Creating Computer Game Developers

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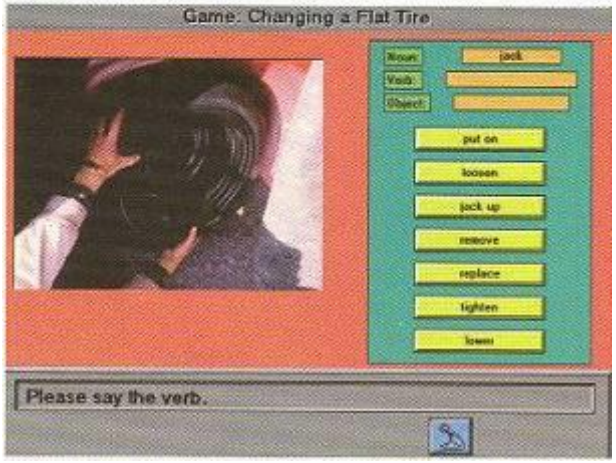
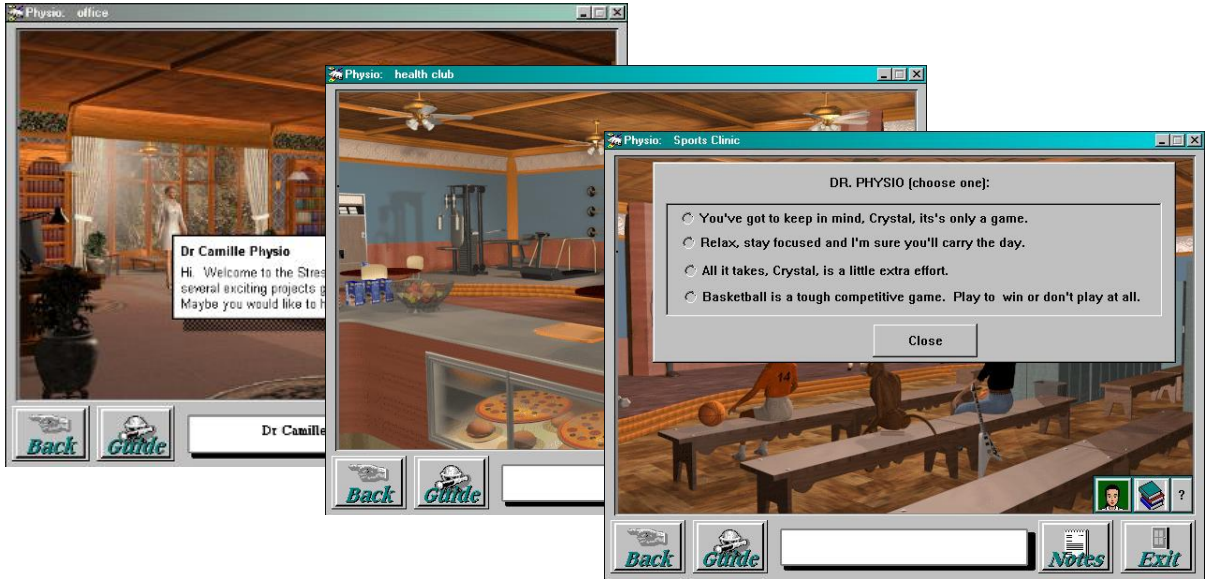
An interactive game in the tutoring system tests the student's ability to select the noun, verb, and object of the scene played in the video window.



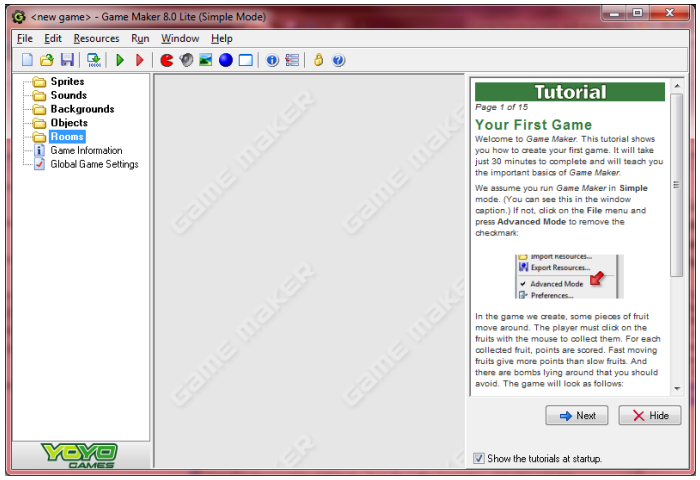


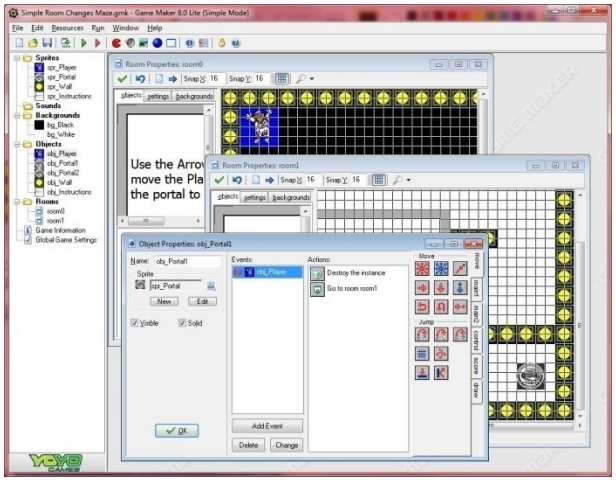
Computer Game Development

- Got to **play** games (board and card) growing up and computer games for my PhD
  - Developed an algorithm for a computer to play well in multi-player games, max^n
  - Combined artificial intelligence and game theory
    - max^n algorithm finds a Nash equilibrium point and is in other solutions
- Got to **make** some games – government, research
  - *SELT* - Saudi English Language Tutor – gamish evaluations
  - *Dr Physio* – teach kids good health behaviors
- Get to **teach** how to make computer games
  - Software engineering classes for 20 years
  - Game development and e-learning/CBT classes
    - St. Mary's for 15 years, every other year
    - PREP (Pre-freshman Engineering Program)
      4 summers with high school students

Setup for Game Development

- Room computers for each student
  - Game development software
    - GameMaker 8.1 is what we have used lately





  - Internet access (to play games and get graphics)
  - Microsoft Office-type, Paint tools
- Students need
  - Email address with attachments allowed
  - Understand how to save files, make folders
  - USB to save files

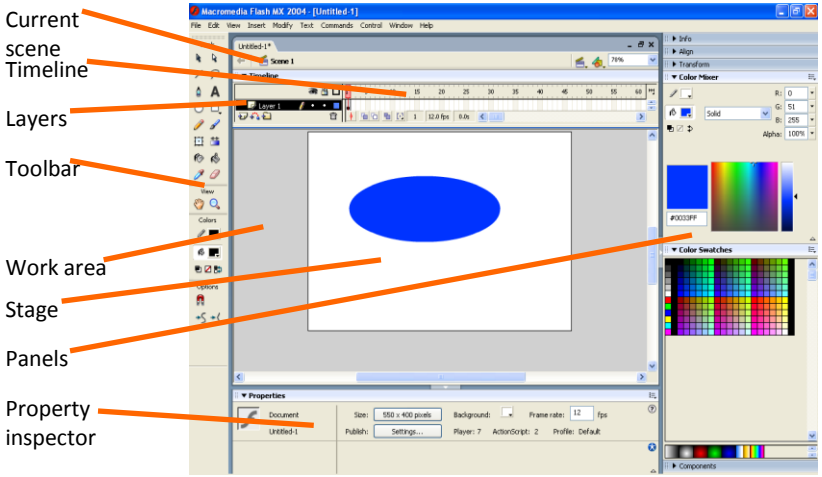
Start with what a game is – then play some, evaluate, design one, create it

- An interactive activity with (fun+)
  - **Environment**
  - **Player(s)**
    - Willingly play by the rules
  - **Rules**
    - Well-defined
  - **Goals**
    - Clear, compelling (survival)
  - **Feedback**/ payoff
    - Usually immediate

