The Game Development Process

Introduction

Outline

• Game Business Overview
  - Stats
  - Shape
• Overview of Game Development Players
• Game Companies
  - Developers and Publishers
  - Timeline
  - Examples
Random Statistics

• 60% of all Americans play video games
  - In 2000, 35% of Americans rated playing computer and video games as the most fun entertainment activity for the third consecutive year
• Computer/video game industry on par with box office sales of the movie industry
  - $6.35B/year for U.S. Sales in 2001
• Development
  - Costs $3M to $10M to develop average game
  - Takes 12-24 months
• 70+ million Playstations worldwide
  - 30 million PS2's, 4 million Xbox's, 4 million GameCubes
  - Maybe 10 million Xbox 360s by end of 2006
• 400,000 pay $12.50/month to play Everquest

Hit-Driven, Entertainment Business

• Entertainment, not packaged goods
  - Consumers say, "I have to have the next WarCraft game from Blizzard!"
  - No one says, "I have to have that next razor blade from Gillette!"
  - Games generate
    * emotional responses - fulfill fantasies
    * escape from reality - stimulate the senses
• Causes of success are intangible
• "Quality is king"
• Consumers are smarter than often thought
• Hits are made by:
  - those who are: creative, instinctive, and who know what a great gaming experience feels like
  - not by marketing executives
Business Models

- Software developers and publishers
  - Money from game sales
  - Internet games
    - Initial game
    - Monthly fee

- Console developers
  - Proprietary media delivery
  - Lose money on consoles (the faster they sell, the faster they go out of business)
  - Charge fee for each game sold

- Tool developers
  - Create “engines” and “middleware” and sell to game developers

- Contract services:
  - Motion capture, art, cut-scenes, audio, ...

Sales

- 2003 U.S. sales of console games totaled $5.8 B
  - Computer games $1.2 billion, consoles $4.6 billion
- Only entertainment industry to grow in 2003
  - Movie and music industries reported losses
    - According to Exhibitor Relations and Nielsen SoundScan
- Console game players:
  - Action (30%), sports (20%), racing (15%), RPG (10%), fighting (5%), family entertainment (5%), and shooters (5%)
- Computer gamer players:
  - Strategy (30%), children’s entertainment (15%), shooters (15%), family entertainment titles (10%), RPG (10%), sports (5%), racing (5%), adventure (5%), and simulation (5%)
Online Growth

• Not just for PC gamers anymore
• 24% of revenues will come from online by 2010 (Forrester Research)
• Video gamers
  - 78% have access to the Internet
  - 44% play games online
  - Spend 12.8 hours online per week
  - Spend 6.5 playing games online

Shape of Industry (1 of 2)

• Hardware (ask):
  - Sony, Nintendo, Microsoft, Intel
• Software (ask):
  - Publishers
    • Electronic Arts, Activision, Sony, Microsoft, Infogrames, UbiSoft, Mindscape, Interplay,…
  - Developers
    • Electronic Arts, Sony, Microsoft (Bungie), Blizzard, Lucas Arts, id, Namco, Square, Valve, Raven, Relic, Red Storm, High Voltage, Outrage, 3DO, …
Shape of Industry (2 of 2)

• Similar to Film Industry
  - About 1 in 10 titles breaks even or makes money
  - Sequels and franchises are popular
    * EA Sports, Sims, Star Trek, ...
  - Few self-published titles
  - Fewer small developers as development costs go up

• Internet
  - Increasingly sales
  - Updates
  - Multiplayer versions of games
  - Massively multiplayer games

Outline

• Game Business Overview (done)
• Game Development Players (next)
• Game Companies
Game Studios - Vertical Structure

- Developers
- Publishers
- Distributors
- Retailers

- Much like a mini-Hollywood

Developers

- Design and implement games
  - Including: programming, art, sound effects, and music
  - Historically, small groups
  - Analogous to book authors
- Structure varies
  - May exist as part of a Publisher
  - May be “full-service” developers or may outsource some
    - Motion Capture (to replicate realistic movement)
    - Art and Animation (can be done by art house/studio)
- Many started on PC games (console development harder to break into)
- Typically work for royalties & funded by advances
  - Do not have the capital, distribution channels, or marketing resources to publish their games
  - Often seen that developers don’t get equitable share of profits
  - Can be unstable
Publishers (1 of 4)

