

Robust, Dependable, and User Error Tolerance - Lessons from Computer Games (Part I)

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Outline

- Background on the Electronic Game Industry
- Game Development Cycle
- Game Design

Background on The Electronic Game Industry

Randy Pausch

Entertainment Technology Center

Carnegie Mellon University

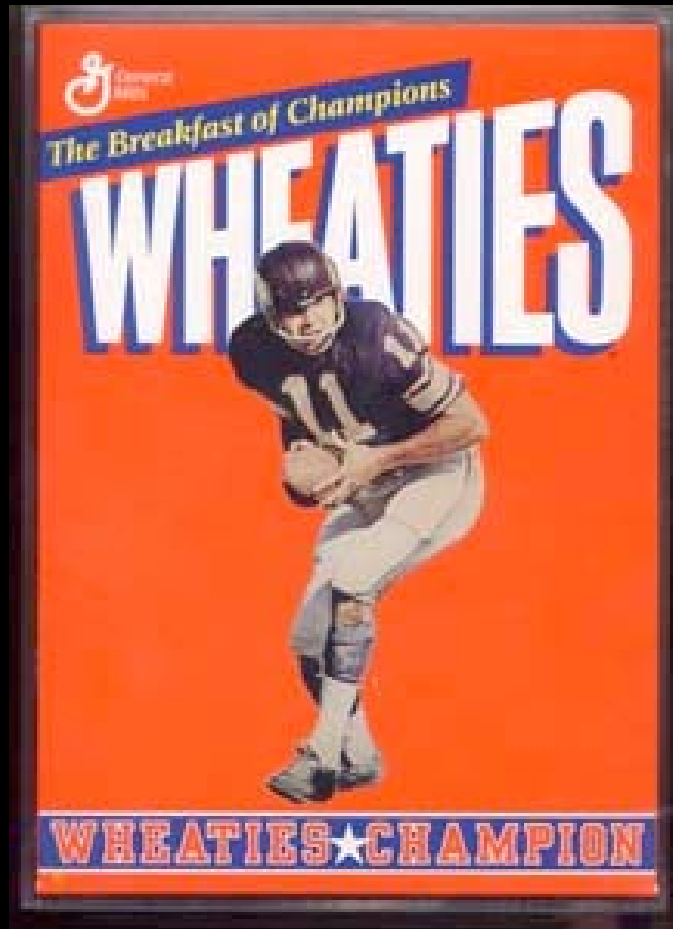


Carnegie Mellon

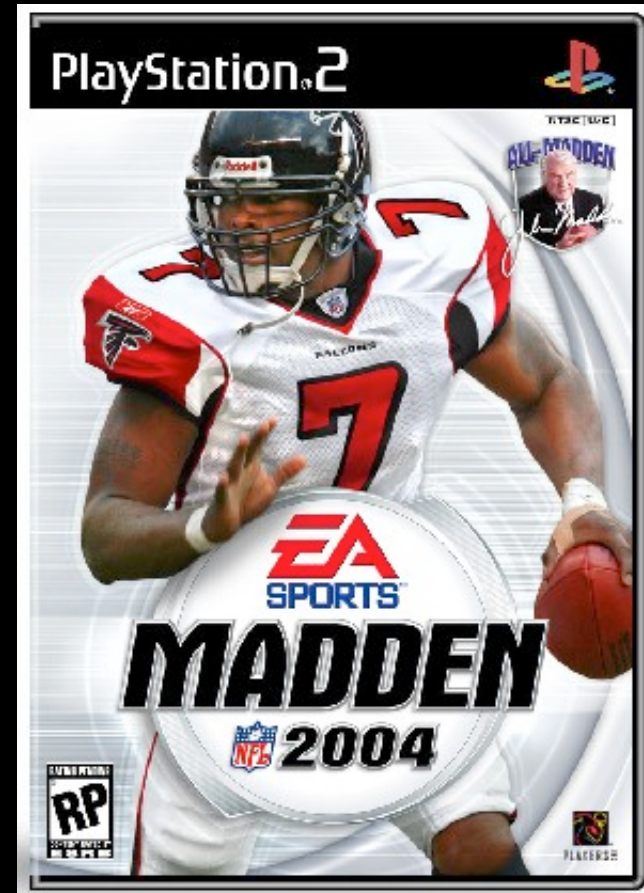
**Entertainment
Technology
Center**



Cultural Icons

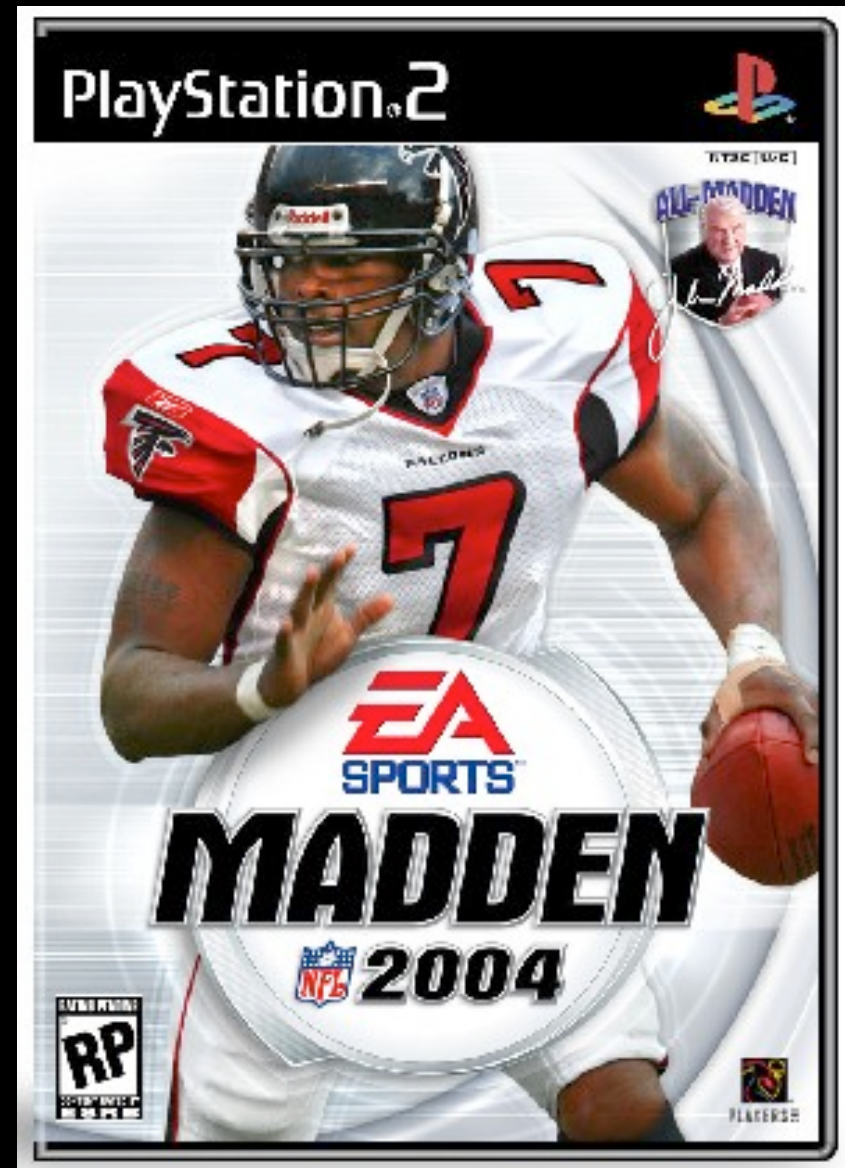


vs.



