02 Game Design Document

Tvorba a dizajn počítačových hier
Game classification

Classifying games and identifying the target audience
Platforms

• Arcades
  • Standalone game systems in public venues
  • Pong, Pac-man, Space invaders
  • Gaming in the 80’s

• Consoles
  • At home in front of the TV
  • Ensures minimal changes in hardware
  • Proprietary platform
  • Microsoft Xbox, Sony PlayStation, Nintendo Wii

• Computers
  • Various HW – problems with compatibility and HW requirements
  • Various SW – problems with unified development
Platforms (2)

• Web browser games
  • Casual, mostly Flash and Java games
  • Limited by browser capabilities and bandwidth
  • HTML5, WebSockets and WebGL move it towards more complex games
  • Gaining more ground with improving capabilities
  • Wide variety of input methods and screen sizes

• Mobile games
  • Casual, Games on portable devices such as phones or tablets
  • Small screen, limited keyboard or touch-based input
  • Gyroscope, GPS, Camera
  • Handheld as well (PSP, GameBoy)
  • “Toilet and bus games”
Platform dependent development

• The platform usually dictates different I/O devices
  • Controllers
    • Wii U
    • Kinect
    • Gyroscope
  • Screens
    • Multiple screens
    • 3D TV capabilities

• Single-platform games
  • Easier development, especially consoles
  • Targeting a specific market

• Multi-platform games
  • Need to solve differences in I/O devices
  • Varying game difficulty due to different I/O methods
Time modes

• Turn-based
  • Pool, Chess, Heroes of Might and Magic
  • Strategic, slower
  • Thinking in minutes
  • Less limited by controllers

• Real-time
  • More about reflexes
  • Thinking in milliseconds
  • Difference in controllers can make a huge impact on performance
  • Soccer, Counter-Strike, Pac-man

• Time-limited
  • A compromise between turn-based and real-time
  • Boxing, Time-limited chess, Racing games
Player modes

- **Single-player**
  - Any opponents controlled by AI
  - Might be that type of game that does not have opponents (Minesweeper)
  - Non-playing characters (NPCs)
  - Due to limited space and time, usually on mobile devices
  - Was limited by internet connectivity in the past
  - Logic casual games

- **1v1 or local multiplayer**
  - Tennis for two, Pong, Tunneler, Console racing games, Fighting/Boxing games
  - No AI
  - Need to provide controller for both players

- **Co-op**
  - Like local multiplayer, but players help each other to reach a common goal
  - People vs. Environment – “PvE”
Player modes (2)

• **LAN multiplayer**
  - Larger number of players
    - Allows for teams competing against each other
    - People versus People “PvP”
  - Communication through talking (shouting)
  - Huge LAN parties (E-sports) organized every year

• **Online multiplayer**
  - In terms of programming usually very small differences compared to LAN
    - Counter-strike 1.6 has identical LAN/online play
    - Newer games add matchmaking, which is the main difference between LAN and Online multiplayer
  - Might need to provide chat and voice communication capabilities
  - 3\textsuperscript{rd} party software exists (Steam, Ventrilo, TeamSpeak, Skype)
  - Theoretically unlimited number of players (WoW)
    - Problems with bandwidth, so you always play with only a small subset of people
Creating a game

• Need to target a specific group
  • Creating a game that will satisfy everyone is impossible
  • Target a small subset of gamers
  • Male aged 15-25 will probably play different games than Female aged 35-50

• Which of the categories is most fun?
  • Highly subjective
  • Every combination of player/time/platform ensures a unique experience
Goals of your game

- **Entertainment**
  - Have fun
  - Live through an engaging story
  - Tomb Raider (2013), BioShock

- **Social**
  - Bring people together to play
  - Allow social interaction such as trading, sharing, comparing who is better

- **Educational**
  - Learn by play, focused on children
  - History, math, learning to type on the keyboard

- **Serious games – not focused on entertainment**
  - Medicine, education, army
  - Surgery simulation, flight simulation, ...
Goals of your game (2)

• Training and Recruitment
  • Part of serious games
  • NASA

• Health and Fitness
  • Kinect, Dance Dance Revolution
  • “Exergaming”

• Marketing and Advertising
  • Advergames that are promoting a product
  • Usually small casual online games

• Creativity
  • Let the players create something
  • Minecraft, Space Engineers, ...
Genres

• Action
  • Platformers – quick moving through “platforms”
    • Super Mario, Sonic, Braid, FEZ, ...
  • Shooters
    • First-person (FPS)
      • Counter-strike, BioShock, Battlefield, Call of Duty, ...
    • Third-person
      • Gears of War, Mass Effect, ...
    • Bird’s eye
      • GTA 1, GTA 2, ...
  • Racing
    • Need for speed, Blur, ...
  • Fighting
    • Tekken, Mortal Combat, ...
Genres (2)