- Games give us
  - *Unnecessary obstacles that we voluntarily tackle*
- More money than movies
  - $25+ billion/year
- We play computer games
  - 3 billion hours/week
  - Kids will play 10,000 hours total
  - WoW (World of Warcraft)
    - Who knows someone who plays?
    - 6 million years worth of play

Develop Games with Coding or Tools

- Programming Languages
  - C/C++, Java, C#, Visual Basic
- Web Programming
  - HTML +, Python, Ruby, php, asp,net, …
- Adobe Flash



- GameMaker www.yoyogames.com/gamemaker *(free)*
- Unity www.unity3d.com, and www.unity3d.com/education/
- Scratch from MIT http://scratch.mit.edu/
- Torque 3D (www.torquepowered.com; harder to use)
- jMonkey engine www.jmonkeyengine.com (Java based)
- XNA http://www.microsoft.com/downloads/details.aspx?FamilyID=80782277-d584-42d2-8024-893fcd9d3e82&displaylang=en and http://creators.xna.com and www.xnawiki.com
- Activate www.activategames.org
- Bravo www.c3softworks.com/products/online/bravo-web/index.html
- Games for Change www.gamesforchange.org/toolkitflash/

Outcomes and Assignments *(see handout)*

Topics/Outcomes	Student Assignments
Understand what a game is and how to evaluate a game	**Show a game** (online or mobile) in class
Understand the design process of games with storyboarding; create sprites; Create 2 games together in Game Maker (clicker, shooter)	**Evaluations** of 5 games with descriptions, images and rating for each game; Say the idea of the game you will develop
Know how to create a game in Game Maker; See a multi-room game in Game Maker; Understand how to make an educational game	**Storyboard** document due and **presented** to class or the instructor
See how artificial intelligence is used in games; Work on their games, especially images	Show the progress of the game to the instructor
See the business side of games and game development; Work on their games	Show the progress of the game to the instructor; Start the game manual
Be inspired about the future of games; Play each others' games	**Present** the **game** by playing it for the class; **Game manual** due

Assignment	Points
Show a cool game (online)	100
Email list of games to evaluate	
Evaluation of 5 games	200
Email your game idea	
Storyboard document	200
Show your game	100
Game in GameMaker	200
Game manual	200

They write three documents *(see handouts)*

Game Evaluations

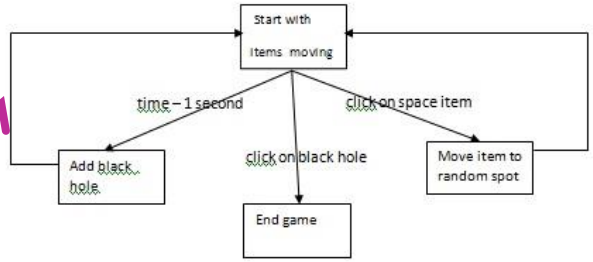
- cover page, table of contents
- for each of 5 games
  - name and description of the game
  - ratings –
    - multimedia, design, depth, support, appeal
  - summary – the good and the bad

Storyboards – Design a game

- cover page and overview idea of your game
- flow of your game screens or activities
- draft screens with descriptions and actions

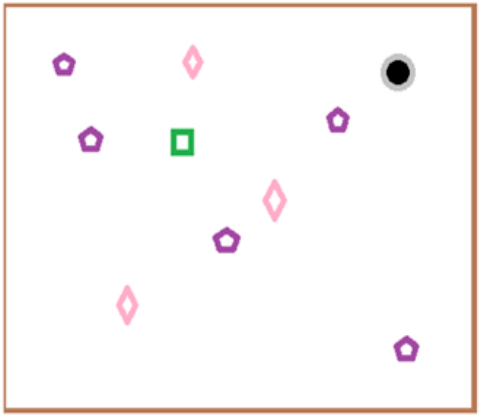
Game Manual

- cover page, table of contents
- overview/background
- requirements
- design
- installing and using the game
- sample sessions



Moving-objects

Score: 0 points



The screen background is dark with some stars. There are 3 types of space objects moving in straight lines, some diagonally (*a ship/rocket-purple item at speed 1 and score 5, a comet-pink item at speed 3 and score 10, and a moon-green item speed 5 and score 25*). The score appears along the top and starts at 0. There is also a black hole at the start. The black hole should have a light or white edge around it. Note that the user cannot give any other input.

Either the user

- Clicks on a ship, comet or moon
  - Go to the Click-Item state
- Clicks on a black hole
  - Go to the End-game state

Or

- A second goes by
  - Go to the Add-black-hole state

Schedule / Timeframe *(see handout)*

- ~40 hours in class
- 10-30 hours outside of class
- 2 weeks to 15 weeks
- In ~55 min, 0-30 present/interact, then an activity
  - Meet with each student 3+ times
- → Example shows 6-7 weeks

Dr Redfield / Doc		PREP IV 2014 CS- Game Development Overview			
CRedfield@stmarytx.edu		You will learn to evaluate games and design and develop a computer game.			
	Outcomes	Day 1 - Monday	Day 2 - Tuesday	Day 3 - Wednesday	Day 4 - Thursday
WEEK 1 June 16-19	Understand what a game is and how to evaluate games. Start using GameMaker.	Introduce gaming, overview, logins; assignments - play games - find 5+	Game Systems; Kinds of Games; How to **evaluate** a game - show sample (include actions you do)	GM Game1 - clicking - Pick Your Space; SAVE & SAVE-AS	**Show a game** (online - have 3) ***Email list of games*** you will evalute by the end of PREP today.
WEEK 2 June 23-26	Understand the design process of games including storyboarding; Evaluate games; Know how to use	GM Game 2 - shooter- Math Shot	Graphics; show some games from other students. *work on evaluations!*	GM Game 3 - maze and rooms - PREP Success; **say your game idea**	Game design; Email your game idea, and ***Evaluations and game idea***. *Start storyboards*
WEEK 3 June 30- July 3	Design a new game with storyboards; Select and create graphics; See educational computer gaming	Educational Computer Games; www.wingz2fly.com GamesForChange.org/ toolkitflash; *find/make graphics and room layouts*	work on storyboards; show **flow chart**; show the idea of your game with a partner	Finish and show some storyboards. Email to Doc by July 5.	student holiday
WEEK 4 July 7-10	Develop the compoents of a game - graphics, objects, rooms/screens, story, actions, scoring. See AI in games.	Artifical intelligence in Games; Show clip - A Beautiful Mind	make games - sprites, objects, rooms	**show** progress on your game - sprites objects rooms	**show** progress on your game - sprites objects rooms
WEEK 5 July 14-17	See the business side and issues. Continue the development of your game and write game manual.	Gaming Business & Gaming Issues+ Future of Gaming; show how to do screen shots	show game progress show each room	test your game; show game progress game manual;	show game progress
WEEK 6 July 21-24	Present your game and turn in game and game manual.	***Game due at start*** all play the games, nominations	***Game manual due Present your game*** (collected 3 files when present)	***Present your game***	show games to prep 1 and 4 (grades due)
WEEK 7 July 28-31	Be inspired about gaming; Graduation	student holiday	awards; surveys; **Scholar Symposium**	Ted.org - McGonigal *(half day?)*	Graduation

St. Mary's - Computer Science CS4375+CS6375 Game Development - Syllabus/info sheet

(mixed class of undergraduate and graduate students)

Catalog data: advanced topics in computer science; may be repeated with different topic names
Prerequisites: proficient in programming in a least one language you could use to create a game
Class meetings: 4 Fridays 6:30p; online
Instructor: Dr. Carol L. Redfield **Email:** CRedfield@stmarytx.edu **Phone**: 436-3298 office
Office: Math 227 **Office hours**: around class and by appointment
Required text: *Game Development Essentials* by Jeannie Novak, 2012; view all files on Blackboard
Book chapters and sections to read are listed below in ().
Recommended *Introduction to Game Development* by Steve Rabin, June 2005 ***(skim for principles)***

Objectives/outcomes: You will be able to evaluate, design and develop a computer game with appropriate documentation.