Electronic Arts

- Bigger than Apple

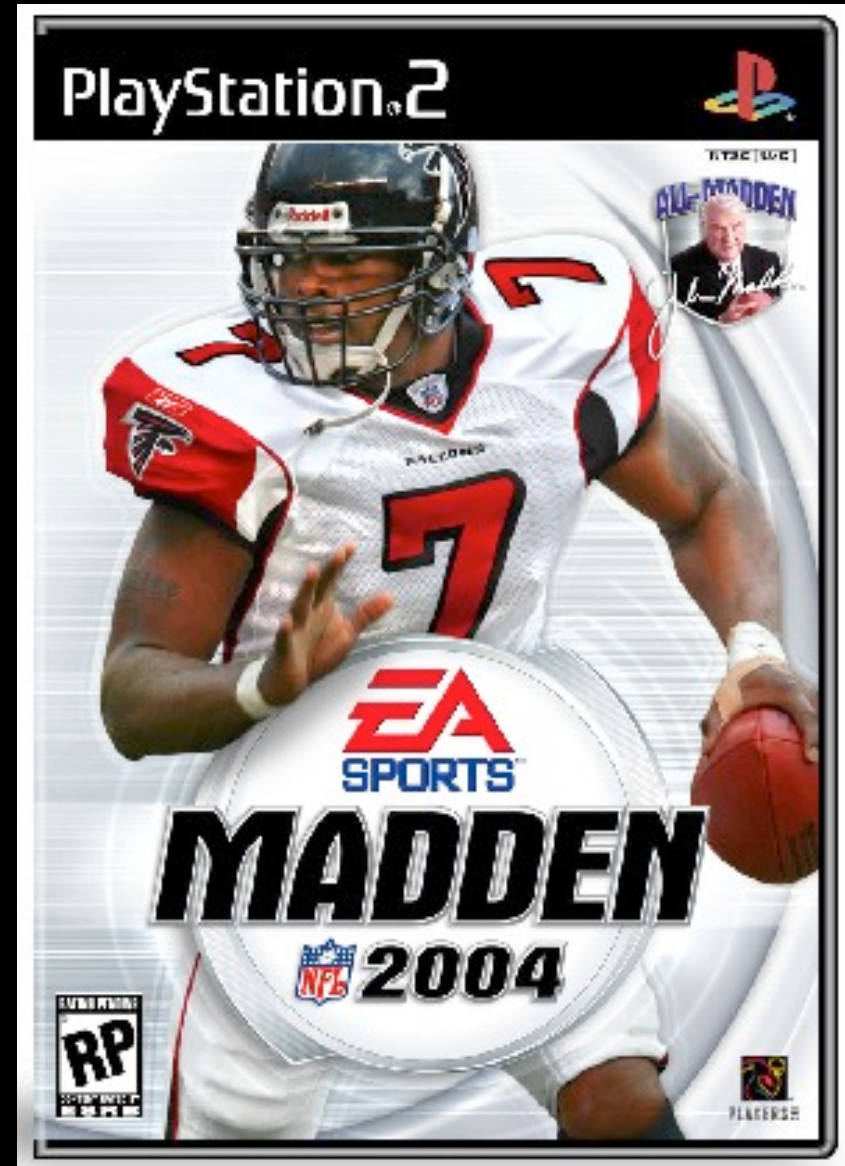


Electronic Arts

- Bigger than Apple

-

- PLUS Pixar



Market Cap: Software & Programming

Leaders in Market Capitalization

Microsoft Corp [MSFT]	\$270.2 B
Oracle Corp [ORCL]	\$61.9 B
SAP AG [SAP]	\$47.1 B
Computer Associates International Inc [CA]	\$15.6 B
Electronic Arts Inc [ERTS]	\$15.5 B
Symantec Corp [SYMC]	\$14.4 B
Softbank Corp [SFTBF.PK]	\$14.3 B
Veritas Software Corp [VRTSE]	\$11.5 B
Infosys Technologies Ltd [INFY]	\$11.1 B
Adobe Systems Inc [ADBE]	\$9.4 B