• Adventure
  • Puzzles, story, freedom of choice

• Action-adventure
  • Mix of the two genres

• Casino

• Puzzle
  • Tetris, Labyrinth, puzzle

• Simulations
  • Construction and management (tycoons)
  • Life simulation (Sims)

• Role-playing games (RPG)
  • Dungeons and Dragons, but not necessarily fantasy games
  • Player have roles, gather treasure, kill creatures, improve their character
  • The Elder Scrolls, Dragon Age, Gothic, even Mass Effect
Genres (3)

• Strategy
  • Turn-based
    • Heroes of Might and Magic
  • Real-time
    • Warcraft, Starcraft

• Massive Multiplayer Online (MMO)
  • MMORPG – World of Warcraft
  • MMOFPS – Counter-Strike
  • MMORTS – Starcraft

• Games don’t have only one genre! Each game is a combination of more genres
  • For example Skyrim
    • RPG, Adventure, FPS, Sometimes there are puzzles
Other genres

- Sandbox games
  - Open-world free roaming games with freedom considering when or how to approach objectives
  - Non-linear gameplay
  - The Elder Scrolls, Gothic

- Stealth
  - Remaining unseen and unheard
  - Metal Gear Solid, Thief, Deus Ex

- Survival horror
  - Sub-genre of action-adventure
  - Solve puzzles to progress to the next level
  - Combat is present, but you are usually very weak
  - Resident Evil, F.E.A.R., Amnesia: Dark Descent
Other genres (2)

- **MOBA**
  - Multiplayer online battle arena
  - DotA-style game

- **Tower defense**
  - RTS sub-genre
  - Stop enemies from crossing a map by building shooting/blocking towers
  - Upgradable towers

- **Roguelike**
  - RPG sub-genre, level randomization and permanent death
  - Rogue (1980), Diablo, Torchlight, FTL: Faster than Light, Binding of Isaac

- **Music**
  - Guitar hero...
  - Vib Ribbon, Audiosurf
Game mechanics
What IS a game?

• A game is a type of play activity, conducted in the context of a **pretended reality**, in which the participants try to achieve at least one arbitrary, nontrivial goal by **acting in accordance with rules**.

• A game is a system in which players engage in artificial conflict, **defined by rules**, that results in a quantifiable outcome.

• A game is a **rule-based system** with a variable and quantifiable outcome, where different outcomes are assigned different values, the player exerts effort in order to influence the outcome, the player feels emotionally attached to the outcome, and the consequences of the activity are negotiable.

• Many games, and game components, can be understood as state machines
Games are unpredictable

• Otherwise, it will get boring fast
• Several ways to introduce unpredictability
  • **Chance** (Randomness) – Blackjack
  • **Player choice** – Rock, Paper, Scissors
  • **Complex gameplay** – combining simple understandable behavior that might create complex (too complex to be predictable) outcome
• Small impact of player choice
  • The player starts to feel frustrated – their decisions do not matter
• Increasing player skill
  • Reduces the amount of unpredictability for complex gameplay
• Most games mix all three ways
  • Think of Warcraft 3 and name examples for each of the three
What’s in a game?

• Assets
  • Sounds
  • Textures
  • Models
  • Animations
  • Levels

• Behavior
  • How individual objects interact
  • How is the game played
  • What are the **unwritten** rules
Game mechanics

• Rules of a game
• Not printed instructions that the player is aware of
• Rules are not known beforehand
• The game teaches the player as he progresses
  • This is where digital games differ from board games and card games
  • Board and card games often require that the player knows the rules, so he does not make invalid actions
  • But digital games have a complex system that enforces only valid actions
Game mechanics

• More concrete than rules
• Include everything that affects the actual gameplay
• Example: Monopoly
  • Rules: several pages long
  • Mechanics: Rules + prices and rent of all properties, as well as the text of all Chance and Community Chest cards

• Core mechanics
  • Most influential, affecting many aspects of the game
  • Interact with mechanics of lesser importance
• Example: Gravity in a platform game
  • Definitely a core mechanic
  • Affects almost all non-stationary objects, interacts with jumping and falling...
• Example: Lockpicking mini-game in Skyrim
  • Not core, affects only a small portion of objects (chests/doors)
Mechanics are media-independent

- Mechanics are not tied to a single medium
- Board games consist of cards, dice, board, ...
- Video games consist of code and assets
- But some games can be identically implemented as a board game and a video game
- Relationships between entities remains the same
  - You interact differently (mouse/keyboard vs. actual moving)
- Using different media can help prototyping
  - Create a paper prototype
- Some mechanics are hard to implement without a computer
  - Physics simulation
- Games can use multiple media at once
Five types of mechanics

• **Physics**
  • A core mechanic in many games: FPS games, Portal, Angry Birds, Braid

• **Internal economy**
  • Mechanics of transactions involving game elements that are consumed, collected, traded. Typically, these elements are called **resources**
  • Example: resources in Counter-Strike – what are those?