Assessment and Grading:

90% or better is an A/A-, 89-80 is a B+/B/B-, 79-70 is a C+/C, 69-60 is a D, below 60 is F

	Undergrad.	**Graduate**
Game evaluations – 5 games	200 points	200 points
Show an example game (with AI if you can)	100	
Storyboards/presentation	200	200
Research notes, PowerPoint		***200***
Notes are a Word file you compile as you gather information – have a cover page, TOC, and each time you read at a reference, add a ***title, reference citation, content, notes*** to the file		
Game & demo – execution, usability; Apply principles learned in class	200	200
Game manual [includes code listing with comments]	***300***	***200***
Total Points	**1000**	**1000**

St. Mary's - Computer Science CS4375+CS6375 Game Development - Syllabus/info sheet
continued - FOR A SUMMER COURSE in 10 WEEKS

Schedule /course content: (assignments are due by **6:30p Fridays**; view materials on BB by the date on the left)

	DO/READ		DUE
week1	1 – game types and systems;	(Chap 1,2,3,4)	**email an alternative email address**
			go to 2 gaming places and play- email where you went and about what you played
week2	***MEET*** 2 – design, languages; GameMaker	(Chap 5,6,7)	**list of games you will evaluate**
week3	3 – examples, ed. games; Dr Physio; ed. game uses		grads**- email research topic**
	4 – graphics, modeling (math, physics);	(Chap 8,9)	**email+post overview of your game**
week4	***game evaluations due***		**email game evaluations**
week5	5 - business; *www.mm-games.com*	(Chap 10,11,12)	**comment on all other game posts**
week5	***MEET show storyboards +*** UG-***show a game*****;** on CD and print cover page		**storyboards;** UG-**show a game**
week6	6 – AI, multiplayer; *A Beautiful Mind, Numb3rs*	(2 papers)	
week7	7 - game issues – violence, gender, taking over, additions		
week8	**optional** - game night – Dave and Busters 6-8p, 410 and 10 NW		
	extra credit – check out and write a paragraph about Xtreme Gaming – 5450 Babcock Rd, #205		
week9	***MEET*** GR-**present research, turn in notes, ppt on a CD+print cover page** (6 min);		**notes and ppt**
	show game progress to Dr R		
week10	***MEET*** **show game;** turn in ***manual, executable, source files*** on CD, + print cover		**game & manual**

We use the Blackboard learning management system --

z Game Development (Template)

- Announcements
- Course Information
- Course Documents
- Assignments
- Discussions
- Game Class Web Links
- Help
- Tools

COURSE MANAGEMENT

Control Panel

- Files
- Course Tools
- Evaluation
- Grade Center

Institution | Course | View All

Announcements

Due for Game Development Class

Posted on: Wednesday, June 23, 2010 10:33:00 PM CDT

Posted by: Carol Redfield
Posted to: z Game Development (Template)

By 6:30p Friday (UG=undergraduates, GR=graduate students)
Aug 27 -- **MEET**; reply to the email from Dr R ***during class*** to test the communication!
Sep 3 -- email your list of the names + platform of 5 games you will evaluate
go to a gaming place to play games; see a game-related movie
Sep 10 -- GR- email your research topic
post in the Wiki to add a game-related movie, TV show, book, or short story
Sep 17 -- email Dr R with the name of a topic or area you think
you would like to make a tutor or game for (you can change it)
Sep 24 -- email a Word 2003 file of your **evaluations** --
title the file: tutor evaluations - *your last name.doc*
Oct 8 -- email the flow chart for your game
Oct 15 -- **MEET** - turn in your **storyboard document** on CD + print of cover page;
present your storyboard document - show flow diagram and screen mock-ups
UG- show example game
Nov 12 -- GR- send draft research notes file
Nov 19 -- **MEET** - GR- present **research** - ppt and notes file on CD, print ppt 6/pg;
individually show Dr R the progress on your game
email I.T. Symposium
Dec 3 -- **MEET** - turn in CD with system manual, storyboard document,
source code and executable (if possible), and a print of the sys man cover
before you go up to **show off your game**
Dec 10 -- **PRESENT** - I.T. Symposium (required to present; -100 if you don't show)

z Game Development (Template)

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- Customization

Course Information

Build Content | Assessments | Tools | Partner Content

course syllabus

Enabled: Statistics Tracking

Attached Files: Computer+Gaming+info+hybrid+Fall+2013.doc (42 KB)
Policy-Statements-StMU-and-Redfield-2014+.docx (15.648 KB)

Read the syllabus and policy statements. Check your emial daily.
You will play and evaluate games, and design and develop a game.
Use whatever language or tool you like to create your game.
(Extra credit for a game teaching either any math or peaceful practices - remind me if you are doing one.)
I have many game books in my office if you want to look through them.

Be sure to follow the schedule and instructions in the syllabus and here on Blackboard, especially the **Assignments** and **Course Documents** tabs. **Announcements** will list what is due by date as a reminder for what is in the syllabus.
See the **Web Links** tab for
game development tools, especially GameMaker,
game organizations,
educational games, and
what makes a good game.

Ranked in top game design programs!

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This game development course is the heart of our graduate Educational Computer Gaming certificate, www.stmarytx.edu/academics/set/graduate/computer-science/certifications/.
Our game-related courses and programs have been ranked in the top 25 game design programs for 2014 by Princeton Review,
www.princetonreview.com/top-graduate-schools-for-video-game-design.aspx.
The story was picked up by the San Antonio Business Journal,
www.bizjournals.com/sanantonio/news/2014/03/12/st-mary-s-ranks-high-on-video-game-design-programs.html

Course Documents

1 kinds of games and systems

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Attached Files:
- game-d-e3-chap1- history.ppt (14.427 MB)
- game-d-e3-chap2- platforms.ppt (21.147 MB)
- game-d-e3-chap3- genres.ppt (22.042 MB)
- Game 1 -- game systems, kinds of games.ppt (2.851 MB)

Read and review each of the presentations attached.
Just for fun, check out some "Game Theory"videos about computer games www.youtube.com/playlist?list=PL35FE5C4B157509C9. I like "Super Mario, Pipe Dreams" and "Illusion of Gaia, World Wonders."
Watch Daphne Bavelier about your/a brain on video games -- www.ted.com/talks/daphne_bavelier_your_brain_on_video_games.

2 design and development

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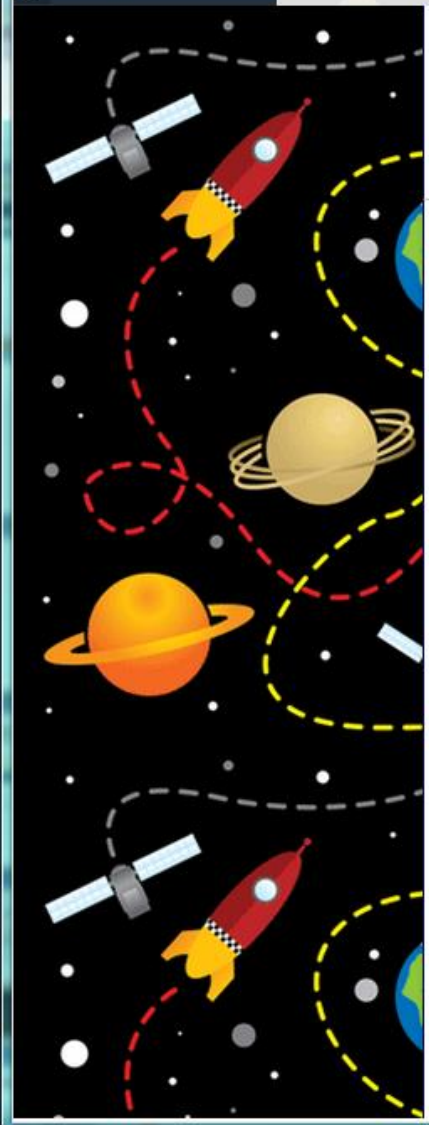
Attached Files:
- Game 2 -- design, development TAKE PC-VB,GMaker.ppt (1.175 MB)
- game-d-e3-chap5- story.ppt (43.07 MB)
- game-d-e3-chap6- game play.ppt (24.398 MB)
- game-d-e3-chap7- levels.ppt (23.406 MB)
- DiceAdd.exe (748 KB)
- Game Lectures 2 Code for Dice Addition in document.doc (71.5 KB)
- Game Lectures 2 Dice Addition Storyboards.doc (211 KB)

See the Storyboard Document example here and in Assignments. You can run and see the code for Dice Addition with the files here.
(Dr R would love to see some educational games that teach things like math concepts, conflict resolution, or peaceful practices.)



