



# 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

Laird and Jamin, EECS 494, Umich, Fall 2003 and Chapter 7.2, *Introduction to Game Development*



## 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

Laird and Jamin, EECS 494, Umich, Fall 2003



## 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, ...

Laird and Jamin, EECS 494, Umich, Fall 2003



## 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%)

The Entertainment Software Association





## Online Growth

- Grew from 38 million (1999) to 68 million (2003)
- 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

Laird and Jamin, EECS 494, Umich, Fall 2003



## 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, ...

Chapter 7.2, *Introduction to Game Development*





## 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

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## Outline

- Game Business Overview (done)
- Game Development Players (next)
- Game Companies





## Game Studios - Vertical Structure

- Developers
- Publishers
- Distributors
- Retailers
  
- Much like a mini-Hollywood

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## 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

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## 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

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## 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

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## 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

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## 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

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## 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

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## 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%)

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## Outline

- Game Business Overview (done)
- Game Development Players (done)
- 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

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## 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

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## 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

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## 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?

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## 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

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## 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

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## 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.

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## 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

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## 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

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## 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

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## 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

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## 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)

Based on notes from Mark Overmars + Neal Robison, ATI





## 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)



Based on notes from Neal Robison, ATI



## Concept: Van Helsing (2 of 4)



Based on notes from Neal Robison, ATI





## Concept: Van Helsing (3 of 4)

(Van Helsing  
Pre-Production)

Based on notes from Neal Robison, ATI



## 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)

Based on notes from Mark Overmars



## Prototype or 1st Playable

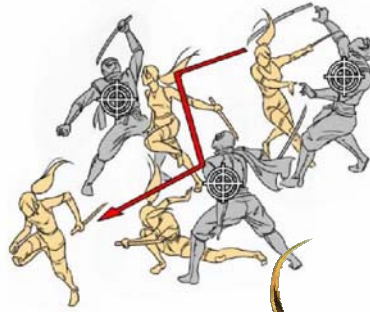
- [ GDD & TDD = "The Bibles"
- [ Production Budget & Detailed Schedule
- [ Submit Concept to Sony, etc.
- [ Working Prototype, with Game Mechanics
- [ Focus Test



Based on notes from Neal Robison, ATI



## 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)

Based on notes from Neal Robison, ATI



## 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

Based on notes from Mark Overmars





## 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

Based on notes from Mark Overmars



## 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)

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## 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)

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## 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)

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## 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!



Based on notes from Neal Robison, ATI



## 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](http://www.gamasutra.com))
  - Search for "post mortem"
  - Game data at bottom includes team size and composition

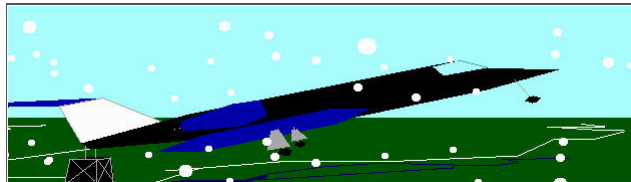
Laird and Jamin, EECS 494, Umich, Fall 2003



## 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



Laird and Jamin, EECS 494, Umich, Fall 2003



## 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



Laird and Jamin, EECS 494, Umich, Fall 2003



## 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+



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## 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)

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## 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