Source: biz.yahoo.com, March 28, 2004

Revenue: Software & Programming

Leaders in Total Revenue (ttm)	
Microsoft Corp [MSFT]	\$34.3 B
Oracle Corp [ORCL]	\$9.9 B
SAP AG [SAP]	\$8.5 B
CSK Corp [CSKKY]	\$3.4 B
Computer Associates International Inc [CA]	\$3.2 B
Electronic Arts Inc [ERTS]	\$2.8 B
Konami Corp [KNM]	\$2.6 B
Peoplesoft Inc [PSFT]	\$2.3 B
Sega Corp [SEGN.Y.PK]	\$1.9 B
Veritas Software Corp [VRTSE]	\$1.8 B

Source: biz.yahoo.com, March 28, 2004

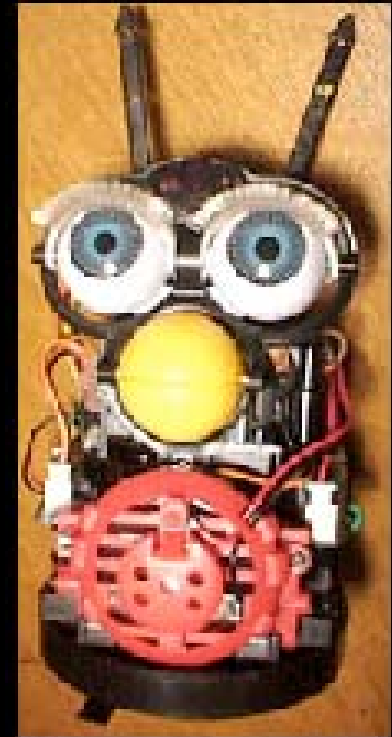
Electronic Arts vs. Microsoft





Furby

Four times as
much code as
the Apollo
lunar lander!





Design a Roller Coaster; Ride it in a simulator

Buzz Lightyear's Astro Blaster



Bumper Cars with
Cannons!

invasion!

TO ENTER THE
ALLEY EXHIBITS





Invasion: Four person
“video game” for
families to play together

Ride the Comix



VR “fight comic book
villains”