6b Numb3rs

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Attached Files: Game 6 Numb3rs game theory.wmv (8.244 MB)

7 gaming issues

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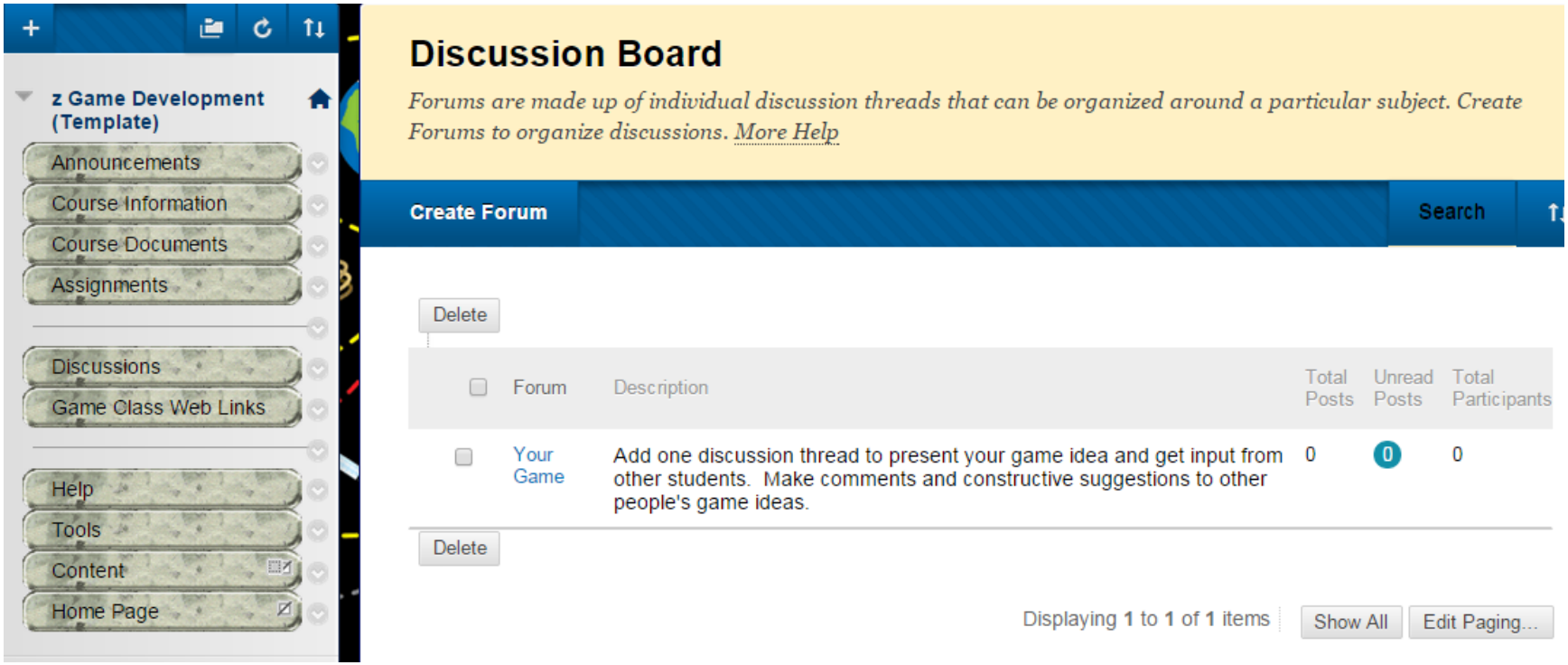
Attached Files: technology lights up kidspage57.pdf (348.922 KB)
Game 7 -- gaming issues.ppt (1.497 MB)
MVI_4070 McGonogal advice to PREP 4.MOV (158.036 MB)
Game Violence Research Notes.pdf (974.072 KB)

Watch Jane McGonigal - www.ted.com/talks/jane_mcgonigal_gaming_can_make_a_better_world.html
See the video file attached to view Dr McGonigal answering a question from Dr Redfield.
Read article about kid's brains -
www.phillymag.com/articles/feature_is_it_just_us_or_are_kids_getting_really_stupid/
See Loretta Clapper's research on violence in games.

Post and comment on games – benefit in hybrid/online



Show BB – assignments, game class web links, course documents

3 Games to Learn the Tool *(see handouts)*

1st – Pick Your Space - clicking game

already saw the flow chart and a storyboard page

GameMaker (continue with Lite; click or select each --)

create sound (speaker): Name sound-hit, Load sound, select laser, Ok *(for clicking on object)*

+ sound: Name -hole, Load sound, select miss, Ok *(for black hole click)*

create sprite (red ball): Name sprite-wall, Load sprite, select wall, Ok

+ sprite: Name -planet, Load sprite, select planet, Ok

+ sprite: Name -capsule, Load sprite, select capsule, Ok

+ sprite: Name -blackhole, Load sprite, select blackhole, Ok

create background (pic): Name background-nebula, Load sprite, select nebula, Ok

create object (blue ball): Name object-wall, Sprite list , select -wall, Solid, Ok

+ object: Name -capsule, Sprite list , select -capsule,

Add event – Create; drag Action- move-MoveFixed

Click all directions (blue arrows), Speed 3, Ok

Add event-Collision – object-wall; drag Action- move-Bounce

Add event-Mouse-LeftPressed; drag Action- score-SetScore 25, Relative, Ok

drag Action- main1-PlaySound, sound-hit, Ok

Ok

right click on object-capsule: Duplicate:

Name- object-planet,

Sprite - -planet,

select Create, double click MoveFixed – click directions, speed 1, Ok

select LeftPressed, double click SetScore – 5, Ok

create room: Settings: Name room-space, Caption PickYourSpace +, Width 400, Height 400

Background: select menu background-nebula

Objects:

Object to add menu: object-wall, click to add around (right click to delete)

Object to add menu: object-capsule, click to add 5

Object to add menu: object-planet, click to add 2

[double click to edit an item]

(repeat to test each time) **File | Save; File | Run normally (F5) – TEST IT**

File | Create Executable – PickYourSpace.exe

Create object: Name object-blackhole, Sprite list , select -blackhole

Add event – Create, drag Action move: JumpToRandom, Ok

drag Action main2-SetAlarm, number of steps 90, Ok

Add event – Alarm, Alarm0, drag Action main1-CreateInstance, object –blackhole, Ok

drag Action main2-setAlarm – number of steps 120, Ok

Add event – Mouse- LeftPressed; drag main1-PlaySound, sound-hole, Ok

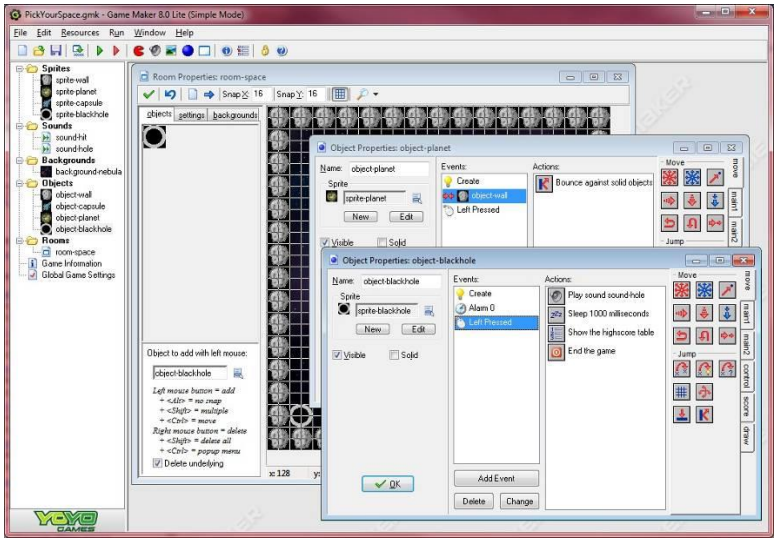
drag main2-Sleep (2000 for 2 seconds), Ok

