CMSC 498M: Chapter 1
Introduction to Computer Games

Resources:
- Lecture notes from R. McKenna, SUNY Stony Brook, 2007.

Overview:
- History and basics of computer games
- Industry facts and figures

What is a Game?

- A game is an activity among two or more independent decision-makers seeking to achieve their objectives in some limiting context. (Clark C. Abt)
- A game is a form of art in which participants, called players, make decisions in order to manage resources through game tokens in the pursuit of a goal. (Greg Costikyan)
- A game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome. (K. Salen and E. Zimmerman)
- A computer game is a software program in which one or more players make decisions through the control of game objects and resources, in pursuit of a goal. (M. Overmars)
- A great game is a series of interesting and meaningful choices made by the player in pursuit of a clear and compelling goal. (Sid Meier)
What Things do You Look for in a Game?

It should be fun:
- Responsibility of game designers.
- Interesting plot/premise, sense of humor, rewards.
- Scoring vs. solving.

It should be nice to look at:
- Responsibility of game artists.
- Beautiful, realistic, or interesting graphics.

It should run correctly and efficiently:
- Responsibility of game programmers.
- Multi-platform, multi-player, multi-threaded.

Key Elements in Game Design

Goals:
- Should be clear to the player. Not too easy to achieve.
- Success/failure depends on a combination of skill and luck, with skill being the more important.

Decisions:
- Interesting decisions lead to an interesting game.
- Users need to have knowledge of outcomes to make good decisions.

Balance:
- Between players.
- Between player and game-play.
- Among game features.

Rewards:
- Positive feedback. Sense of accomplishment.

Flow:
- Sense of progress: increased abilities, increased challenges.

Immersion:
- A sense of "being there." Graphics, stories, characters, music, effects.
What Things Infuriate you in a Game?

**Game-play:**
- Weak premise or boring storyline.
- Too difficult or too easy.
- Overly complicated rules (no 100-page game manual, please).
- Poor pacing (action too fast or too slow).
- Inflexible (players are forced to play a certain way).

**Artistic Issues:**
- Annoying music/sound effects.
- Poor geometric modeling ("what the heck is that supposed to be?").
- Disorienting graphics ("where in heck am I?").
- Poorly designed point-of-view ("something is standing in my line of sight").

**Programming Issues:**
- Bugs. Minor: "Why doesn't this work as it should?" Major: Program crash.
- Unintelligent games.
- Slow-downs.
- Multiplayer cheaters.

Why Study Compute Games?

- To get a job in the computer game industry.
- It is **fun**.
- Games are **complex**.
- They push the envelope of computing technology.
- How do I write my own?

- **Bottom line:** Making games is a great way to learn.
**Game Genres**

**Action** - Hand-eye coordination and fast reflexes.
- Donkey Kong, Sonic, Mario Bros, Metal Gear, ...

**Shooter** - Combat involving projectile weapons (first-person, third-person)
- Doom, Quake, Unreal, Halo, Call of Duty, ...

**Adventure** - Linear storyline in a journey of exploration and puzzle-solving.
- Myst, Shadow of Destiny, ...

**Role-Playing Games (RPGs)** - Similar to adventure, but more character growth.
- Diablo, World of Warcraft, Final Fantasy, ...

**Fighting games/Sports**
- Soul Calibur, Mortal Kombat, ...
- EA Sports NHL series, John Madden football series, ...

**Puzzle/Board games**
- Tetris, Monopoly, Risk, Stratego, Scrabble, ...

**Racing**
- Need for Speed, 18 Wheeler, ...

**Simulations** - Simulate real-life environments
- Flight Simulator, The Sims, RollerCoaster, SimCity, ...

**Strategy** - Tactical organization
- Civilization (turn based strategy), Warcraft, Starcraft (real-time strategy), ...

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**History of Computer Games**

1952 - First Computer Game
"Naughts & Crosses" by A.S. Douglas
for EDSAC Computer, Cambridge University, U.K.
1958 – First Video Game
"Tennis for Two" by William Higinbotham of Brookhaven National Lab.

1962 – First Widely Distributed Computer Game
"Spacewar" by Steve Russell of MIT
for a PDP-1 minicomputer.
1971 - First Video Arcade Game Released
“Computer Space” by Nolan Bushnell of Nutting Associates.

1972 - First Home Video Game Console Released
“Odyssey” by Ralph Baer with Magnavox.
1965 – History of Computer Games


1975 - “Pong” home version released by Atari.

1977 - Atari 2600 Home Console Released
Combat, Space Invaders.
1985 – Video Game Revenues $0.1 billion.

1983 - The Video-Game Crash.

1982 - Video Game Revenues $2 billion.

What happened?
• Market saturation.
• Stale game platforms.
• PC gaming.
1985 – Nintendo Entertainment System
Shigero Miyamoto’s Super Mario Brothers.

1991 – id releases Wolfenstein 3D.

1993 – id releases DOOM (John Carmack).
Game Industry Facts and Demographics

http://www.theesa.com/

How many households own either a console or computer for games?
- 67%

What’s the average age of game players?
- 34

What percentage of gamers are over 50?
- 26%

What percentage of gamers are female?
- 40%
  - Adult women represent a greater portion of the game-playing population (33 percent) than boys age 17 or younger (20 percent)

What percentage of people play on wireless devices (PDA, iPhone)?
- 42%

Who Plays What?

Best-Selling Video Game Genres by Units Sold, 2009.

Source: The NPD Group/Retail Tracking Service
Best-Selling Computer Game Genres by Units Sold, 2009.