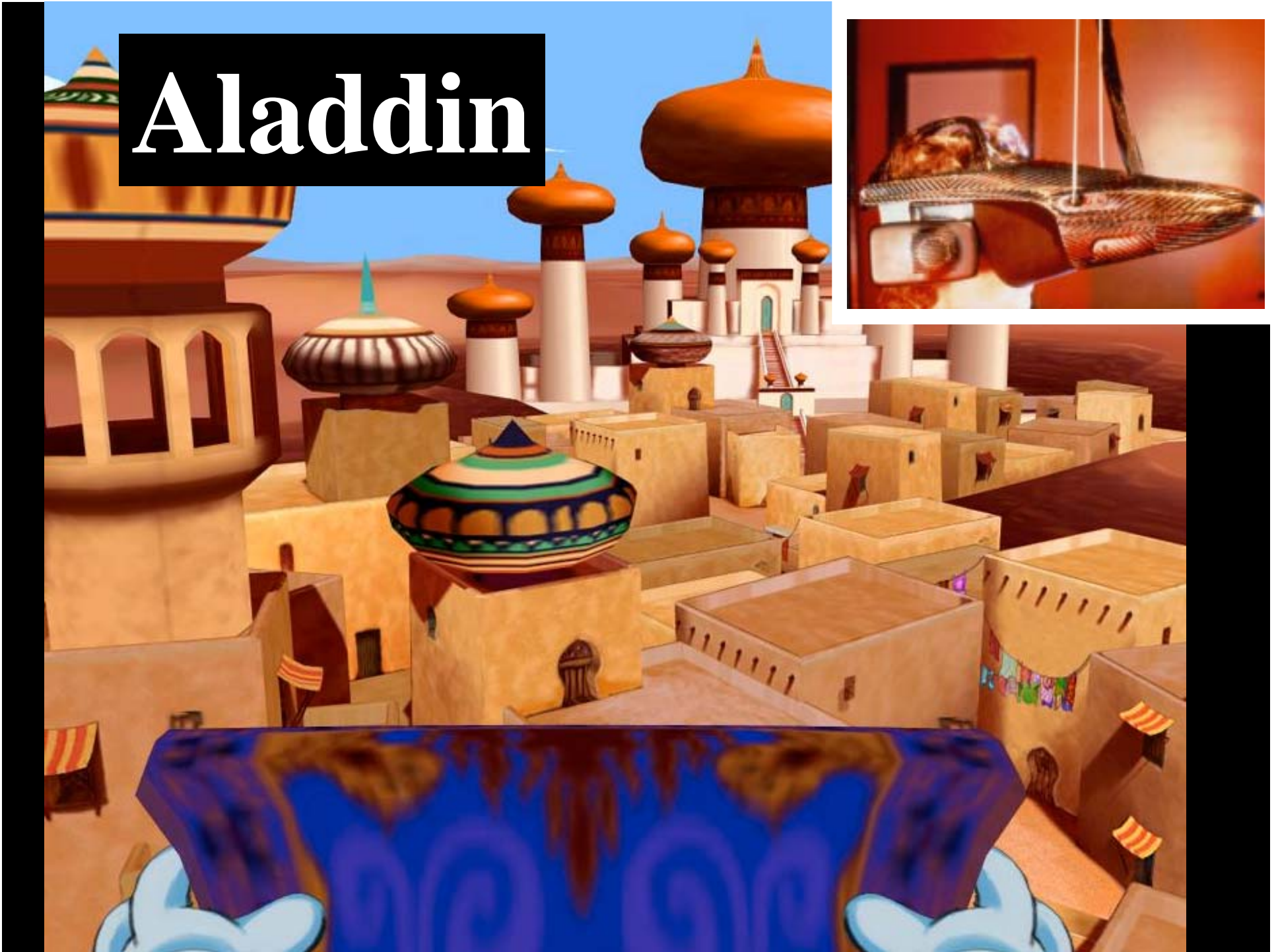
Virtual Jungle Cruise







Aladdin



Disney Theme Park Attractions...

- **Must have throughput of $\geq 3,000$ /hour**
- **Must run 365 days/year, up to 16 hours/day**
- **Can not have unscheduled downtime**
- **Can not fail**
- **High end rides have autonomous, trackless vehicles**
- **Modern high end attracts have \$100 million budgets**

**NOKIA
5190
WITH
THAT?**



Shown with optional color faceplate.

Marketing Gets Really Bizarre

Encyclopedia comes free when you buy 24 slices of cheese!



Emotion drives usage of technology: SETI (3 million users)



The Search for
Extraterrestrial Intelligence at HOME



setiathome.ssl.berkeley.edu

Data Analysis

Chirping data

Doppler drift rate: -0.4385 Hz/sec

Frequency resolution: 0.074506 Hz

Strongest Peak: power: 166.15

(2937.9 Hz at 0.00 seconds, drift rate 0.117 Hz/sec)

Strongest Gaussian: power: 0.71 , fit 3.003

(6696.0 Hz at 26.00 seconds, drift rate 8.527 Hz/sec)