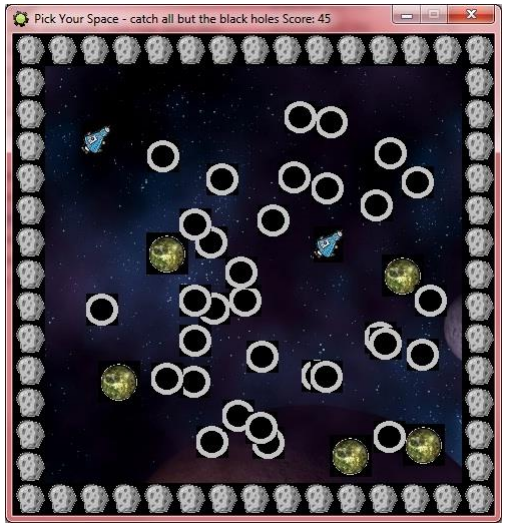
drag score-ShowHighScore, may change colors, Ok

drag main2-EndGame

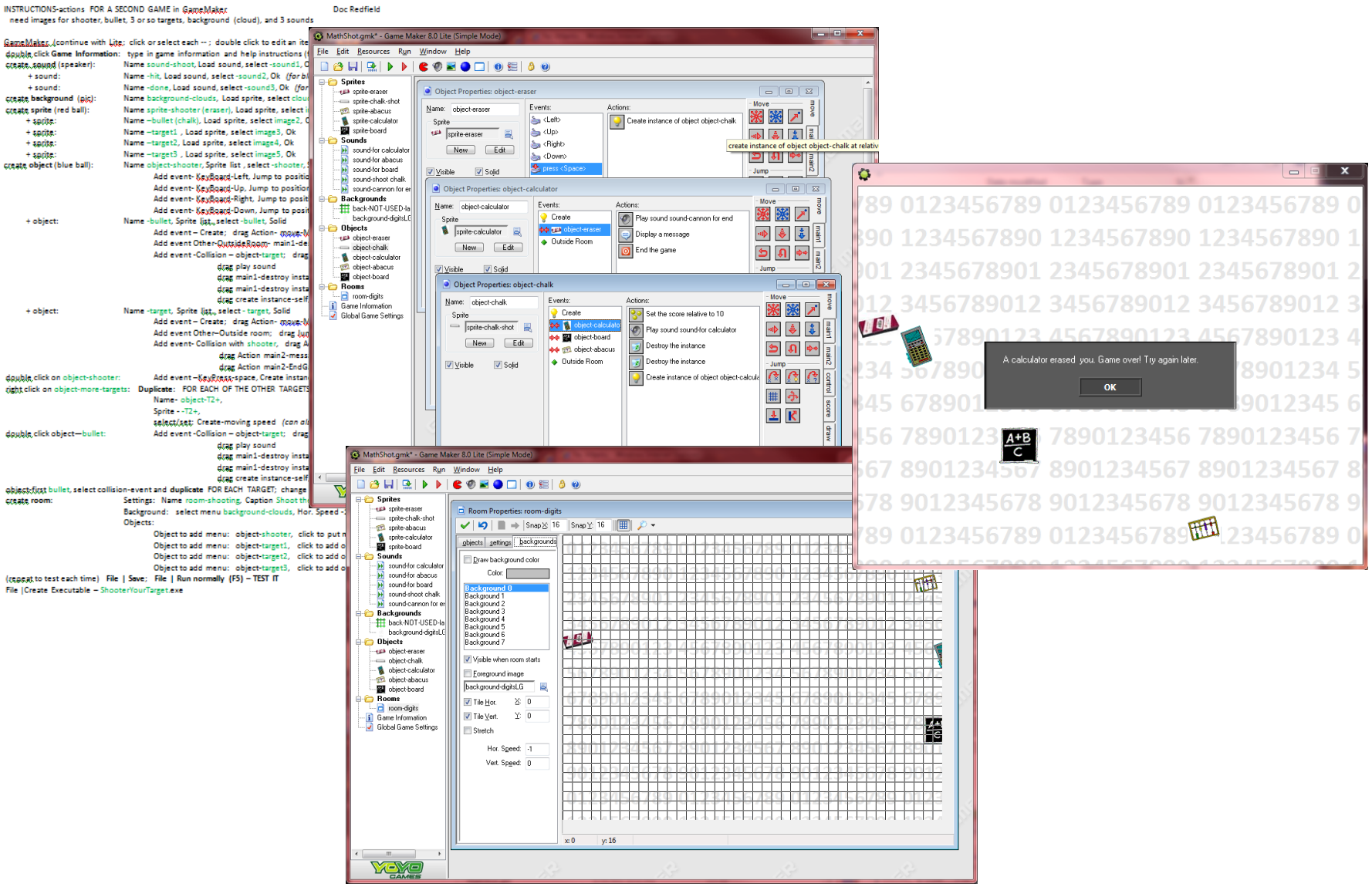
in (double click) room-space: select object-blackhole, click in room to add 1

double click Game Information: type in game information and help instructions (for F1)