- Strategy: 35.5%
- Shooter: 10.1%
- Sport Games: 1.6%
- Other Games/Compilations: 2.2%
- Action: 3.2%
- Adventure: 10.2%
- Arcade: 0.3%
- Children’s Entertainment: 1.7%
- Family Entertainment: 18.7%
- Fighting: 0.1%
- Flight: 1.8%
- Racing: 0.8%
- Role-Playing: 13.9%

Source: The NPD Group/Retail Tracking Service

Top Video Games (by Units Sold, 2009)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Title</th>
<th>Platform</th>
<th>ESRB Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CALL OF DUTY: MODERN WARFARE 2</td>
<td>360</td>
<td>Mature</td>
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<tr>
<td>2</td>
<td>NEW SUPER MARIO BROS. WII</td>
<td>WII</td>
<td>Everyone</td>
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<tr>
<td>3</td>
<td>WII SPORTS RESORT W/ WII MOTION PLUS</td>
<td>WII</td>
<td>Everyone</td>
</tr>
<tr>
<td>4</td>
<td>WII FIT W/ BALANCE BOARD</td>
<td>WII</td>
<td>Everyone</td>
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<tr>
<td>5</td>
<td>MARIO KART W/ KIWI</td>
<td>WII</td>
<td>Everyone</td>
</tr>
<tr>
<td>6</td>
<td>WII PLAY W/ REMOTE</td>
<td>WII</td>
<td>Everyone</td>
</tr>
<tr>
<td>7</td>
<td>CALL OF DUTY: MODERN WARFARE 2</td>
<td>PS3</td>
<td>Mature</td>
</tr>
<tr>
<td>8</td>
<td>WII FIT PLUS W/ BALANCE BOARD</td>
<td>WII</td>
<td>Everyone</td>
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<td>9</td>
<td>HALO 3: ODST</td>
<td>360</td>
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<td>10</td>
<td>POKEMON PLATINUM VERSION</td>
<td>NDS</td>
<td>Everyone</td>
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<tr>
<td>11</td>
<td>MADDEN NFL 10</td>
<td>360</td>
<td>Everyone</td>
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<tr>
<td>12</td>
<td>NEW SUPER MARIO BROS</td>
<td>NDS</td>
<td>Everyone</td>
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<tr>
<td>13</td>
<td>MARIO KART DS</td>
<td>NDS</td>
<td>Everyone</td>
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<tr>
<td>14</td>
<td>ASSASSIN’S CREED II</td>
<td>360</td>
<td>Mature</td>
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<tr>
<td>15</td>
<td>MADDEN NFL 10</td>
<td>PS3</td>
<td>Everyone</td>
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<tr>
<td>16</td>
<td>LEFT 4 DEAD 2</td>
<td>360</td>
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<td>17</td>
<td>MARIO &amp; LUI: BOWSER’S INSIDE STORY</td>
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<td>Everyone</td>
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<td>18</td>
<td>UFC 2009 UNDISPUTED</td>
<td>360</td>
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<td>19</td>
<td>EA SPORTS ACTIVE BUNDLE</td>
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<td>Everyone</td>
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<tr>
<td>20</td>
<td>RESIDENT EVIL 5</td>
<td>360</td>
<td>Mature</td>
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<td>1</td>
<td>THE SIMS</td>
<td>Teen</td>
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<tr>
<td>2</td>
<td>WORLD OF WARCRAFT: WRATH OF THE LICH KING EXPANSION PACK</td>
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</tr>
<tr>
<td>3</td>
<td>THE SIMS 2 DOUBLE DELUXE</td>
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<tr>
<td>4</td>
<td>WORLD OF WARCRAFT: BATTLE CHEST</td>
<td>Teen</td>
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<tr>
<td>5</td>
<td>CALL OF DUTY: MODERN WARFARE 2</td>
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<td>6</td>
<td>WORLD OF WARCRAFT</td>
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<td>7</td>
<td>THE SIMS 3 WORLD ADVENTURES EXPANSION PACK</td>
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<td>8</td>
<td>SPORE</td>
<td>Everyone 10+</td>
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<td>EMPIRE: TOTAL WAR</td>
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<tr>
<td>11</td>
<td>THE SIMS 3 COLLECTOR'S ED</td>
<td>Teen</td>
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<tr>
<td>12</td>
<td>WORLD OF WARCRAFT: BURNING CRUSADE EXPANSION PACK</td>
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<td>13</td>
<td>AION</td>
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<tr>
<td>14</td>
<td>THE SIMS 2 APARTMENT LIFE EXPANSION PACK</td>
<td>Teen</td>
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<tr>
<td>15</td>
<td>STARCRRAFT: BATTLE CHEST</td>
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<tr>
<td>16</td>
<td>WARHAMMER 40,000: DAWN OF WAR II</td>
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<tr>
<td>17</td>
<td>LEFT 4 DEAD 2</td>
<td>Mature</td>
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<td>18</td>
<td>MUMBO JUMBO ASSORTMENT</td>
<td>Everyone</td>
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<tr>
<td>19</td>
<td>DIABLO BATTLE CHEST</td>
<td>Mature</td>
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<tr>
<td>20</td>
<td>WARCRAFT III BATTLE CHEST</td>
<td>Teen</td>
</tr>
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Source: The NPD Group/Retail Tracking Service

### Types of Online Games (2009)

- Puzzle, Board Game, Game Show, Trivia, Card Games: 42%
- Action/Sports/Strategy/Role-Playing: 20%
- Persistent Multi-Player Universe: 14%
- Downloadable Games: 11%
- Other: 12%

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Summary

Summary:
- Computer Games - overview
- History of Computer Games
- Computer Game Facts and Figures

What's Next?
- Graphics programming for games