Algorithms and Networking for Computer Games

Preface

In the beginning...

"If, when walking down the halls of MIT, you should happen to hear strange cries of 'No! No! Turn! Fire! ARRRGGGHHH!!,' do not be alarmed. Another western is not being filmed—MIT students and others are merely participating in a new sport, SPACEWAR!"

— D. J. Edwards & J. M. Graetz, "PDP-1 Plays at Spacewar", *Decuscope*, 1(1):2–4, April 1962

...and then...

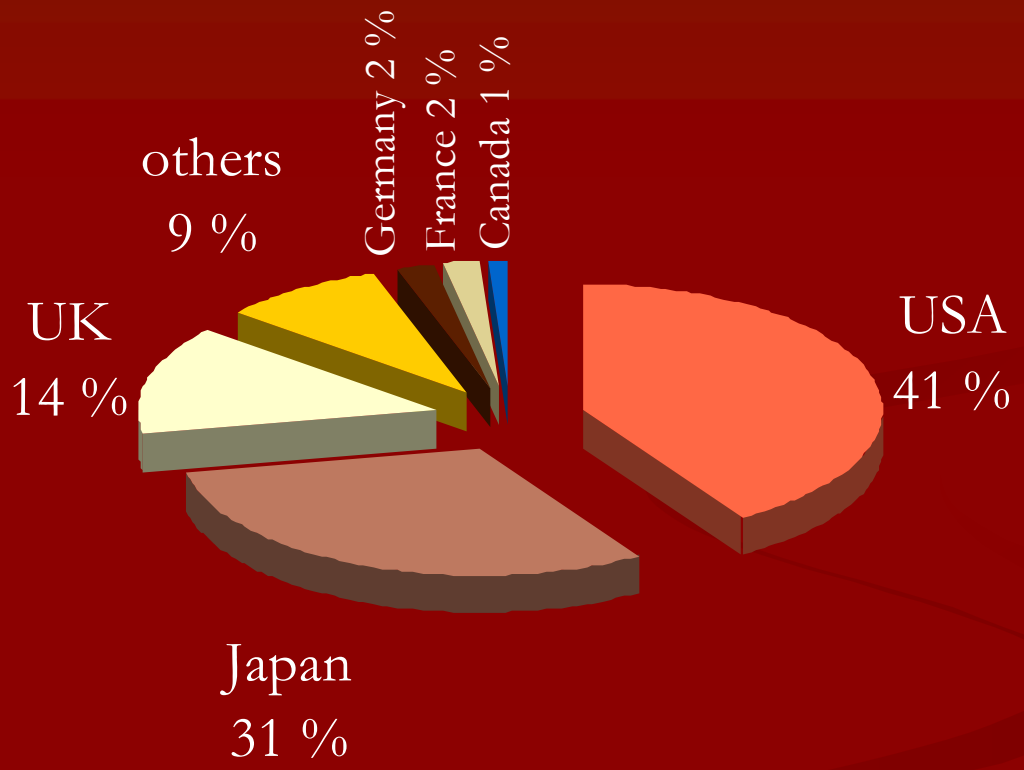
- 1962: *Spacewar*
- 1971: Nutting: *Computer Space*
- 1972: Atari: *Pong*
- 1978: Midway: *Space Invaders*
- 1979: Roy Trubshaw: *MUD*
- 1980: Namco: *Pac-Man*
- 1981: Nintendo: *Donkey Kong*
- 1983: Commodore 64
- 1985: Alexei Pajitnov: *Tetris*
- 1989: Nintendo Game Boy
- 1993: id Software: *Doom*
- 1994: Sony Playstation
- 1997: Origin: *Ultima Online*
- 2001: Microsoft Xbox

…and now

- annual global revenue 2002:
  - computer games: 25 G€
  - film box office: 24 G€
- US revenue 2003:
  - computer games: 11.4 G$
  - film box office: 8.3 G$
- predictions for annual growth 2003–07:
  - computer game industry: 11.3 %
  - movie industry: 6.4 %