100%



Overall: 68.998% done

CPU time: 1 hr 59 min 46.3 sec

Data Info

From: 22 hr 52 min 44 sec RA, $+ 22$ deg 16 min 12 sec Dec

Recorded on: Fri Mar 8 16:56:20 1929 GMT

Source: Arecibo Radio Observatory

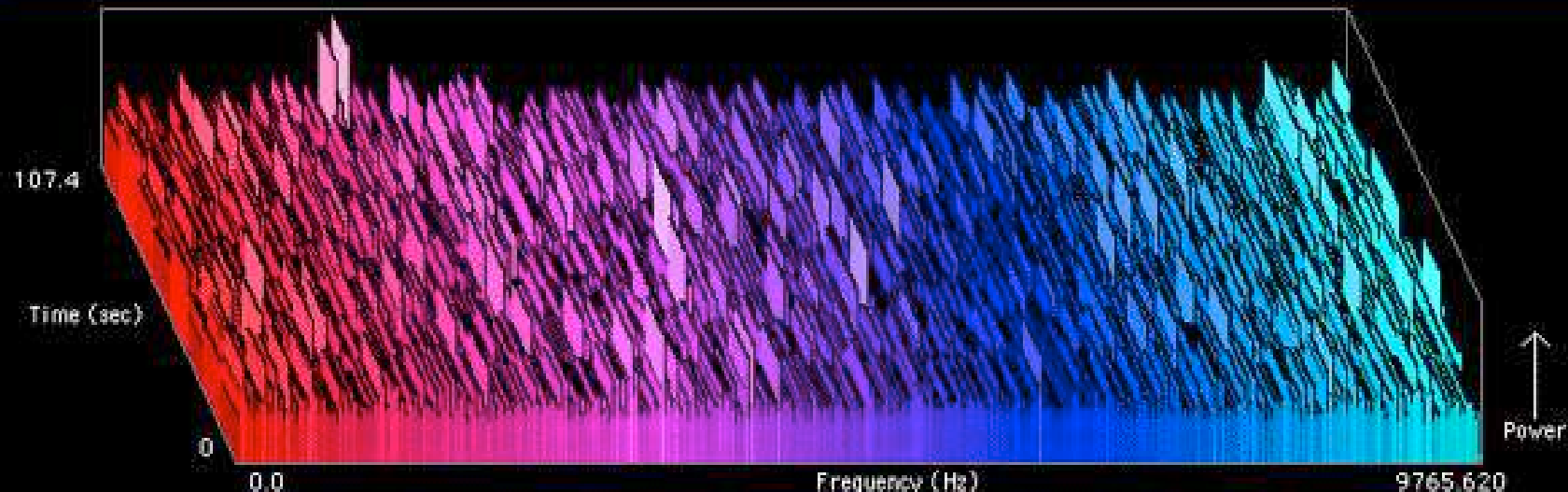
Base Frequency: 1.419646436 GHz

User Info

Name: Ron Hipschman

Data units completed: 46

Total computer time: 359 hr 09 min 47.6 sec



Average Console Game

- Over one million lines of code
- Developed in 12 to 18 months
- At cost of \$6 M
- A block buster game income will exceed a block buster movie
- In cartridges there are no patches, software has to be right the first time

Game Development Spiral

- Generate central idea
 - Technology - something could not do before
 - Reinforce existing story
 - New type of game
- Look at idea through filters (technology, financial, marketing,)
- First prototype in 1 to 3 months



