Games

- Games are played on different kinds of machines:
  - The Art of Computer Game Design [Crawford 1997]
  - Expensive/inexpensive dedicated machines
  - Personal computers
  - Large mainframe computers
  - Networks

Fundamentals Elements Common to Games

- Four common factors [Crawford 1996]
  - Representation
  - Interaction
  - Conflict
  - Safety

Representation

- A game is a closed formal system that subjectively represents a subset of reality [Crawford 1996].
  - By ‘closed’, we mean the game is complete and self sufficient as a structure.
  - The model world created by the game is internally complete; no reference need be made to agents outside of the game.
Representation [Crawford 1996]

- By 'formal' we mean that the game has explicit rules.
- By 'system' we mean that a game is a collection of parts which interact with each other.
- Game must be at most a subset of reality.
- A game creates a subjective and deliberatively simplified representation of emotional reality.

Interaction [Crawford 1996]

- The most fascinating thing about reality is not that it is static or dynamic, or even that it changes with time, but how it changes, the intricate webwork of cause and effect by which all things are tied together.
- The highest and most complete form of representation is interactive representation.
- Games provide this interactive element, and it is a crucial factor in their appeal.

Conflict [Crawford 1996]

- Conflict arises naturally from the interaction in a game.
- The player is actively pursing some goal.
- Obstacles prevent him from easily achieving this goal.
- If obstacles are active and dynamic, if they purposefully respond to the player, the challenge is a game.
- However, active, responsive, purposeful obstacles require an intelligent agent. If that intelligent agent actively blocks the player’s attempts to reach his goals, conflicts between the player and the agent is invariable.

Safety [Crawford 1996]

- Conflict implies danger; danger means risk of harm; harm is undesirable.
- Therefore, a game is an artifice for providing the psychological experiences of conflict and danger while excluding their physical realizations.
- A game is a safe way to experience reality.

Questions for Good Game Design [Crawford 1996]

- Why do people play games?
- What motivates them?
- What makes games fun?
  - What makes one game more fun than another?
- The answer to these questions are crucial to good game design.

A Taxonomy of Computer Games [Crawford 1996]

- Skill-and-action games
- Strategy games
A Taxonomy of Computer Games [Crawford 1996]

- Skill-and-action games
  - Combat games
  - Maze games
  - Sports games
  - Paddle games
  - Race games
  - Miscellaneous games

- Strategy games
  - Adventures
  - D&D games
    - Fantasy role-playing, Gary Gygax, Dungeons and Dragons
    - Wargames
    - Games of chance
    - Educational and children’s games
    - Interpersonal games

Game Design Sequence [Crawford 1996]

- Choose a goal and a topic
- Research and preparation
- Design phase
  - I/O structure
  - Game structure
  - Program structure
  - Evaluation of the design
- Pre-programming phase
- Programming phase
- Play-testing phase
- Post-mortem

Education of Game Designers

- An advice to whom wants to be a game designer [Nov. 2003, in Crawford 97]

Courses Relevant to Games

  - Programming
  - Programming languages
  - Data structures and algorithms
  - Compilers
  - Operating systems
  - Graphics
  - Computer architecture
  - AI
  - Databases

Kinds of Game Products

  - Personal computer games
  - Home console games
  - Arcade games
  - Online games
How the Game Industry Functions [Adams 2003]

- Subcontractors
- Developers
  - Design and build games, porting or converting games
- Publishers
  - Funds the development and advertises them
- Manufacturers
  - Console manufacturers, add-on manufacturers, product manufacturers
- Distributors
  - Retailers, mail-order, online, shareware, rental, bundling, ...
- Customers

Gamer Demographics and Markets [Adams 2003]

- 34% of PC gamers and 45% of console gamers are under 18.
  - However, parents are involved in determining what games kids play.
    - Only 10% of PC game buyers and 4% of console game buyers are under 18.
  - There are now people in their 30s and 40s who grew up playing games, and the age of the average gamer is now 28.
    - As the market ages, so its tastes are changing as well.

Gamer Demographics and Markets [Adams 2003]

- In reality, 43% of American game players are female, and their age is 27.
- The industry is still trying to figure out how to make games more appealing to women and girls, because while a great many women play games, a rather smaller number is prepared to buy them.

Game Genres [Adams 2003]

- Action
  - Action-adventures, fighting games, dance simulations, ...
- Strategy and war games
- Sports games
- Vehicle simulators
- Construction and management simulations
- Graphic adventures
- Fantasy role-playing games
- Online role-playing games
- Puzzle games and software toys
- Children’s games

Console Games [Adams 2003]

- Action, 25.1%
- Sports, 19.5%
- Racing, 16.6%
- Eduainment, 7.6%
- All others, 31.2%

How Games Are Built? [Adams 2003]

- Idea
- Pre-production – exploratory and planning stage
  - Design work
  - Technical research and prototyping
  - Project planning
  - Going to full production
- Production
  - Production process: designers, programmers, artists, audio and music, testers
  - Marketing activities
- Testing
  - Alpha testing, localization, beta testing, configuration testing, content rating, quality assurance, licensor and console manufacturer approvals
- Manufacturing
Game Outline/Proposal in Basic Design [Mulligan and Patrovsky 2003]

- Genre
- Graphic look and requirement
- Interface style
- Engine
- Database
- Target audience
- Client platform
- Licensed or original world