• **Progression mechanisms**
  • Describes how the player progresses through the game world
  • Getting to a particular place, obtaining an item, unlocking a door, ...

• **Tactical maneuvering**
  • Placement of game units on a map
  • Strategic advance by placing units in possible locations (e.g. Chess)

• **Social interaction**
  • Teams, clans, giving gifts, trading items, creating alliances, ...
<table>
<thead>
<tr>
<th>Action</th>
<th>Strategy</th>
<th>Role-Playing</th>
<th>Sports</th>
<th>Vehicle Simulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detailed physics for movement, shooting, jumping, etc.</td>
<td>Simple physics for movement and fighting</td>
<td>Relatively simple physics to resolve movement and conflict, often turn-based</td>
<td>Detailed simulation</td>
<td>Detailed simulation</td>
</tr>
<tr>
<td>Economy</td>
<td>Progression</td>
<td>Tactical Maneuvering</td>
<td>Social Interaction</td>
<td></td>
</tr>
<tr>
<td>Power-ups, collectables, points and lives</td>
<td>Predesigned levels with increasingly difficult tasks, storyline to set player goals</td>
<td>Scenarios to provide new sets of challenges</td>
<td>Coordinated actions, alliances and competition between players</td>
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<td>Progression</td>
<td>Tactical Maneuvering</td>
<td>Social Interaction</td>
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<tr>
<td>Positioning of units to gain offensive or defensive advantages</td>
<td>Coordinated actions, alliances and competition between players</td>
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<td>Social Interaction</td>
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<td>Sports</td>
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<td>Team management</td>
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<td>Seasons, competitions, tournaments</td>
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<td>Team tactics</td>
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<td>Vehicle Simulation</td>
<td>Detailed simulation</td>
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<td>Vehicle tuning between missions</td>
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<td></td>
<td>Missions, races, challenges, competitions, tournaments</td>
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<tr>
<td>Management Simulation</td>
<td>Managing of resources, economy building</td>
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<td></td>
<td>Coordinated actions, alliances and competition between players</td>
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<tr>
<td>Adventure</td>
<td>Managing a player's inventory</td>
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<td></td>
<td>Story to drive game, locks and key to control player progress</td>
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<tr>
<td>Puzzle</td>
<td>Simple, often non-realistic and discrete, physics generate challenges</td>
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<td>Short levels providing increasingly more difficult challenges</td>
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<td>Social Games</td>
<td>Resource harvesting and unit building, resources spend on personalized content</td>
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<td>Quests and challenges to give player a purpose and a goal</td>
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<td>Players exchange in-game resources, mechanics encourage player cooperation or conflict</td>
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</table>
Discrete vs. Continuous Mechanics

• Mechanics can be discrete or continuous

• Continuous
  • Physics

• Discrete
  • Picking up an object
  • Items in your inventory
  • Things related to internal economy (if using integer resources)
Game development stages
Image from *Game Development Essentials: An Introduction*
Development phases

- Concept
  - Start with a small team, work on a game concept document

- Pre-production
  - Create the Game Design Document, Technical Design Document, Art Style...

- Prototype
  - “A working piece of software that captures onscreen the essence of what makes your game special, what sets it apart from the rest, and what will make it successful.”

- Production
  - Alpha
  - Beta
  - Gold
  - Post-production
Game documentation

Necessary steps before starting the actual development
Software requirements specification (SRS)

- Complete description of the behavior of a system to be developed
- May include use-cases describing user interaction with the system
- Usually a structured document
- May evolve during development
- Serves as a communication tool between software developers and project managers (or even customers)
- Must contain lots (all) of information concerning the system
- Two teams developing from the same specification will get systems that perform exactly the same operations
Structure of a SRS

- Introduction
- Overall description
- Specific requirements
Structure of a SRS (2)

• Introduction
  • Purpose
  • Definitions
  • System overview
  • References

• Overall description

• Specific requirements
Structure of a SRS (3)

