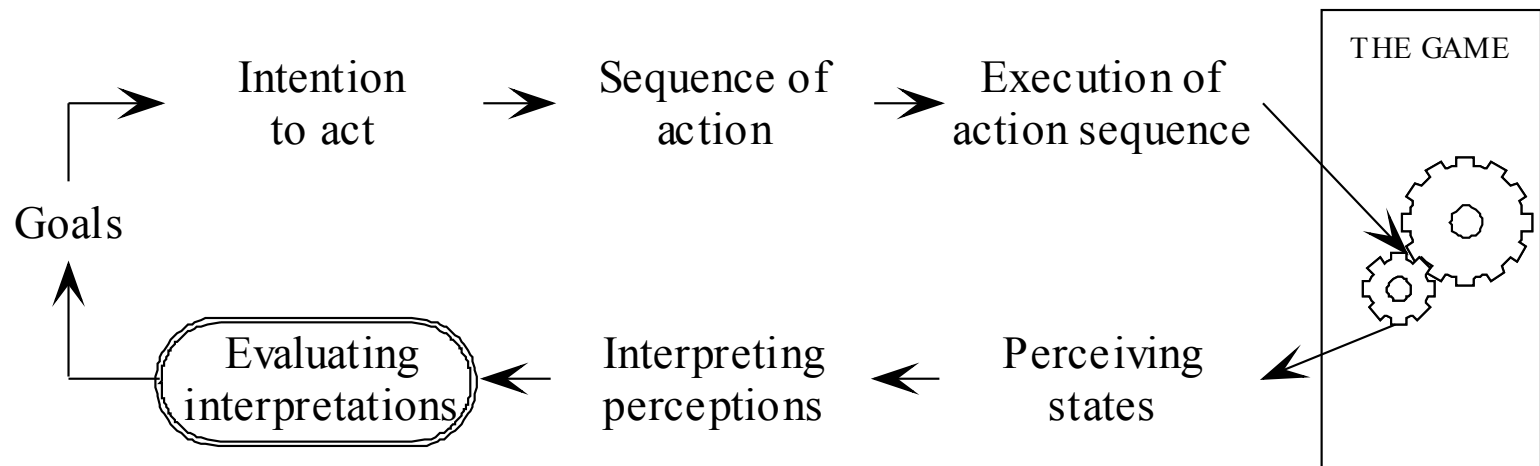
Seven Stages of Action

- Player **interprets** their perceptions
 - Interpretations based upon a model of the system



Seven Stages of Action

- Player **evaluates** the interpretations
 - Current states are compared with intentions and goals



Seven Stages of Action

- Donald Norman's approximate model
 - Actions not often in discrete stages
 - Not all actions progress through all stages

Seven Stages of Action

- Scales to...
 - ...an individual mechanic
 - A “primary element”
 - Examples:
 - » Move
 - » Shoot
 - » Talk
 - ...an entire game
 - A generalized model of interaction

Overview Game Design

- Come up with a good idea
- Create storyboard (rough sketches, game world, char, and action)
- List details of game + take everything in game universe into account
- Write a design document

General Advice

- Make games you would enjoy playing yourself, but remember to focus on the player's experience and not your own
- Communicate with your target audience
- Ask for consumer feedback (this means track it and use it)
- Play and evaluate games written by others

General Advice

- Read game reviews and opinions (magazines and web sites)
- Attend conferences to exchange ideas and make new contacts

The next 3 slides come from the
Rabin text

Creativity

- Classic approach - Graham Wallace
 - Preparation
 - Background research and comprehension
 - Incubation
 - Mulling things over
 - Insight
 - Sudden illumination – Eureka!
 - Evaluation
 - Validating revealed insights
 - Elaboration
 - Transforming the idea into substance

Creativity

- Six Thinking Hats
 - White Hat – neutral and objective
 - Red Hat – intuition, gut reaction
 - Black Hat – gloomy, naysayer
 - Yellow Hat – Pollyannaish, optimistic
 - Green Hat – growth and creativity
 - Blue Hat – process and control
- Symbolize perspective worn by people involved in the creative endeavor
- Edward de Bono

Inspiration

- Board games
 - Spatial relationships
- Card games
 - Resource management
- Paper RPGs
 - Dynamic narratives
- Books
 - Fantasy and agency
- Sports
 - Team competition
- Film
 - Continuity techniques
- Television
 - Serialized stories
- Music
 - Temporal systems
- Martial arts
 - Discipline in action
- Children
 - Invention

Getting a Creative Idea

- Go to an extreme along one dimension of a game
- Mix ideas from several games
- Use ideas from books, movies, comics, etc.
- Take a good game idea and make it better (e.g. improve graphics, AI, etc.)

