The Game Development Process

Slides: largely based on Mark Claypool (WPI, USA) course on game development
Outline

• Introduction
• Game Business Overview
  - Stats
  - Shape
• Game Companies
  - Structure
  - Timeline
References

• *Game Architecture and Design - A New Edition*
  - by Andrew Rollings and Dave Morris

• *On Game Design*
  - by Andrew Rollings and Ernest Adams
  - Some solid game design material

• *Handbook of Computer Game*
  - by J.Raessens and J.Goldstein

• *User-centered Design in Games In: The Human-Computer Interaction Handbook*
  - by A.Sears and J.A.Jacko
Projects

• Project 1: Game Creation
  - Inspiration of a game, design and documentation
  - Create 2-d animated sprite and select supporting content
  - Implement game objects and game rules
  - Put above components together in compelling game

• Project 2: Game Evaluation and Testing
  - Evaluate and compare existing games

• Project 3: Game-based Learning
  - Show how games can be used in e-learning

• Project 4: Apply game techniques to productivity applications
  - Show if and how some game techniques could be applied in developing productivity sw
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

• 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%)

The Entertainment Software Association
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
Outline

- Game Business Overview
- Game Companies
- Game Development
  - Timeline
  - The Role of Documentation
Shape of Industry (1 of 2)

• Hardware:
  - Sony, Nintendo, Intel, Microsoft

• Software:
  - 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
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

- **Typically work for royalties & funded by advances**
  - Do not have the capital, distribution channels, or marketing resources to publish their games
  - Can be unstable
Publishers

• *Fund development of games*
  - Including: manufacturing, marketing/PR, distribution, and customer support
• Publishers assume most of the risk, but they also take most of the profits
• 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
• Originally grew out of developers
• Massive consolidation in recent years
• Most also develop games in-house
Moving Projects Forward

• Most Publishers have a “Greenlight Process”
  - Use to determine which projects go forward
• Developers submit to committee at five, 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
Distributors and Retailers

• Distributors
  - Get software from publisher to retailer
  - Originally modeled on book distribution
  - 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%)
  - Shift in 90’s to mass market retailers (Today 70%)
    • Target, Best Buy, WalMart
  - Internet sales big but still not huge (Today 5%)
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 “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 MS flight sim
- 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 ($1000000+)
  - 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
What’s Involved?

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

- Time involved
  - 12-24 months

(Will walk through what phase
Each plays a roll, next)

Based on notes from Mark Overmars
Game Development Timeline (1 of 4)

• **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

Based on notes from Mark Overmars
Game Development Timeline (2 of 4)

• **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 (3 of 4)

• 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
Game Development Timeline (4 of 4)

• 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
Role of Prototypes

• Prototypes
  - Build prototypes as proof of concept
  - In particular to test game play
  - Throw them away afterwards

• Projects 1-5 ... prototype!
  - Pitch to publisher
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

Based on notes from Mark Overmars