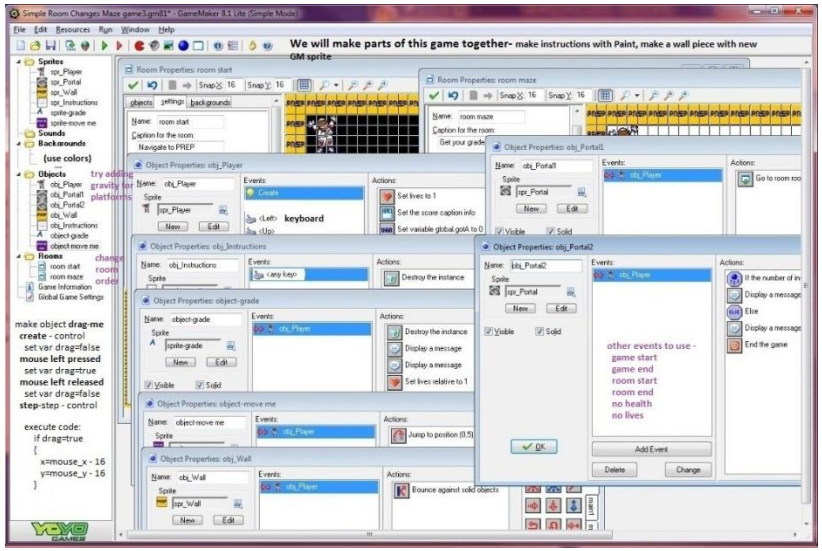


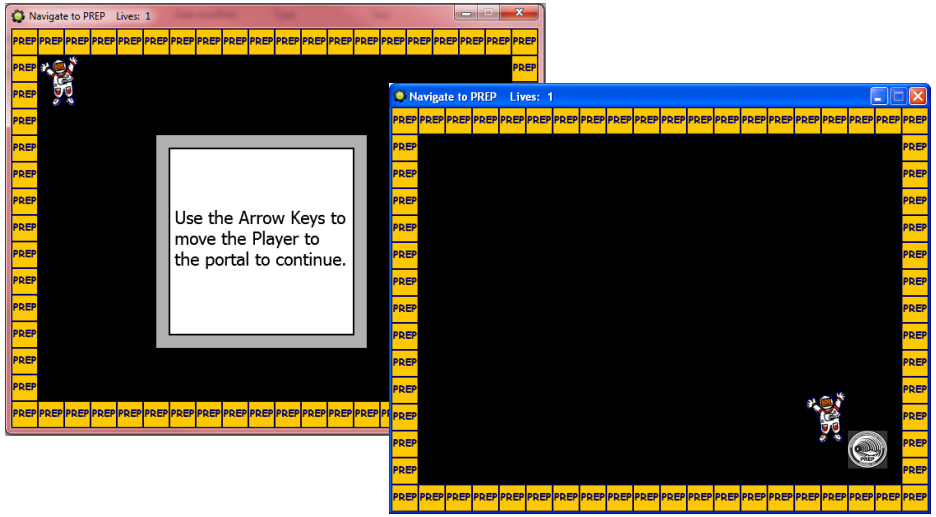


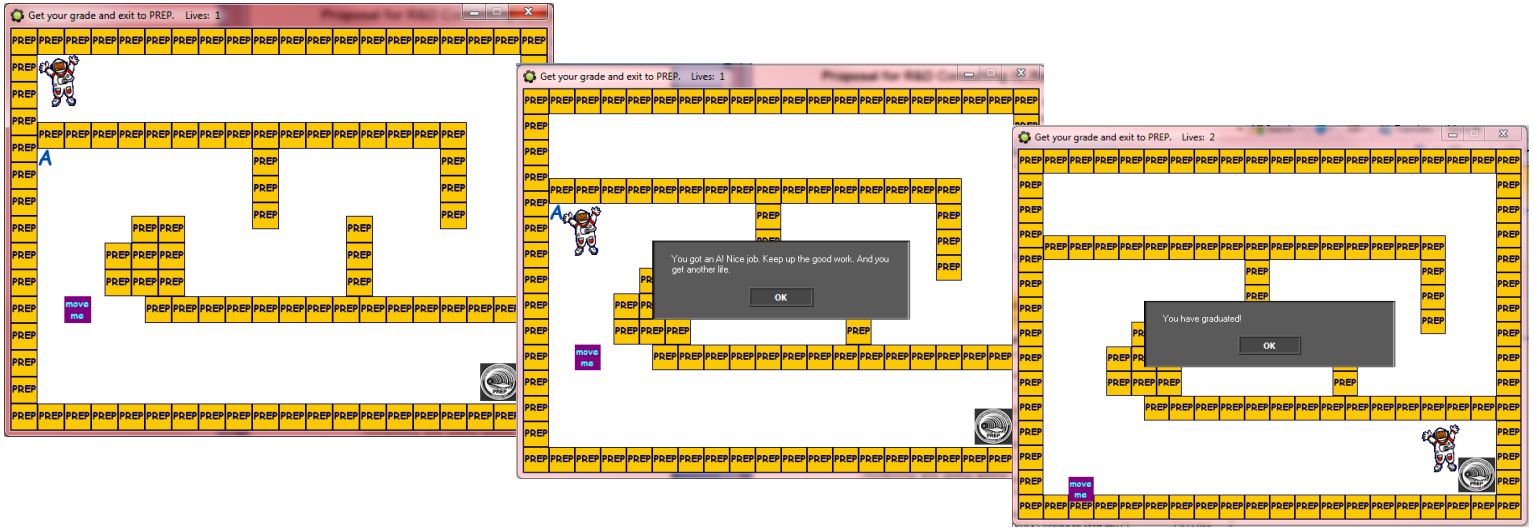
2nd – Math Shot - shooting game



3rd – PREP Success - multi-room maze, drag





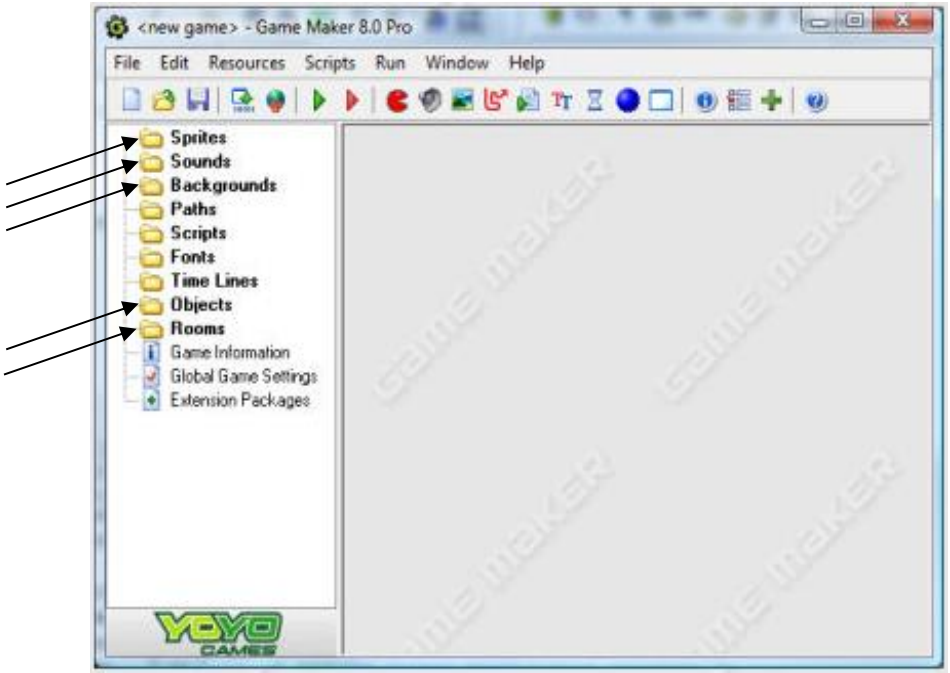


Students can make game actions

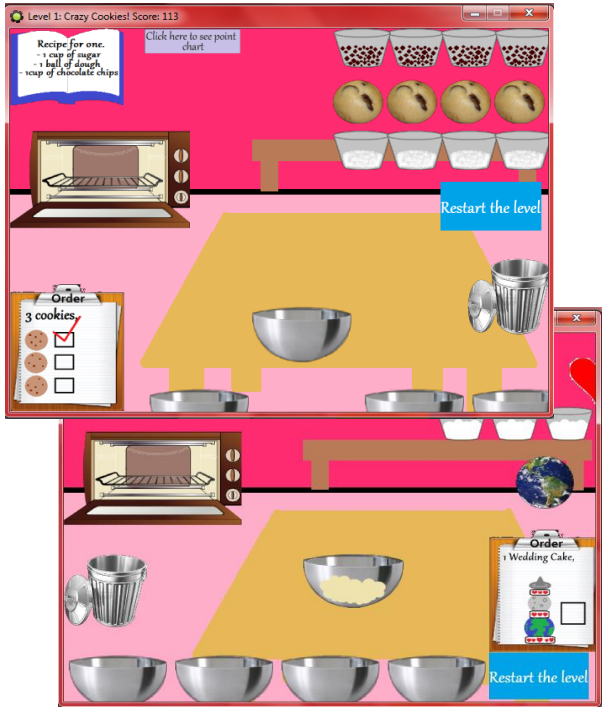
- Click on objects
- Move an object
- Shoot
- Objects appear
- Object disappear
- Collisions
- Drag
- Go to a room
- Add or take away
  - points
  - lives
  - health
  - other scoring

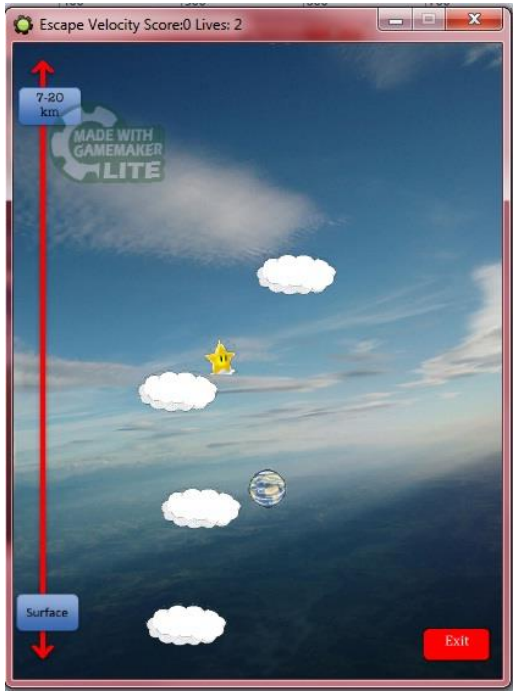
<u>In GameMaker</u> (optional - create sounds)

