Digital Games
An Introduction
What are Digital Games?

Commonly referred to as video games

People who play video games are called gamers

Rapidly growing industry
  • Generated close to USD 100 billion in revenue in 2015
But, play is older than games

- Playing done in many animal species
  - Training
    - Passing knowledge
    - Determining social rank

- Possible between species
  - Communication non-verbal
First Games?
- First suspect: Sport

- Ritualized forms of other activities (hunting)
  - Running
  - Spear throwing
  - Archery

- Gameplay features
  - Produce a measure of physical skill by competition against other person
First Games?
- Second suspect: Divination

- Randomizers
  - Objects used for divination

- Evidence
  - Staves found in Tutankhamen’s tomb (~1323 BC) together with gameboard
  - Similar staves found in the royal tombs at Ur together with another gameboard
  - Mentioned in the Rig Veda (~1500 BC)

- Gameplay features
  - Produce a random outcome within well-defined limits and clear states

Source:
Parlett, David, The Oxford History of Board Games, Oxford University Press, 1999
First Organized Games

- Funerals
  - Gladiators
- Religious festivals
- Olympic Games, 776 BC
  - Judges
  - Truces between countries,
  - Participants status as religious pilgrims
- Gladiator Games
  - Celebrate battles at funeral
  - Changed when Julius Caesar organized one in honor of his dead daughter
Dice Games

- Inventors
  - Lydians of Asia according to Herodotus
- Predecessors
  - Binary Lots
  - Astragals
    - Depicted ~800 BC
- Gameplay features
  - Provide *variety of ranges* for randomizers and tie results to abstract measures - *numbers*
  - *Meta game* - betting on outcome (but equally possible from sports)
    - Will of the gods - not taxed!
Board Games

- Origins
  - traced to keeping track of player’s scores in dice games

- Gameplay features
  - Introduced *game token* to maintain *game state*
  - *Linked series of actions* to randomized values to manipulate *game state*
Racing games

- Interpreting movement on board as physical movement
  - Ludo (from Pachisi, ~700 BC)
  - Backgammon (from Senet & Mehen, 2650+ BC)

- Gameplay features
  - Introduction of the concept of a game world
  - Introduction of several game tokens controlled by one player introduced choice
  - Capturing other tokens meant that effects of changing one part of the game state by have additional effects – abstract events
Perfect Information Games

- Removal of randomness from board games
  - Chess (referred ~600 AD)
  - Go (from Wei-qi, 2000 BC)

- Gameplay features
  - 2D game world
  - Focus on mental skills
  - Actions defined by tokens
    - Context-dependent actions
    - Functionally different tokens
  - Possible to predict opponent
  - Additional goals based on space control, space filling, connection, and collection
Imperfect Information Games

- Making part of the game state unknown to players
  - Stratego
  - Battleship
  - Blind Chess | Kriegspiel

- Gameplay features
  - *Hidden game state*
  - *Heterogeneous information availability*
  - Need of *umpire* for gameplay to commerce
Skill Games

- Board games where movement is determined by successful action or performance
  - Scrabble
  - Trivial Pursuit
  - Pictionary
  - “Normality Game”
  - Balderdash (Rappakalja)
  - Apples to Apples

- Gameplay features
  - Introduction of variety of *skills* - social, artistic, intellectual
Tabletop or Miniature Games

- Origins in forms of kriegspiel
- Similar to board games but use graphically depicted miniatures
  - Warhammer
  - Warhammer 40K
- Gameplay features
  - Continuous game world
  - Players own game tokens they use
  - Requires players to do extra-game activities
Card Games

- Background intertwined with Dominoes & Mah-Jong tiles
  - Modern variants probably Persian origin
  - Brought to Europe by Arabs 13th century
  - Specialized decks quite late
- Gameplay features
  - Game systems
  - Bipartisan
  - Random but fixed distribution
  - Define Game Space
Collectable Card Games

• Combines card games with idol cards
  • Magic: the gathering
  • Illuminati: new world order

• Gameplay features
  • Cards have *self-contained rules* within a rule framework
  • *Physical rarity affects value* of game token
  • *Time-limited functionality* of cards
Roleplaying Games

- Expansion from miniature games
  - Dungeons & Dragons, 1974
  - The Basic Roleplaying System

- Gameplay features
  - *Unclear winning conditions*
  - *Unclear end conditions*
    - campaigns
  - *Game master*
    - Unequal power structure
    - Open-ended rule set
    - Mediates the Game World
  - *Character development*
  - *Roleplaying*
  - Novel narrative structure – *adventure modules*
  - D&D 3rd edition introduced *Open Gaming License* and *id20 Trademark License*
  - D&D 4th edition will include online support
Live-Action Roleplaying Games

- Arose from roleplaying games, improvisational theatre and re-enactment societies
- Earlier similar activities
  - re-enactments of battles between Osiris and Seth in ancient Egypt
  - ‘carrousel’ games at European courts during the 17th and 18th centuries
  - psychoanalytic methods in the 1920s
- Gameplay features
  - Players represent their characters
  - Players *physically act out* what they do in the game
  - *Extra-game activities* may take a majority of time spent
Novelty Games

- Machines that provide gameplay or lets players test skills
- Gameplay features
  - *Coin-op*
  - *Machine controls game flow*
Pinball

- Reaction to games being banned due to being used for gambling
- Gameplay features
  - Flippers
  - *Electro-mechanical game system*
What do you need to play a digital game?