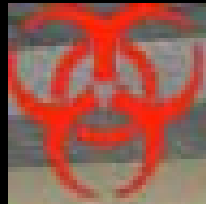


00:00:20



Firefighter 5

Rescued: 0



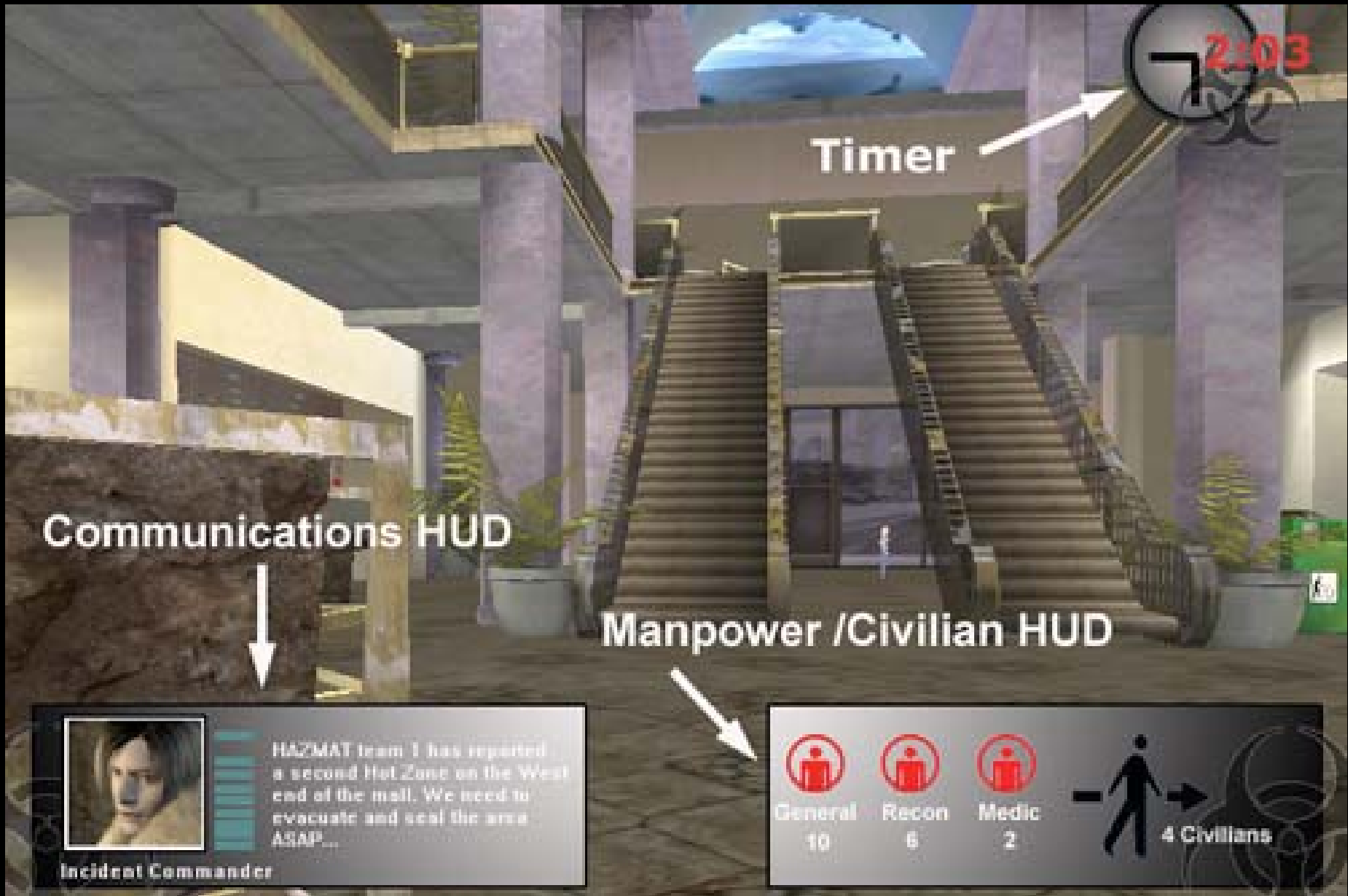
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Waldan Books



Firefighter_5

Rescued: 0



Massive, Multi-Player Game

■ Taken Seriously

- Sued when game down for two hours
- Game Objects sold on e-Bay
- EverQuest game 85th largest GNP in the world



Welcome!

Yellow Rabbit

Character Name

It's time for me to get going.

Hi!

Disney's
TOONTOWN
ONLINE

Type to chat



Would you like to make friends with raison?

Yes

No

List Friends

raison



- Goto
- Chat
- Fun
- Friend
- Ignore
- Stats

Close

raison

Bossy Boots