Brainstorming

- Make sure everyone attends meeting and is involved
- Ensure free interchange of ideas
- Make goals clear
- Stay focused – don't allow distractions
- Make sure everyone is heard
- Take notes

Brainstorming a Game

- You can start with game play
 - This often dictates player interaction and style of play
 - Determines hardware needed
 - Total resources needed for game
- You can start with story
 - In some genre (RPG) story is central
 - May determine how players and NPC's interact
 - Technology should match story line

Brainstorming a Game

- You can start with technology
 - Game engine characteristics (rendering, AI, language parsers, etc.)
 - Often dictates type of game that can be developed
 - May dictate type of story
 - May define user interaction possibilities
 - It is generally better to find a topic first and then select a genre rather than the reverse

The next 12 slides are form the Gibson
textbook

Brainstorming and Ideation

"The best way to have a good idea is to have a lot of ideas and throw out all the bad ones."

– Linus Pauling

Pauling is the only person to have won both the Nobel Prize in Chemistry and the Nobel Peace Prize as an individual.

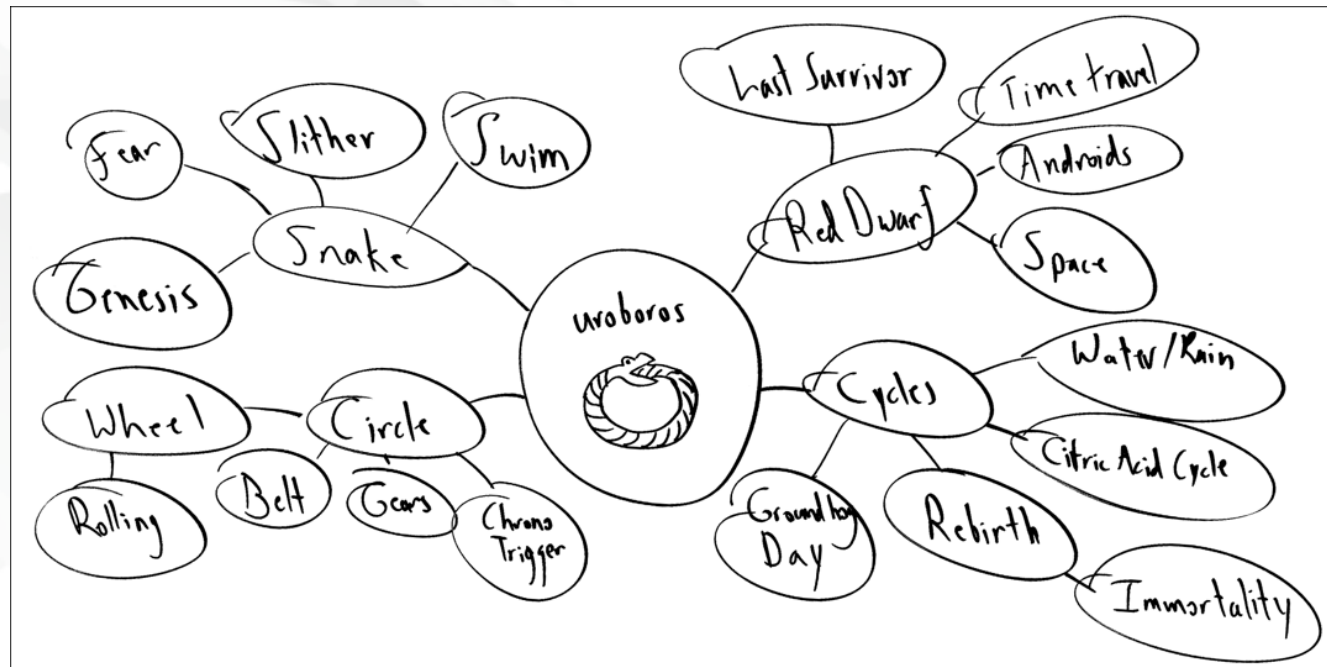
Brainstorming and Ideation

- This brainstorming process is based on intersectional innovation
- It has worked well in both large and small groups
- Five Steps:
 - Step 1: Expansion
 - Step 2: Collection
 - Step 3: Collision
 - Step 4: Rating
 - Step 5: Discussion

Brainstorming and Ideation

- Step 1: Expansion

- Start with the core theme of your brainstorm in the middle of a whiteboard
- Create as many ideas as possible around it
- Don't censor at all in this phase



Brainstorming and Ideation

- Step 2: Collection

- Write down each node of the expansion phase on a 3x5 note card or a Post-it note
- These are "idea cards"

Fear	Slither	Swim	Genesis	Last Survivor	Time Travel
