



VIDEO GAMES




WHY WASTE GOOD TECHNOLOGY
ON SCIENCE AND MEDICINE?

K. Becker & J. R. Parker Serious Games + Computer Science = Serious CS 1


Serious Games + Computer Science = Serious CS



This session focuses on how games can fit into a CS curriculum at various levels and in various ways.



Katrin Becker / J. R. Parker
University of Calgary
October 2007



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Why?

- Enrollment
- Engagement
- Motivation
- Connection
- Learner-Centered
- Applied
- Real-World Contexts
- Start where learners are

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Ready, Set, GO!!

TONY HAWK'S PRO SKATER™
SHORT CUTS

Games as Assignments - Year 1
A Game Programming Course
Computer Science and Arts
Collaborative Efforts

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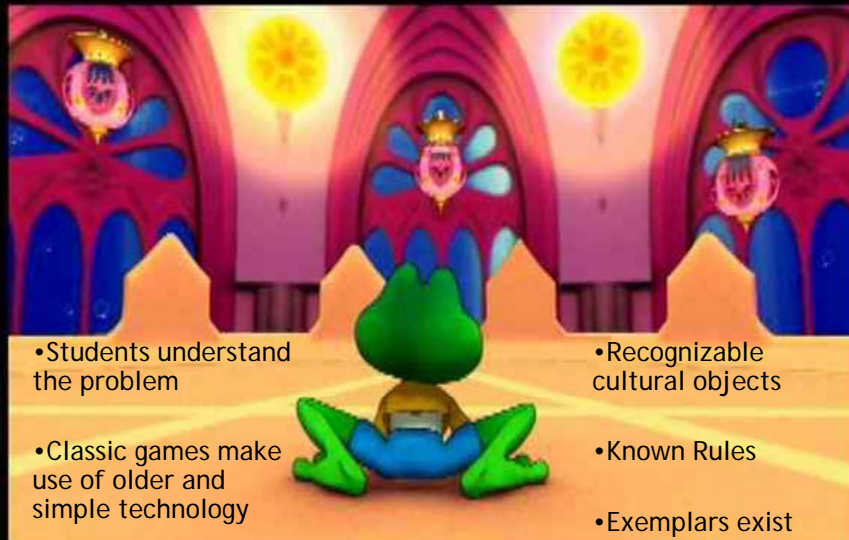
Games as Assignments - Year 1

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Vampire: The Masquerade 5

Use of Classic Arcade Games



- Students understand the problem
- Classic games make use of older and simple technology
- Recognizable cultural objects
- Known Rules
- Exemplars exist

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Frogger

Assignments

Standard Set:

1. Read percentage grades and print corresponding letter grades.
2. Create a class that represents a point in a two dimensional Cartesian coordinate system.
3. Create subclasses *shape*, *rectangle*, *circle*, and test from the *point* class defined in assignment 2.
4. Swing-based mortgage calculator.
5. Simulate a greenhouse. Has sensors and effectors, uses threads and a simple GUI.

Game-based Assignment Set:


1. An implementation of a simple calculator (no classes).
2. First class - integrate a *BigNum* class into the calculator.
3. Write an ASCII-graphics version of the Four Seasons Solitaire game.
4. Design and write a recursive parser for expressions.
5. Design and implement an ASCII-graphics, turn-based version of the Centipede arcade game.

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Games Vs Other Assignments

(N) Number of Tokens
(v) Vocabulary
(L) Length
(LOC) Lines of Code
(E) Effort
(TC) Time to Code
(CC) Cyclomatic complexity [1]

	Set A	Set B (games)	Set A: 3&5 only	Set B 3&5 only
N	369	481	412	636
V	315	534	301	648
L	2556	4846	2410	5978
LOC	117	152	131	203
E	13,623	24,910	15,321	34,740
TC	4.2	7.7	9.5	10.7
CC	6.84	4.75	1.7	4.18



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$n1$ = the number of distinct operators
 $n2$ = the number of distinct operands
 $N1$ = the total number of operators
 $N2$ = the total number of operands

Vocabulary: This is the number of distinct symbols used in the definition of the program. It is defined as:
 $n = n1 + n2$

N: This is a measure of program length in terms of the number of tokens used by the program. It is calculated as
 $N = N1 + N2$

Length: The *length* is a relationship between the token length N and the vocabulary n. It is defined as:
 $N = n1 \log(n1) + n2 \log(n2)$

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Programming Effort (Halstead measure)
 $E = V/PL$
 where the symbol V represents a quantity named *program volume*, an estimate of the volume of information required to specify a software program; and the symbol PL is the *program level*, a measure of the relation between the volumes of the most compact representation and the actual program.
 $PL = 1 / ((n1 / 2) * (N2 / n2))$
 $V = N * (LOG2 n)$