- Fund development of games
  - Including: manufacturing, marketing/PR, distribution, and customer support
- If developers are the "geeks", publishers are the "suits"
- Various specialties: PC only, PC + console, mobile, import, web
- Publishers assume most of the risk, but they also take most of the profits
- Console/PC publishers handle:
  - Production process
  - Quality assurance
  - Licensing
  - Manufacturing and shipping to retail
  - Sales
  - Consumer marketing and PR
  - HR, finance, investor relations, legal

Publishers (2 of 4)

- Relationship to developers
  - Star Developers can often bully Publishers, because publishers are desperate for content
  - Most Developers are at the mercy of the almighty Publisher (details on relationship in Chapter 7.3, done later)
- Originally grew out of developers
- Massive consolidation in recent years
- Most also develop games in-house
Publishers (3 of 4)

• May also use:
  - Quality of Service Provider
    • Alternative to maintaining team of full-time salaried testers
    • Established in PC publishing, due to amortization of multiple hardware configurations over multiple projects
    • Gaining ground in console publishing; security of sharing proprietary console equipment is a perceived concern

Publishers (4 of 4)

• May also use:
  - PR firms to communicate with
    • "consumer" media (ie mass-market general media)
    • "specialist" video game publications
  - Ad agency to prepare creative marketing campaign
    • good communication ensures alignment of vision with publisher
  - Merchandising teams to ensure all is in order at store level
Distributors

- *Get software from publisher to retailer*
- Originally modeled on book distribution
- May resell to smaller independent stores and chains
- Compete on price, speed and availability
- Earn profit margin of around 3%
- Becoming less important as the retail market changes

Retailers

- *Sell software*
- Started with mail-order and computer specialty stores
- Shift in 80's to game specialty stores, especially chains (Today 25%)
  - *EB Games, GameStop*
- Shift in 90's to mass market retailers (Today 70%) (ask)
  - *Target, WalMart, Best Buy*
- Retailers generally earn 30% margin on a $50 game
- Electronic download of games via Internet still in infancy
  - Big but not huge (Today 5%)
Outline

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• Game Companies (next)
  - Developers and Publishers
  - Timeline
  - Examples

Developer and Publisher Relationship
The Pitching Process: Prototype

• Key game prototype features:
  - Core gameplay mechanic
  - Game engine / technological proficiency
  - Artistic / styling guide
  - Demonstration of control / camera system
  - Example gameplay goals
The Pitching Process: Pitch Presentation

• Key pitch presentation content:
  - Concept overview & genre profile
  - Unique selling points
    • What makes it stand out from its competitors
  - Proposed technology & target platform/s
  - Team biographies & heritage
  - Outline marketing information, including potential licensing opportunities

Chapter 7.3, Introduction to Game Development

The Pitching Process: Design

• Game Design - focuses on intimate detail such as:
  - Storyline
  - Control dynamics
  - Camera system
  - Level progression
  - Game features and functionality
  - Score systems etc.
• Technical Design - covers technical topics:
  - Graphics engine
  - AI routines
  - Audio system
  - Online capability and requirements
  - Peripherals/controllers
  - Development asset management/backup

Chapter 7.3, Introduction to Game Development
The Pitching Process: Project Schedule & Budget

• Schedule & budget must:
  - Be detailed and transparent
  - Allow for contingency scenarios
  - Have several sets of outcomes for different size publishers
  - Be realistic

Deal Dynamics: Research

• The stress was Publishers screening Developers
• But points Developers should research of prospective Publishers:
  - Are they financially stable?
  - Do they have global reach?
  - Do they market / PR their games well?
  - Is there a history of non-payment of milestones or royalties?
  - Have they canned many titles?
Deal Dynamics:
IP Rights

• Intellectual Property Rights include:
  - Game name
  - Logos
  - Unique game mechanics & storyline
  - Unique characters, objects & settings
  - Game Source Code including artwork & associated assets
  - Unique sounds and music

Payment Negotiation:
Overview

• Current approximate development costs:
  - $4-5 million for AAA multi-platform
  - $2-3 million for AAA PlayStation 2 only
  - $1 million for A-quality single platform
Payment Negotiation: Royalty Negotiation

- Royalties are percentage payments of profits made above and beyond the recoup of development costs
- Royalty rates are calculated the wholesale price of the product
- Developer royalties can range from 0 percent for work for hire, to 40 percent for a self-funded AAA title.