sources: PriceWaterhouseCoopers, NPD Funworld

Game industry geographically



source: GDAA Game Industry Fact Sheet, 2003

Top 20 game publishers

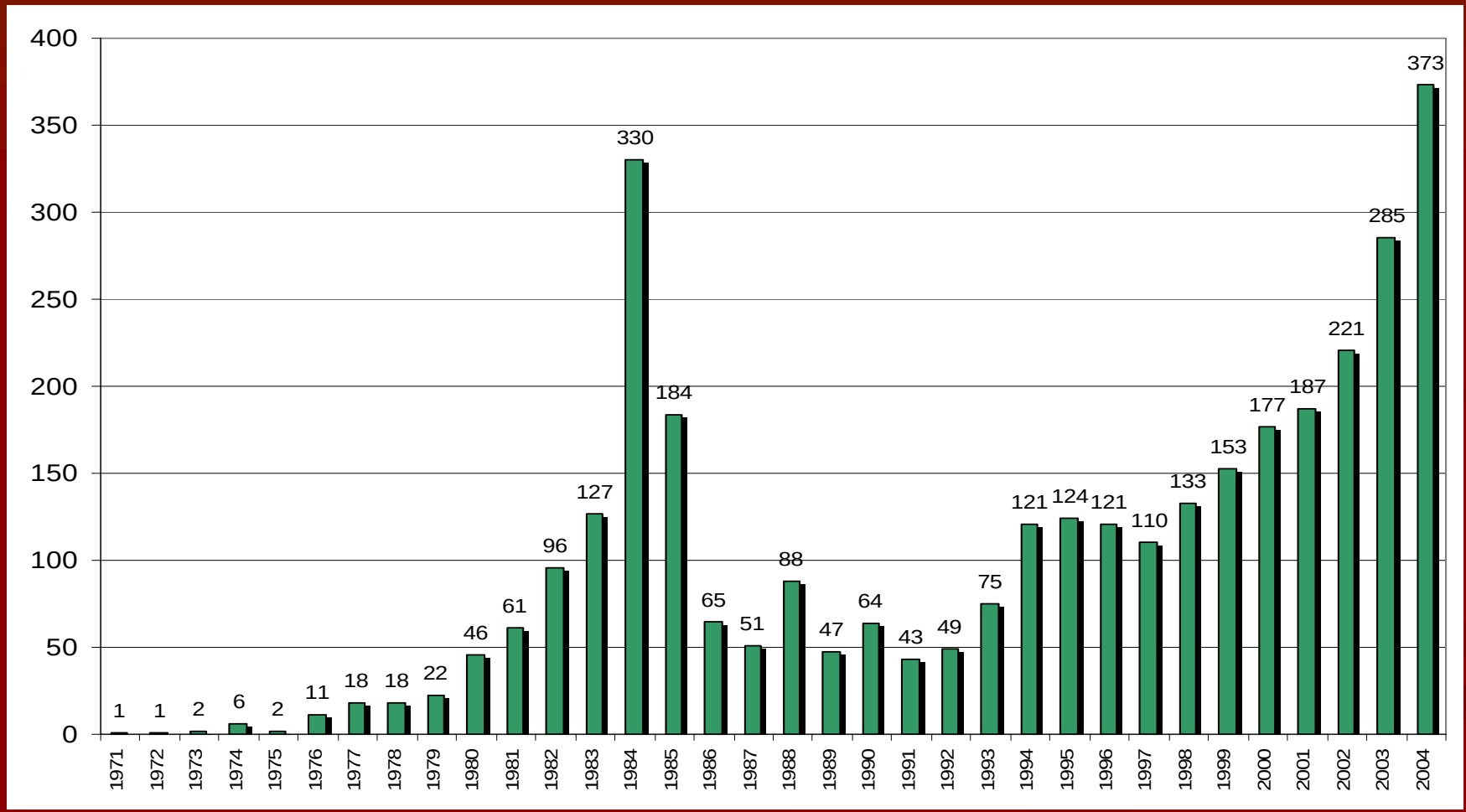
ranking criteria:

- annual revenue
- game reviews and revenue
- developer polls

	Publisher	G$
1.	Electronic Arts	2.96
2.	Microsoft Game Studios	.64
3.	Sony Computer Ent.	1.78
4.	THQ	.64
5.	Ubisoft	.62
6.	Eidos Interactive	.25
7.	Activision	.95
8.	Take-Two Interactive	1.03
9.	Atari	.47
10.	Nintendo	2.10
11.	Vivendi Universal Games	.72
12.	Codemasters	.14
13.	Acclaim	.14
14.	Sega	.59
15.	Konami	.89
16.	Square Enix	.60
17	Midway Games	.09
18.	Koei	.27
19.	Empire Interactive	.05
20.	Namco	.20

source: *Game Developer*, Oct. 2005

Articles containing 'computer game' according to the Inspec database



source: Inspec, Aug. 2005

IGDA: Curriculum framework

- humanistic perspective
  - critical game studies
  - games and society
- technical perspective
  - game design
  - game programming
  - visual design
  - audio design
  - interactive storytelling
- administrative perspective
  - game production
  - business of gaming

source: http://www.igda.org/academia

Game programming

IGDA: "Aspects of traditional Computer Science — modified to address the technical aspects of gaming."

- mathematical and algorithmic methods
- modelling
- multimedia programming (graphics and audio)
- artificial intelligence
- networking and distributed computing
- software construction, prototyping and testing

Algorithmic problems in computer games

- graphics and audio
  - 3D rendering
  - camera movements
  - adaptive audio
- simulation and modelling
  - game engines
- multiplayer networking
  - protocols and security
  - resource distribution
- artificial intelligence (AI)
  - computer-controlled actors

The intention of this course

To provide a glance into the world of computer games as seen from the perspective of a computer scientist.