Androids	Space	Water/Rain	Citric Acid Cycle	Immortality	Groundhog Day
Chrono Trigger	Gears	Belt	Rolling	Snake	Red Dwarf
Cycles	Rebirth	Circle	Wheel		

Brainstorming and Ideation

- **Step 3: Collision**

- Shuffle all the idea cards together
- Deal two to each person in the group
- Each person takes the two idea cards up to the whitboard and reveals them to the group
- The group collectively comes up with three game ideas inspired by the collision of the two cards
- Again, don't censor too much in this step

Brainstorming and Ideation

- Step 3: Collision

– Examples:

Groundhog
Day

Gears

1. Gardener building crazy contraptions to trap a groundhog that's been eating her garden.
2. Gears of War-style shooter where soldiers must relive a battle until they get it perfect (like in the movie Groundhog Day).
3. A time-management game (e.g. Diner Dash) where the player must manage the weather so that each season accomplishes its goals and transitions to the next on time.

Belt

Snake

1. Classic game of Snake (snake eats apples and grows but must avoid running into itself), but on a moving conveyor belt.
2. A snake must move across a room camouflaged as people's belts by jumping from waist to waist.
3. A snake hypnotizes a person but can only control them to do very simple things. As the person's belt, the snake must swing and platform them through a dangerous level to escape the zoo.

Brainstorming and Ideation

- Step 4: Rating

- Each person should pick the two ideas from Step 3 that she feels have the most merit and write them on the whiteboard
- If someone has already written one of your top ideas, just write your 3rd choice
- Wait for everyone to finish doing this
- Then, each person in the group should simultaneously put a mark on the board next to the three ideas that they like the most
 - Some ideas will have many marks next to them, while others will have only a few