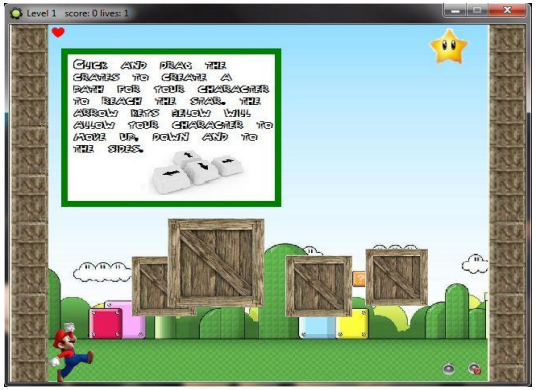
- create sprites
- create **objects** (walls, players, …)
  - add image/sprite
  - add **events - actions**
- create a **room**
  - put in a background
  - put in objects

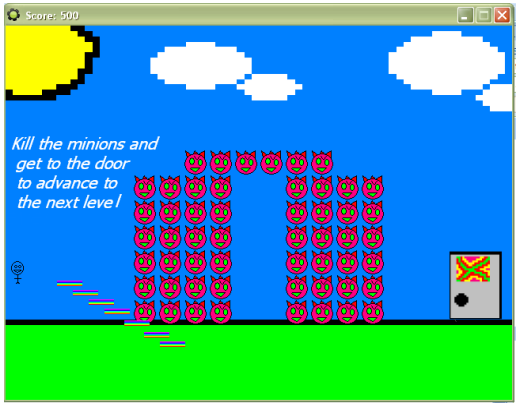


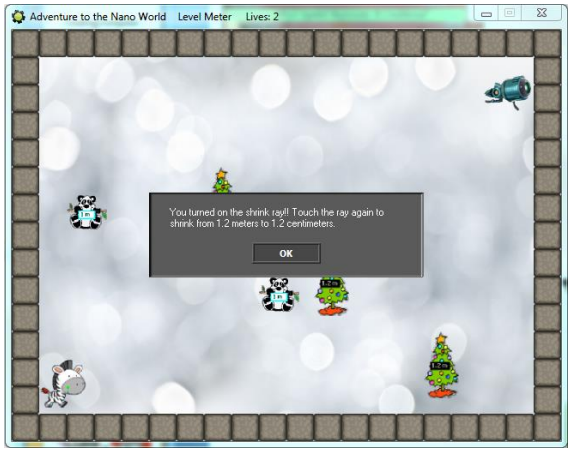
Example GameMaker Games - HS

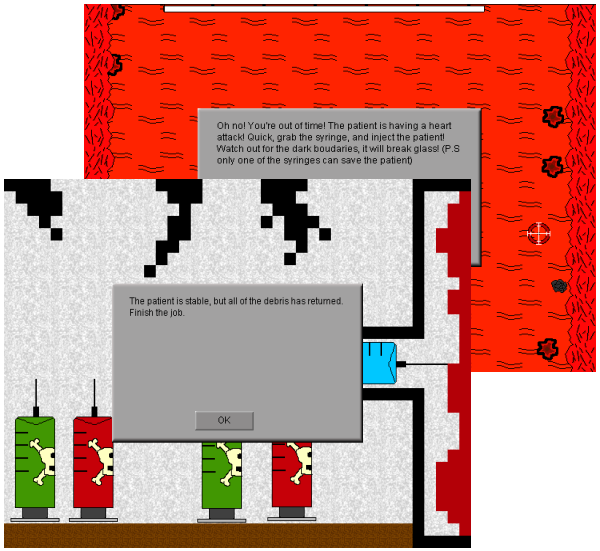


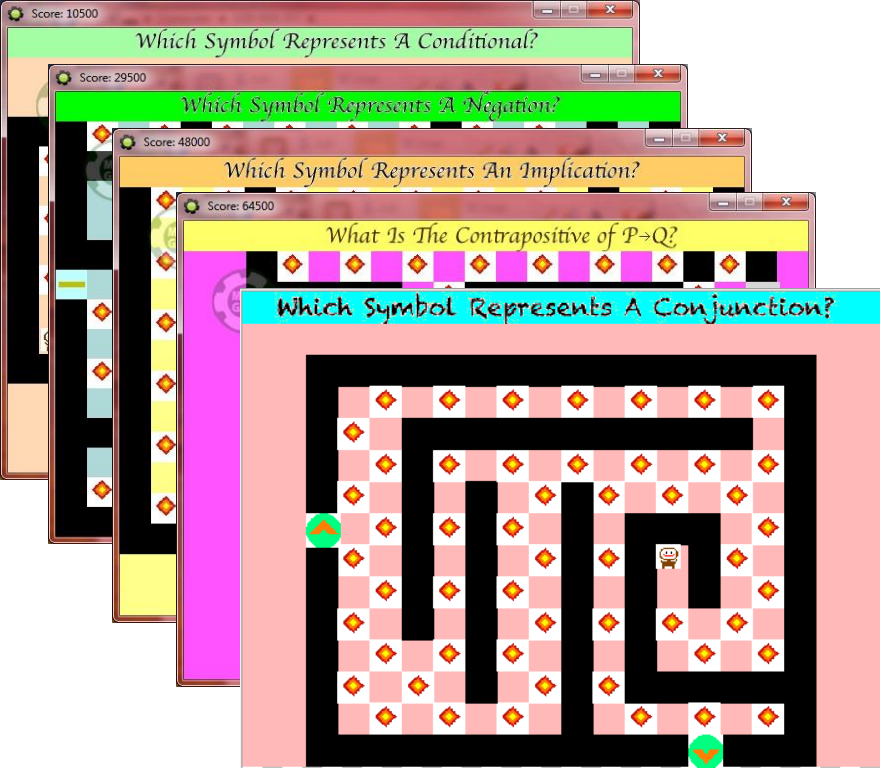




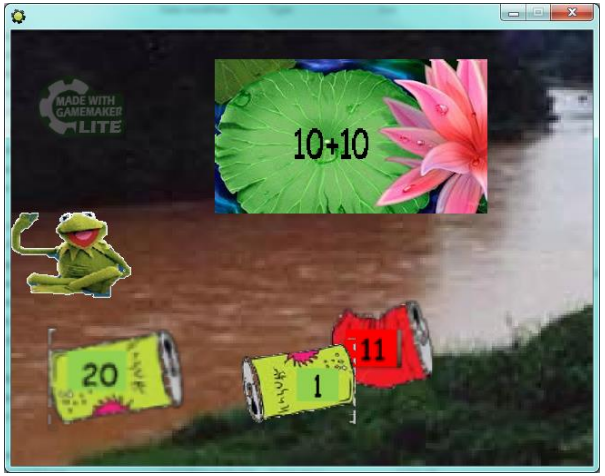


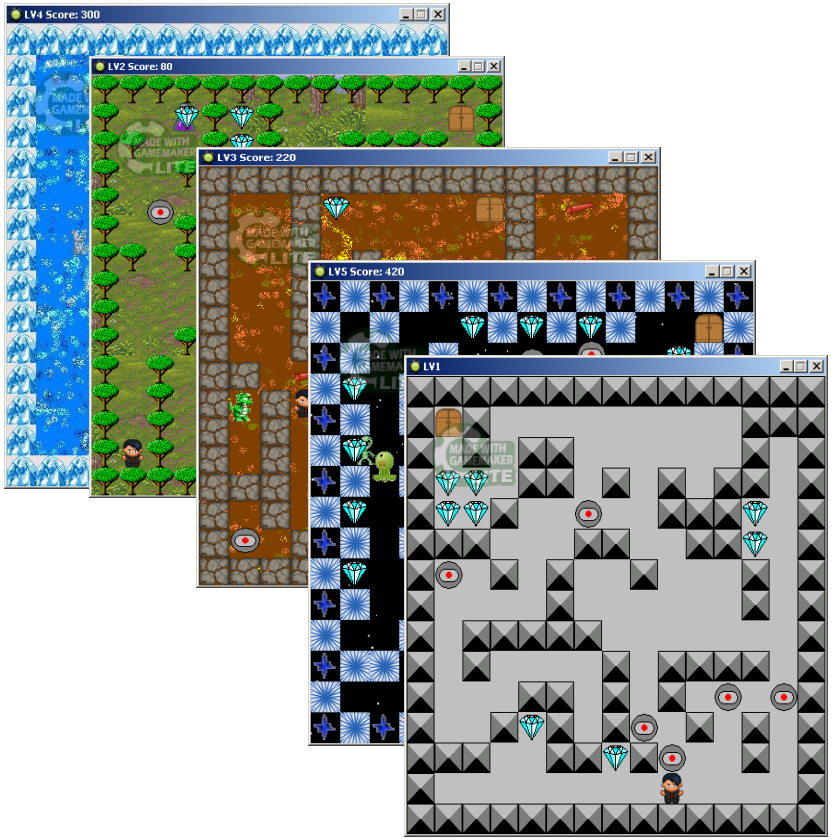





Score: 10500
Which Symbol Represents A Conditional?
Score: 29500
Which Symbol Represents A Negation?
Score: 48000
Which Symbol Represents An Implication?
Score: 64500
What Is The Contrapositive of P→Q?