Payment Negotiation: Royalty Negotiation

- Other considerations:
  - Rising-rate royalty, increasing percentage the more units sell
  - Clear royalty definition of ‘wholesale price’ (i.e. including cost of goods etc.)
  - Right to audit publishers books
  - Currency/exchange rate/VAT figures
Payment Negotiation: Milestones

- Milestone payments represent the agreed rate of release for development funding
- Developers will usually be given a lump-sum advance payment, with the remainder of the payments split into regular milestones payable upon delivery of agreed content

Moving Projects Forward

- Most Publishers have a “Greenlight Process”
  - Use to determine which projects go forward
- Developers submit to committee at five, mostly independent stages:
  - Concept
  - Assessment
  - Prototype
  - First Playable
  - Alpha
- At each stage, committee reviews:
  - Decides whether or not to continue funding
  - Evaluates market potential
  - Adjusts unit forecasts accordingly
## Development Milestones: Development Timeline

- Here are some example development periods for different platforms:
  - 4-6 months for a high-end mobile game
  - 18-24 months for an original console game
  - 10-14 months for a license/port
  - 16-36 months for an original PC Game

## What's Involved?

- **People involved**
  - lead designer
  - project leader
  - software planner
  - architectural lead
  - programmers/artists
  - level designers
  - testers

- **Time involved**
  - 12-24 months
    - PC about 12
    - Console about 24
  - Note, film:
    - 12 months

(Will walk through what phase each plays a roll, next)
Game Development Timeline (1 of 5)

- Inspiration
  - getting the global idea of the game
  - duration: 1 month (for a professional game)
  - people: lead designer
  - result: treatment document, decision to continue

- Conceptualization
  - preparing the "complete" design of the game
  - duration: 3 months
  - people: lead designer
  - result: complete design document
  - (continued next slide)

Based on notes from Mark Overmars

Concept

- Define Game Concept
- Define Core Game Features
- Find/Assign Developer
- Estimate Budget & Due Date

Based on notes from Neal Robison, ATI
Concept: Van Helsing (1 of 4)

Gameplay: Still firing after being hit

Based on notes from Neal Robison, ATI

Concept: Van Helsing (2 of 4)

Van Helsing Concept: 10/16/02
Gameplay: Finishing Move

Based on notes from Neal Robison, ATI
Concept: Van Helsing (3 of 4)

(Van Helsing
Pre-Production)

Concept: Van Helsing (4 of 4)

(Van Helsing
Finished
Concept)

Based on notes from Neal Robison, ATI
Game Development Timeline (2 of 5)

• Prototypes
  - Build prototypes as proof of concept
    • Can take 2-3 months (or more)
    • Typically done a few months in
  - In particular to test game play
  - Throw them away afterwards
• Projects 1-5 ... prototype!
  - Pitch to Publisher
• (Continued next slide)

Prototype or 1st Playable

- GDD & TDD = “The Bibles”
- Production Budget & Detailed Schedule
- Submit Concept to Sony, etc.
- Working Prototype, with Game Mechanics
- Focus Test
Prototype: Red Ninja (1 of 3)

Based on notes from Neal Robison, ATI

Prototype: Red Ninja (2 of 3)

(Red Ninja Pre-Production)

Based on notes from Neal Robison, ATI
Prototype: Red Ninja (3 of 3)

(Red Ninja
Final
Production)

Game Development Timeline (3 of 5)

• Blueprint
  - separate the project into different tiers
  - duration: 2 months
  - people: lead designer, software planner
  - result: several mini-specification

• Architecture
  - creating a technical design that specifies tools and technology used
  - duration: 2 months
  - people: project leader, software planner, lead architect
  - result: full technical specification
Game Development Timeline (4 of 5)

• Tool building
  - create a number of (preferably reusable) tools, like 3D graphics engine, level builder, or unit builder
  - duration: 4 months
  - people: project leader and 4 (tool) programmers
  - result: set of functionally tools (maybe not yet feature complete)

• Assembly
  - create the game based on the design document using the tools; update design document and tools as required (consulting the lead designer)
  - duration: 12 months
  - people: project leader, 4 programmers, 4 artists
  - result: the complete game software and toolset