Time to Code: This is an estimate of how long it would generally take to write the program. This measure correlates very well with the actual measured time to write programs, and is also an established measure of program difficulty or effort needed to write a particular program.
 This measure is a function of the programming language use. For Fortran, the programming time T is computed as
 $T = E/K$
 where the constant K depends on the language. For the Java language the constant 0.9 was used; this was estimated by computing the effort for a sample set of programs for which the programming time was known.

http://www.minkhollow.ca/KB/Papers/233asq-paper1_fm.pdf

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CPSC 585
[4th year capstone]

A Game Programming Course

RADICAL ENTERTAINMENT
playworklivebreathegames

Crash of the Titans

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Course Outline

- Block Week classes, 9-5
- Term project
- Site visit
- Final demos
- driving game
- 5-person teams
- No engines
- Access to Maya, assets

Crash of the Titans

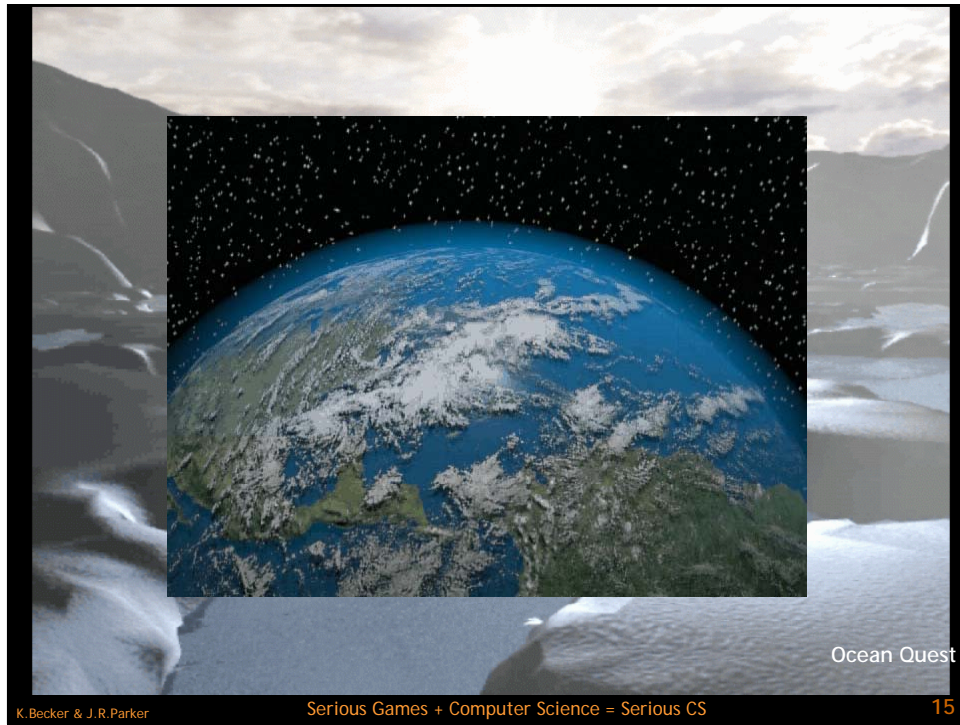
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Driving & Racing Games

- Representative sound, graphics, play
- Graphics can be simple
- No need for complex character animation
- No need for complex objects (like trees)
- Can be done in one semester
- Physics is challenging

The Result





POWER 87%
 OXYGEN 47%
 ELAPSED TIME 2:45
 SPEED 20
 COURSE 127
 DEPTH 490

Ocean Quest

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Computer Science and Arts

CHRONICLE 1: Harbingers of War

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joint CS/Drama 2 campuses

- High School Physics
- Rural / remote learners.
- Low motivation
- Small schools