Which Symbol Represents A Conjunction?

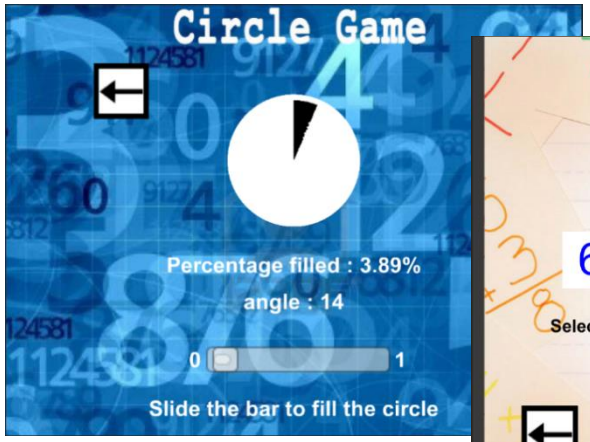

Pokemon Frogger! Level 3

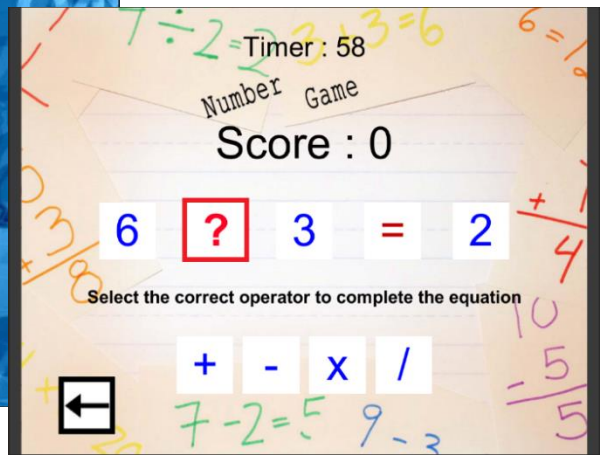

MADE WITH GAMEMAKER LITE
10+10
20
1
11

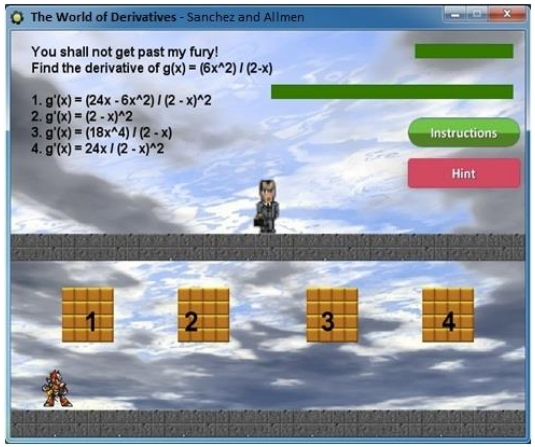

LV4 Score: 300
LV2 Score: 80
LV3 Score: 220
LV5 Score: 420
LV1

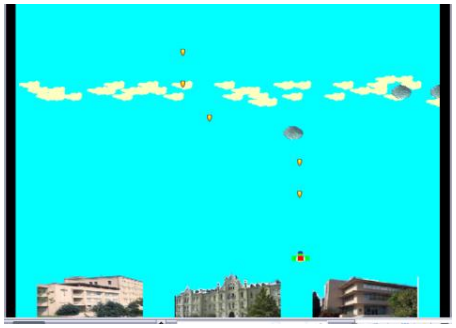
At StMU - any tool/language; Graduate certificate in **Educational Computer Gaming**

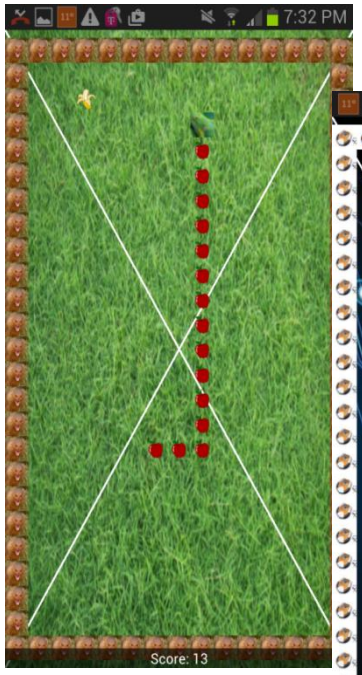
4 classes – in class or hybrid format

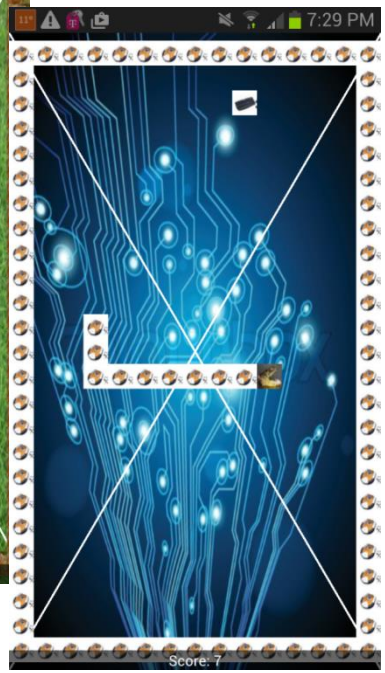


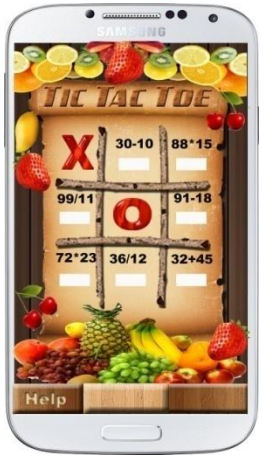


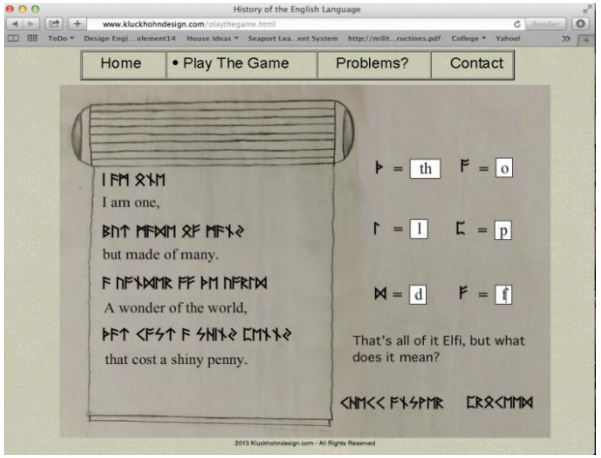












PREP 4 in 2014 (my 4th summer) – 66 students *play games*