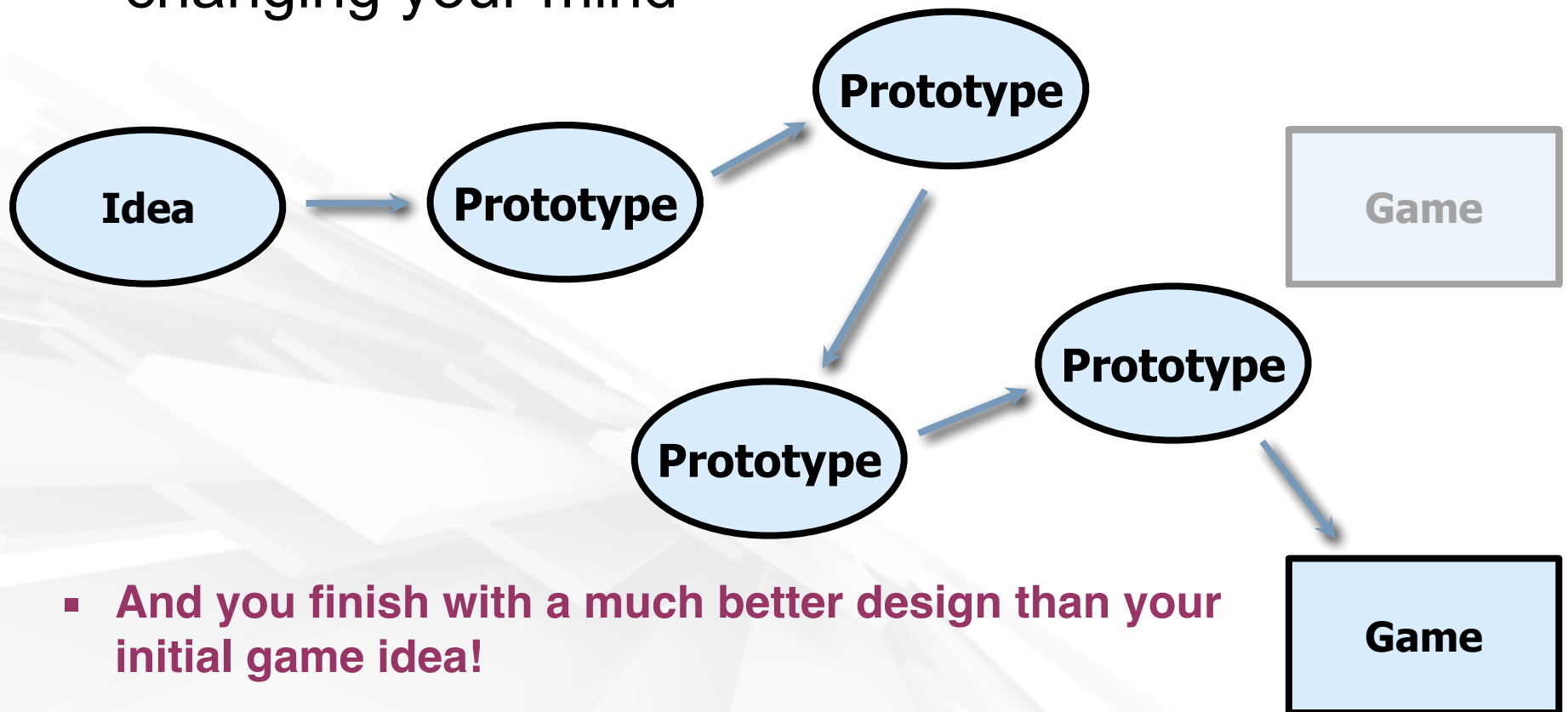
Brainstorming and Ideation

- **Step 5: Discussion**

- Given the information from Step 4, start discussing ideas
- Start with the most popular ideas, but don't be afraid to mix in some of the other ideas as well
- Combine the best ideas into something really great!

Changing Your Mind

- The real process involves a lot of iteration and changing your mind



- And you finish with a much better design than your initial game idea!

Brian Storming Exercise

- Groups of 3 or 4
- Think of a feature you would like added to an existing favorite game
- Create a story board (rough sketches no more than 6 slides) that shows how the feature will affect gameplay from the player's perspective

What makes gameplay good?

- Interactivity (little passive observation by players)
- Pursuing and achieving goals
- Require interesting choices to achieve goals
- Provide feedback to players about progress toward goals
- Consistency and fairness

Achieving Goals

- Always something for players to achieve
- Make sure goals are not too easy or too hard
- Three levels of goals
 - Long term (e.g. complete game)
 - Medium term (10-30 minutes)
 - Short term (0-60 seconds)

Common Game Goals

- Eliminate other players
- Score points (e.g. sports games)
- Get some place first (e.g. racing games)
- Solve puzzles
- Gain territory (e.g. strategy games)
- Improve abilities (e.g. role playing)
- Develop social relationships (e.g. multiplayer games)
- Play god (e.g. simulations)

The next 4 slides come from the
Rabin text

Goals and Objectives

- **Objectives**

- Designed tasks players must perform
 - Rigid requirements – formal

- **Goals**

- An intentional outcome
 - Notions that direct player action
 - Scales all levels of motivation
 - From selecting particular strategies...
 - ...to basic motor actions (e.g. pressing a button)

