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
  - "carousel" 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 let 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
  http://newzoo.com/insights/articles/global-esports-market-report-revenues-to-jump-2016-

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
• Immerse 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.