1. An input device

2. An output, typically video, device
Input Devices

Commonly used input devices:
- Keyboard and mouse
- Gamepad
- Touchscreen
- Motion controllers

Other input devices include steering wheels, joysticks, light guns, and rhythm game controllers
Output Devices

Screens

Speakers

Controllers
  • Haptic feedback
Platforms

Personal computers

Consoles
  • Home and handheld

Mobile devices

Arcade machines
Media

Cartridges

Optical discs
  • CD, DVD, Blu-Ray, Proprietary

User-writable media
  • Floppy discs, cassettes, memory cards

Digital downloads
  • Steam, GOG, XBL, PSN

1948 – Alan Turing

- Wrote a program to play chess
- The algorithm looked 2 moves ahead
- Doesn’t play chess very well
A.S. Douglas - 1952

- Part of Ph.D. thesis in Human-Computer Interaction
  - Tic-Tac-Toe (noughts & crosses)
  - Play by dialing numbers
  - Computer opponent

- Emulator
  - http://www.dcs.warwick.ac.uk/~edsac/
Tennis for Two - 1958

- William Higinbotham
- Demonstrate system
  - Analog computer
  - *Real-time game*
Spacewar! - 1962

- Stephen "Slug" Russell, MIT
- DEC PDP-1 assembler in 1962
- Demonstrate the Type 30 Precision CRT Display
  - “It should demonstrate as many of the computer's resources as possible, and tax those resources to the limit;
  - Within a consistent framework, it should be interesting, which means every run should be different;
  - It should involve the onlooker in a pleasurable and active way -- in short, it should be a game.”
Ralph Baer - 1951

- Asked to *Build the best television set in the world.*
- Built in several prototypes between 1966-1968
- Hand controller and light gun
  - *Use of sensor*
- Magnavox signed an agreement in 1971 and the first video game system got released in May 1972: Odyssey
Computer Space – 1970
Back to Spacewar

- Nolan Bushnell decided to commercialize Spacewar
- Stand-alone arcade machine
Nolan Bushell - 1972

- Atari
  - syzygy
- Pong
  - Arcade version, 1972
  - TV-console, 1975

- Difficulties getting bank loans due to association with arcades and mafia
Genres – Platform Games

Primarily involve navigation through environments
• 2D or 3D
• Traversal from one platform to the next (Donkey Kong)
Genres - Shooters

Combat oriented using ranged weapons

- First-person
- Third-person
- Light gun
- Shoot ‘em ups
Genres – Fighting Games

Focus on close combat
  • 2D or 3D

Usually involves 2 combatants
  • Player vs. Player
  • Player vs. AI
  • AI vs. AI
Genres – Role Playing Games

Play the role of one or more characters immersed in a well-defined world

- Detailed lore
- Focus on narrative, exploration, and quest completion
Genres – Sports Games

Emulate real-world sports

• Degree of realism varies widely
• Realistic titles are referred to as sims
• Usually competitive – against AI or other gamers
Genres - Strategy

Outcome of combat determined by skilful thinking and planning

- Real-time vs. turn-based
- Strategy vs. tactics
Other Notable Genres

Massively multi-player online games
Casual games
Party games
Rhythm/music games
Puzzle games
Exergames
Educational games
Adventure games

Many games incorporate elements of more than one genre
The Game Industry

Developer
- Company specializing in video game development
- Multi-disciplinary – programming, art, testing etc.
- E.g. Crystal Dynamics, Rockstar Games, Rare, Naughty Dog

Publisher
- Company responsible for funding, marketing, and distribution
- May also develop video games – internal team of developers referred to as a studio
- E.g. Electronic Arts, Activision Blizzard, Ubisoft, Take-Two Interactive
Business Models

“Packaged” games
• Purchase game for full access to its features
• Further monetary outlay unnecessary

Subscription games
• Playing the game requires paying a subscription fee
• May require initial purchase as well
• “Pay-to-play”

Free-to-play games
• Core game is free
• Certain game content locked behind in-game currency that is difficult to obtain
• In-game currency can be purchased directly with real world money
Business Models

Microtransactions
• Ability to purchase in-game goods using real world money
• Often used in conjunction with free to play games – “Pay-to-win”

Downloadable content
• Additional content released for a game post-release
• Can include new modes, levels or aesthetic content
Gamer Demographics

Based on a study by the Entertainment Software Association (ESA) in the US in 2016:

- 59% of gamers are men. 41% are women.
- The average age of a male gamer is 35. The average age of a female gamer is 44.
- The average gamer has been playing video games for 13 years.
- 63% of households have at least one gamer.

eSports

Organized video game competition
- Competitors typically professional
- Competitions are broadcast
- Prize money for winners

Genres associated with eSports:
- Real-time strategy games
- Fighting games
- First-person shooters
- Multiplayer online battle arena games

First established in South Korea
- Since 2000
- Now a global phenomenon with an audience of 226 million people in 2015
Controversies

Negative behavioural effects:
  • Heightened aggression, lowered empathy
  • Various studies performed – no consensus

Censorship and regulation

Portrayal of women and minorities

Online harassment
  • Gamergate
Future

Virtual Reality
• Immerses user in a virtual environment
• User can look around, move and interact with environment
• Headsets for VR gaming recently released – Oculus Rift, HTC Vive

Augment Reality
• Real-world environment augmented with computer generated input – imagery, sound etc.