Other Development Milestones: Alpha Definition

• At Alpha stage, a game should:
  - Have all of the required features of the design implemented, but not necessarily working correctly
  - Be tested thoroughly by QA to eliminate any critical gameplay flaws
  - Still likely contain a certain amount of placeholder assets
  - (Continued next slide)
Alpha Definition

- Feature Complete
- “Localization” Begins
- Focus Test
- Play Testing
- Marketing Continues

Based on notes from Neal Robison, ATI

Alpha: Crash Bandicoot (1 of 2)

Based on notes from Neal Robison, ATI
Alpha: Crash Bandicoot (2 of 2)

(Crash Bandicoot)

Game Development Timeline (5 of 5)

- Level design
  - create the levels for the game
  - duration: 4 months
  - people: project leader, 3 level designers
  - result: finished game with all levels, in-game tutorials, manuals

- Review
  - testing the code, the gameplay, and the levels
  - duration: 3 months (partially overlapping level design)
  - people: 4 testers
  - result: the gold master

Based on notes from Mark Overmars
**Other Development Milestones: Beta Definition**

- At Beta stage, a game should:
  - Have all content complete
  - Be tested thoroughly for bugs and gameplay tweaks
  - Be shown to press for preview features
  - (Continued next slide)

**Stages of Development: Beta**

- Polish, Polish, Polish
- Game Balancing
- Localization Continues
- Demo Versions

Based on notes from Neal Robison, ATI
Other Development Milestones: Gold Master Definition

- At Gold Master stage, a game should:
  - Be sent to the platform holder/s (where applicable) for TRC testing
  - Be sent to press for review
  - Be sent to duplication for production
  - Be backed up and stored
  - (Continued next slide)

Final/GMC/Gold

- The Game is “Done”
- Testing, Testing, Testing
- Intense Pressure
- Submit to Console developers
- Manufacturing Timing

Based on notes from Neal Robison, ATI
Post-Mortem

- Analysis of PR, Marketing
- Analysis of Production, Source Code
- Archive All Assets
- What went right, what went wrong
- Kick-off the Sequel!

Development Team Size

- As late as the mid-80's teams as small as one person.
- Today, teams today ranging from 10-60 people.
- Programming now a proportionally smaller part of any project
- Artistic content creation proportionally larger
- See Gamasutra, (www.gamasutra.com)
  - Search for "post mortem"
  - Game data at bottom includes team size and composition
Development Team 1988

- Sublogic's JET (early flight sim)
  - Sublogic later made scenery files for Microsoft flight simulator
- 3 Programmers
- 1 Part-Time Artist
- 1 Tester

Total: 5

Development Team 1995

- Interplay's Descent
  - Used 3d polygon engine, not 2d sprites
- 6 Programmers
- 1 Artist
- 2 Level Designers
- 1 Sound Designer
- Off-site Musicians

Total: 11
Development Team 2002

• THQ’s *AlterEcho*
• 1 Executive Producer
• 1 Producer
• 4 Programmers
• 2 Game Designers
• 1 Writer
• 3 Level Designers
• 3 Character Modelers and Animators
• 1 2d and Texture Artist
• 1 Audio Designer
• 1 Cinematic Animator
• 1 QA Lead and Testers

**Total: 19+**

Development Teams for Online Games

• Star Wars online (2003?)
• Development team: 44 people
  - 50% Artists
  - 25% Designers
  - 25% Programmers
• 3 Producers
• “Live” Team (starting at Beta, 6 months before done)
  - 8 Developers
  - 50-60 Customer support (for 200K users)
  - 1000 Volunteer staff (for 200K users)
A (Larger) Developer Company

Today

• Designing and creating computer games is serious business
  - Large budgets ($1 million+)
  - Large number of people involved
  - Large risk
• Wisdom
  - Use modern software development techniques
  - Keep creativity where it belongs
    * In the design
    * Not during the programming

Based on notes from Mark Overmars

Is This the Way for Everyone?

• Some companies still work in old-fashioned ways
  - No good division of tasks
  - No good schedule/deadlines
  - No good design
  - Feature creep
  - No good software development techniques
  - No reusable components
  - Not object oriented (or even assembly)
  - No working hours, dress codes, etc.
  - Bad salaries

• Things need to change
  - It is getting too expensive
  - Games are getting too complex
  - Many projects fail
  - Many companies go bankrupt
  - Divide tasks and responsibilities
  - See the timeline above

Based on notes from Mark Overmars