Choice and Outcome

- **Choice**
 - A question asked of the player
- **Outcome**
 - The end result of a given choice
- **Possibility space**
 - Represents the set of possible events
 - A “landscape” of choice and outcome

Choice and Outcome

- **Consequence or Weight**
 - The significance of an outcome
 - Greater consequences alter the course of the game more significantly
 - Choices are balanced first by consequence

Choice and Outcome

- Well-designed choice
 - Often desirable and undesirable effects
 - Should relate to player goals
 - Balanced against neighboring choices
 - Too much weight to every choice is melodrama
 - Orthogonal choices – distinct from others
 - Not just “shades of grey”

Qualities of Choice

- Terms in which to discuss choices
 - **Hollow** – lacking consequence
 - **Obvious** – leaves no choice to be made
 - **Uninformed** – arbitrary decision
 - **Dramatic** – strongly connects to feelings
 - **Weighted** – good and bad in every choice
 - **Immediate** – effects are immediate
 - **Long-term** – effects over extended period
 - **Orthogonal** – choices distinct from each other

Gameplay

Consistency and Fairness

- Consistency of actions and outcomes
 - A reason for each failure or success
 - Good players can anticipate and make plans
 - Don't solve problems by unlikely actions
- Fairness
 - Players believe they have a fair chance
 - Don't allow game to be won by a single simple strategy
 - Plot twists are allowed, but must be explainable

Game Design

- Start with simple concept
- Design around computer limitations
- Minimize player confusion
- Importance of play testing
- Incorporate a smooth learning curve
- Accommodate all skill levels

Establishing Focus

- What is it about the game that makes it compelling?
- What is the game trying to accomplish?
- What sort of emotions is the game trying to evoke in the player?
- What should the player take away from the game?

Establishing Focus

- How should the game be unique?
- How is it different from other games?
- What sort of control should the player have over the world?

Note:

Answers to these question should be one page long.
You want every team member to carry these answers around in their head during development.

The next 5 slides come from the
Rabin text

Premise

- The metaphors of action and setting
- Directs the player experience
 - Provides a context in which mechanics fit
 - Players map game states to the premise

Premise

- Story is the typical example of premise
 - Time
 - Place
 - Characters
 - Relationships
 - Motivations
 - Etc.

Premise

- Premise may also be abstract
 - *Tetris* operates under a metaphor
 - The metaphor: arranging colored shapes
- Encompasses all game elements
 - Player discussions use the language of the premise

Premise

- Games are models
- Activities being modeled form premise
 - Actions may appear similar in model
 - Usually are fundamentally quite different
 - Sports games are good examples
 - Playing video games isn't like playing the sport

Premise

- Goes beyond setting and tone
- Alters the players mental model
 - Basis of player understanding and strategy

Design Choices

- Arcade vs. strategy
- Graphics vs. game play
- Single player vs. network
- Core game market vs. wider audience
- New technology vs. wider base
- Custom built vs. off the shelf tools
- Standard distribution vs. shareware
- Legal issues

Game Design Sins

- Poor production style
 - Bad writing
 - Breaks in suspension of reality
- Linear plot or gameplay
- Micromanagement of user actions or play
- Repetition of user actions or graphics
- Ignore user's learning curve
- Poor game balance
 - Same strategies always works
 - Trial and error is not fun

Game Design Sins

- Not enough variety
 - Graphics, objects, monsters, levels, etc.
- Awkward user interface
- Limited feedback
 - Player confused about goals or progress
- Story inconsistencies
 - continuity problems)
- Player dies and does not know it

Nokia Top 10 Usability Recommendations

1. Provide a clear menu structure
2. Simplicity is key
3. Provide help when needed
4. Be relentlessly consistent
5. Don't waste the user's time
 - Allow user to skip introduction
 - Do not require re-entry of data
6. Use natural controls

Nokia Top 10

Usability Recommendations

7. Enable save and pause
8. Conform to real-world expectations
 - Realistic physics model
9. Go easy on sound
 - Use for feedback
 - Allow it to be turned off
 - Make game playable with sound off
10. Implement a high score list