• Introduction
• Overall description
  • Product perspective
    • System Interfaces
    • User Interfaces
    • Hardware interfaces
    • Software interfaces
    • Communication Interfaces
    • Memory Constraints
    • Operations
    • Site Adaptation Requirements
  • Product functions
  • User characteristics
  • Constraints, assumptions and dependencies
• Specific requirements
Structure of a SRS (4)

• Introduction
• Overall description
• Specific requirements
  • External interface requirements
  • Functional requirements
  • Performance requirements
  • Design constraints
    • Standards Compliance
  • Logical database requirement
• Software System attributes
  • Reliability
  • Availability
  • Security
  • Maintainability
  • Portability
• Other requirements
Documents related to Game Design

• Concept Document
• Game Proposal Document
• Game Design Document (GDD)
• Technical Design Document
• Art Style Guide
• Project Plan
• Test Plan
Concept document

• “pitch”
• Convey the goal and purpose of the game
• For management level to help assess viability, budget, ...
• Around 5 pages long
• Written by the producer/creative director
Parts of a concept document

• Premise – high level concept, describe your game and how it is unique in a few sentences
• Player motivation – what will motivate the players? How do they win?
• Unique Selling Proposition – Why will players pick YOUR game?
• Target Market – Age, Gender, Platform, ...
  • Target rating (mature content, violence, ...) 
• Genre
• HW requirements (platform)
• License
Proposal

• Follow-up of the concept document
• Early stage of a GDD
• Additional sections
  • Hook
    • Audio, Visuals, Gameplay, Story, Mood
  • Gameplay
    • First minutes of gameplay
• Online features
• Technology
• Production details
  • Team, Budget (rough estimate), Schedule
• Backstory, characters, ...
• Budget (detailed)
Game Design Document

• A Game Design Document is very similar to a SRS
  • It is not meant to “sell the idea” as the concept or proposal

• In addition to the complete description of the software, a GDD contains also the “art” part of a game

• The GDD must contain
  • Complete gameplay description
  • Story description
  • Description of all game elements (all creatures, NPCs, items, classes, …)

• Can contain parts of the SRS

• Often 50 – 200 pages long

• It’s a living document
Game Design Document (2)

• Is it necessary?
  • For teams, this is the “holy grail” they refer to when creating a game
  • What about a one-man team?

• The form of a GDD is relatively loose
  • Certain sections are totally irrelevant for certain types of games

• Focus is on
  • Gameplay
  • Storyline
  • Characters
  • Interface
  • Mechanics (Rules)
One of the possible structures of a GDD

• Game Interface
  • Complete description of all interfaces, their usability, production time and cost, ...

• Game World
  • All elements present in levels
  • Doors, pick-up items, cinematics, triggers, characters, animations, ...
  • Gameplay mechanics

• Character abilities and items

• Game engine

• Incorporated concept art in all sections
Technical Design Document

• Describes the engine on which the game will run
• Comparison to other engines on the market
• Technology production path
  • How they will get from concept to software
• Who will be involved and what their tasks will be
  • How long will each task take
• Specific requirements and features
• Hardware and software to buy for production
• Closer to the SRS, farther from the concept document
Example GDDs
Homework

• Prepare your game idea
  • Identify which genres/categories it belongs to
  • Identify target audience
  • Core mechanics (and their type)
  • Short description of the game
  • (Market analysis)

• Send by e-mail
  • No hard deadline
  • Remember, all game ideas have to be confirmed
Homework (2)

• Watch the Special Extra Credits videos featured by Unity: http://unity3d.com/learn/tutorials/modules/beginner/your-first-game

• Watch more tutorials at Unity: http://unity3d.com/learn/tutorials/modules
  • Recommended: Architecture, Graphics section, UI section, 2D section

• Watch the Extra Credits game design playlist: https://www.youtube.com/playlist?list=PLhyKYa0YJ_5BkTruCmaBBZ8z6cP9KzPiX
References

• http://www.gamedev.net/page/resources/_/creative/game-design/tom-slopers-format-for-game-design-specifi-r243
• http://sloperama.com/advice.html
• http://www.gamepitches.com/
References (2)

  • Chapter 1 – Historical Elements
  • Chapter 2 – Platforms and Game Modes
  • Chapter 3 – Goals and Genres
  • Chapter 4 – Player Elements
  • Chapter 11 – Production & Management

• Further reading
  • Chapter 10 – Roles & Responsibilities
  • Chapter 12 – Marketing & Maintenance

• Adams and Dormans (2012). *Game Mechanics: Advanced Game Design (Voices That Matter)*.
  • Chapter 1 – Designing Game Mechanics