- Game play
- New player experience
- Competition
- Staffing and qualifications
- Core team
- Schedule
- Budget

Preparing to be a Game Developer [Adams 2003]

- Uncover your talents and lay the foundations
- Using computers and creativity tools
- Computer programming
- English (writing and literature)
- Mathematics
- Art
- Music
- Science
- History
- Typing

Curriculum Framework [Adams 2003]

- Game design
- Art and animation
- Audio and music
- Programming
- Production and project management
- Other subjects
  - Humanities, social sciences, sciences and engineering
  - Postgraduate programs

Other Ways to Prepare Yourself [Adams 2003]

- Play games
- Try different genres
- Look at the way games are designed
- Examine the user interface
- Take notes
- Develop your own games
- Attend industry events (IGDA)
- Follow the press
- Be your own press
- Take part in beta tests
- Attend focus groups

IGDA

- International Game Developers Association (IGDA)
- http://www.igda.org/

Curriculum Framework [IGDA 2004]

- IGDA Education Committee
- Conceptual guide for game-related educational programs
Curriculum Framework [IGDA 2004]

- Core topics: games-related education
  - Critical game studies
  - Games and society
  - Game design
  - Game programming
  - Visual design
  - Audio design
  - Interactive storytelling
  - Game production
  - Business of gaming

Curriculum Framework [IGDA 2004]

- Critical game studies
  - Criticism, analysis and history of electronic and non-electronic games
  - Games and society
  - Understanding how games reflect and construct individuals and groups
  - Game design
  - Principles and methodologies behind the rules and play of games

Curriculum Framework [IGDA 2004]

- Game programming
  - Aspects of traditional Computer Science – modified to address the technical aspects of gaming
- Visual design
  - Designing, creating and analyzing the visual components of games
- Audio design
  - Designing and creating sound and sound environments

Curriculum Framework [IGDA 2004]

- Interactive storytelling
  - Traditional storytelling and the challenges of interactive narrative
- Game production
  - Practical challenges of managing the development of games
- Business of gaming
  - Economic, legal and policy aspects of games

Typical Career Ladders for Game Developers [Adams 2003]

**Development ladders**

<table>
<thead>
<tr>
<th>Increasing skill, experience, authority, and pay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief Tech Officer</td>
</tr>
<tr>
<td>Art Director</td>
</tr>
<tr>
<td>Audio Director</td>
</tr>
<tr>
<td>Sound designer</td>
</tr>
<tr>
<td>Audio engineer</td>
</tr>
</tbody>
</table>

**Design Ladder and Production Ladder**

<table>
<thead>
<tr>
<th>Increasing skill, experience, authority, and pay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief Creative Officer</td>
</tr>
<tr>
<td>Lead creative designer</td>
</tr>
<tr>
<td>Level designer / World builder</td>
</tr>
<tr>
<td>Junior designer</td>
</tr>
</tbody>
</table>

Typical Career Ladders for Game Developers [Adams 2003]
Development Tools [Adams 2003]

- Programming tools
  - Graphic engines, gameplay engines
- Art tools
  - 3-D modeling tools, 2-D (image editing/pixel painting) tools
- Audio tools
  - Waveform editors and tools, MIDI and music tools
- Office tools

How to Get a Job in the Game Industry [Adams 2003]

- Packaging yourself as a professional
  - Cover letter
  - Resume
  - Portfolio
  - Demo
  - Business card
  - Web site

How to Get a Job in the Game Industry [Adams 2003]


Professional Game Development Web Sites [Adams 2003]

- GameDev.net
  - www.gamedev.net
- Gamasutra
  - www.gamasutra.com
- FlipCode
  - www.flipcode.com
- Yahoo’s Game Programming Directory
  - http://dir.yahoo.com
- Webring.com’s Game Programming Webdings
  - www.webring.com

Game Job Postings [Adams 2003]

- Gamasutra Jobs Page
  - www.gamasutra.com/jobsearch
- GameJOBS.com
  - www.gamejobs.com
- Games-match
  - www.games-match.com
- Mary-Margaret.com
  - www.mary-margaret.com

Networking Resources [Adams 2003]

- IGDA Chapter Meetings
  - www.igda.org/chapters
- Game Developers’ Conference
  - www.gdconf.com
- Electronic Entertainment Expo (E3)
  - www.e3expo.com
- SIGGRAPH
  - www.siggraph.org
Educational Institutions [Adams 2003]
- Lists of educational institutions that provide training for game developers
- Gamasutra developers’s webzine
  - www.gamasutra.com

Guide to Writing for Games [IGDA 2004]
- Game Writers’ Special Interest Group
  - http://www.igda.org/writing/
- Quick Guide to Games Writing
- Glossary of Game Writing Terms
- Guide to Writing for Games
- White Papers
- Resources
- Discussion Forum

The Future of Game Development [Adams 2003]
- Bigger games, bigger teams
  - Bigger teams mean more bureaucracy
  - The rise of the content creators
  - Programmer specialization
  - Subcontracted services
- Spiraling development costs and consequences
  - Publisher conservatism
  - Inbreeding
  - Sequels and sequels to sequels

New Options for New Ideas [Adams 2003]
- Homebrew: Mods, Bots, and Engines
- Academic research
- Video games as an Art form

References
- Acknowledgement
  - These notes are summarized mainly from the following references.
  - Other references (provided separately)