Collaborative Efforts





The Orphans of Galileo Island

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CPSC 701.03 Serious Games

<http://www.ucalgary.ca/~jparker/cs70103/>



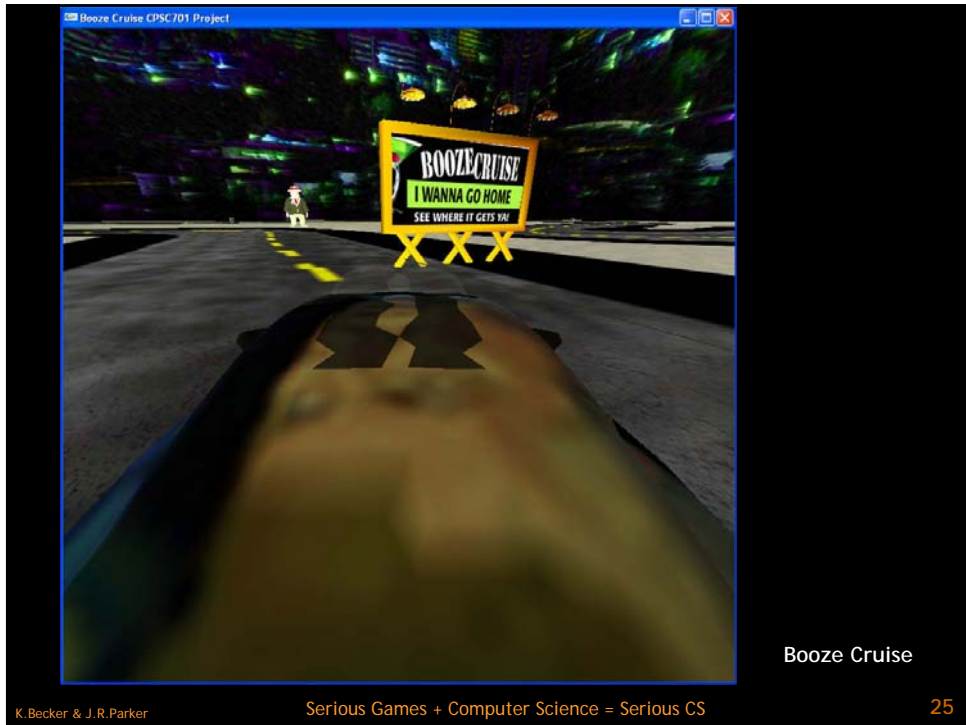
- <http://canadianpress.google.com/article/ALeqM5hZGBS4N3qOP9UIFCLRBo7gQUVOfQ>
- <http://www.cbc.ca/cp/technology/071002/z100215A.html>
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- <http://dailygleaner.canadaeast.com/liveit/article/88960>
- http://www.ctv.ca/servlet/ArticleNews/print/CTVNews/20071003/video_game_071003/20071003/?hub=SciTech&subhub=PrintStory
- <http://www.theglobeandmail.com/servlet/Page/document/video/vs?id=RTGAM.20071003.wwwvideo.runk1003>
- <http://www.scienceblog.com/cms/booze-cruise-driving-game-serious-drinking-problem-14372.html>
- <http://www.stltoday.com/blogs/entertainment-the-game-guy/2007/10/drunk-driving-game-tries-to-teach-teens-important-lessons/print/>

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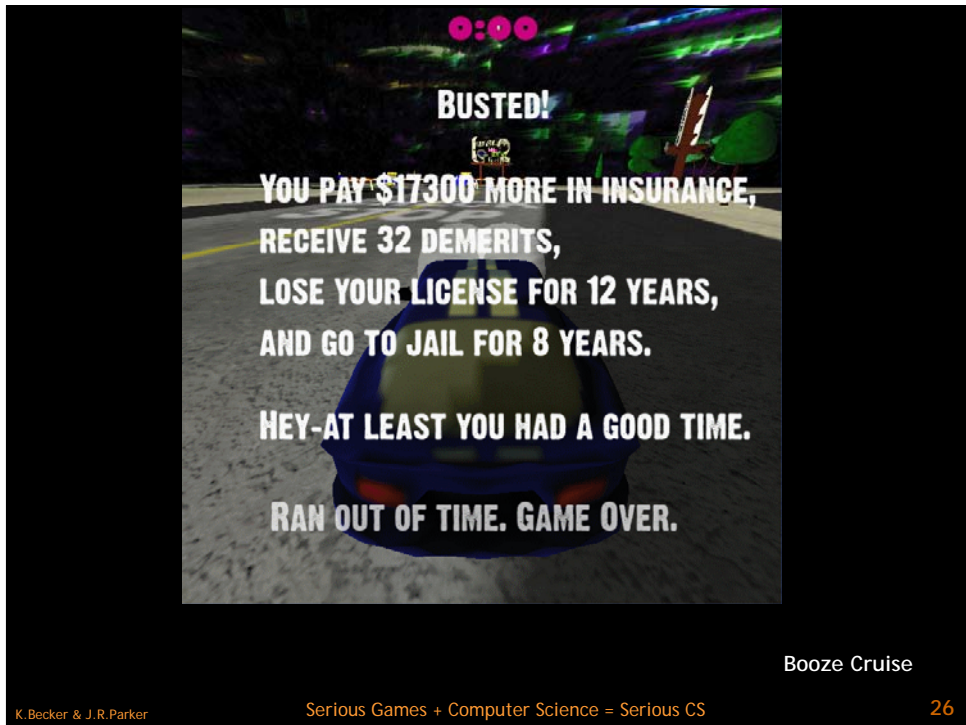


Booze Cruise

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Booze Cruise

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Thanks!!

Game Images courtesy of:
Official Game Sites (images are identified by game)
Fan Art
Mobygames.com
Gamespot.com
IGN.com
JRParker & His Students



www.jrparker.com

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Neverwinter Nights

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