

IT630 – Computer Simulation & Modeling



**SERIOUS GAMES, SIMULATIONS,
BUSINESS PROCESS MANAGEMENT
SIMULATORS, & VIRTUAL WORLDS**

DR. ROBERT H. SEIDMAN – AUGUST 31, 2009

Preparing for this class – do prior to class



- Bookmark this Innov8 2.0 Online Simulator web site: <http://www-01.ibm.com/software/solutions/soa/innov8/index.html>
 - Watch the trailer.
 - Try Smarter Customer Service Scenario to get a feel for it. You do not have to complete it.
- Point your browser to <http://cnettv.cnet.com/>. In the search field type: **second life w hotel**. In the results, click on “New Edge 2.0: Virtual hotel.”
 - View the video.
- Do an internet search for a current articles on “serious games.”
 - Choose one interesting article. Read it and prepare a 2 paragraph summary that you can share in class.
- Read this article: Alkhaldi, F. , Olaimat, M., Rashed, A., (2008). “The Role of Simulation in Business, Process Reengineering.” Chapter in Sheikh, A., Ajeeli, A. and Abu-Taieh, E., *Simulation and Modeling: Current Technologies and Applications*. NY: IGI Publishing. [Posted to Bb Course Documents](#).
- OPTIONAL: Get a Second Life account and explore. <http://secondlife.com>

Serious Games & Simulation Modeling



- Part of this class period is devoted to exploring of the current and future role of computer simulation & modeling in the field of serious games and to brainstorming advanced aspects of DES.
- Class time is divided into:
 - Forming 5 groups of 4 students each.
 - Share your serious games articles and choose the most interesting one to present to the entire class.
 - Each group comes up with their definition of ‘serious game.’ Ok to do internet research.
 - Lecture on serious games, virtual worlds & the place of simulation and modeling.
 - In-class group work.
 - Groups report out to entire class.
 - Wrap-up by instructor: serious games, simulation & virtual worlds.
 - Continue our study of simulation modeling using Arena.

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- **Approximate time line for the 195 minute class.**
 - Minutes 1-20: Group work on articles, definitions and sharing with entire class. (20 minutes)
 - Minutes 21-56: Professor's lecture/demo on serious games, virtual worlds and simulations. (35 minutes)
 - Minutes 56-96: Group work on in-class assignment (40 minutes)
 - Minutes 97-112: *15-minute Break*
 - Minutes 117-137: Groups report out on assignment (20 minutes)
 - Minutes 138-148: Professor wrap-up on serious games, virtual worlds and simulations (10 minutes)
 - Minutes 149-195: Continue coursework on simulation & modeling using Arena software - Rossetti textbook (46 minutes)

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- Form 5 groups of 4 students each.
- You have already individually researched some the literature on serious games. Share your article summaries with your group members & then collectively, decide on the most interesting one to tell to the class. Choose a spokesperson for this article summary.
- As a group, create a two-sentence definition of 'serious game' and choose a spokesperson to convey this to the class.
- Groups post their chosen article summary and definition to the Serious Games discussion forum in Bb.

Serious Games & Simulation Modeling



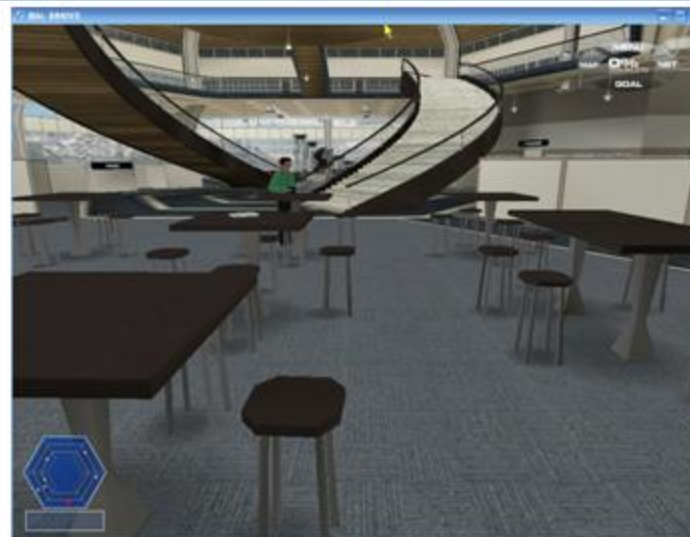
- W Hotel chain simulates new hotel design in Second Life. <http://cnettv.cnet.com/>.



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- Walking through a 3D digital virtual world can hardly be called a game, much less a serious game.
- But, how about Innov8 2.0? More about this later.



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- **Serious Game Working Definition:**

“Any contest (play) among adversaries (players) operating under constraints (rules) for an objective (winning, victory, or pay-off).” (Abt, 1970)

Educational games (or serious games) are designed to reach people about a certain subject, expand concepts, reinforce development, or help them drill or learn a skill or change their attitudes as they play.

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- **Serious Games Working Definition** (continued)

For our purpose, we also include simulations in this category. Simulations resemble games in that both have some underlying model, allowable actions that the learner can take, and constraints under which those actions should occur. Additionally, learners observe their actions' consequences.”

(von Wangenheim and Shull, 2009).

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Table I. Identifying Simulation Games and Simulators

<i>Identifying Characteristics</i>		<i>Games</i>	<i>Simulation Games</i>	<i>Training Simulators</i>
1.	<i>Involves simulation</i>	1. A virtual environment is present. 2. The application interactively engages the user in a form of simulation.		
2.	<i>Imaginative experience</i>	1. May provide an imaginative or fictitious simulated environment.		1. Only provides recreations of real-world environments.
3.	<i>Entertaining, fun, and engaging</i>	1. Provides entertainment. 2. Provides interesting & engaging challenges. 3. Provides a fun experience.		1. Not intended to be entertaining, fun, or engaging. 2. Operator may possibly find the application entertaining, fun, and engaging.
4.	<i>Skills development</i>	1. Does not provide an application-specific skill development. 2. Possible, although not as a primary feature.		1. Operator skills-development is the primary purpose of a simulator.
5.	<i>Type of challenge</i>	1. Ideally, a continuous and intelligent challenge.		1. Challenges depicted accurately with respect to an equivalent real-world scenario.
6.	<i>Gestalt</i>	1. Presence of game-play patterns. 2. Game-play patterns may vary. 3. Possible development of a game-play gestalt.		1. Presence of standard operational procedures. 2. Procedures do not change.
7.	<i>Goal-oriented</i>	1. Goal-oriented activity present.		1. Goal-oriented activity absent. 2. No obvious end-state.
		2. End-state present.	2. No obvious end-state.	

Serious Games & Simulation Modeling



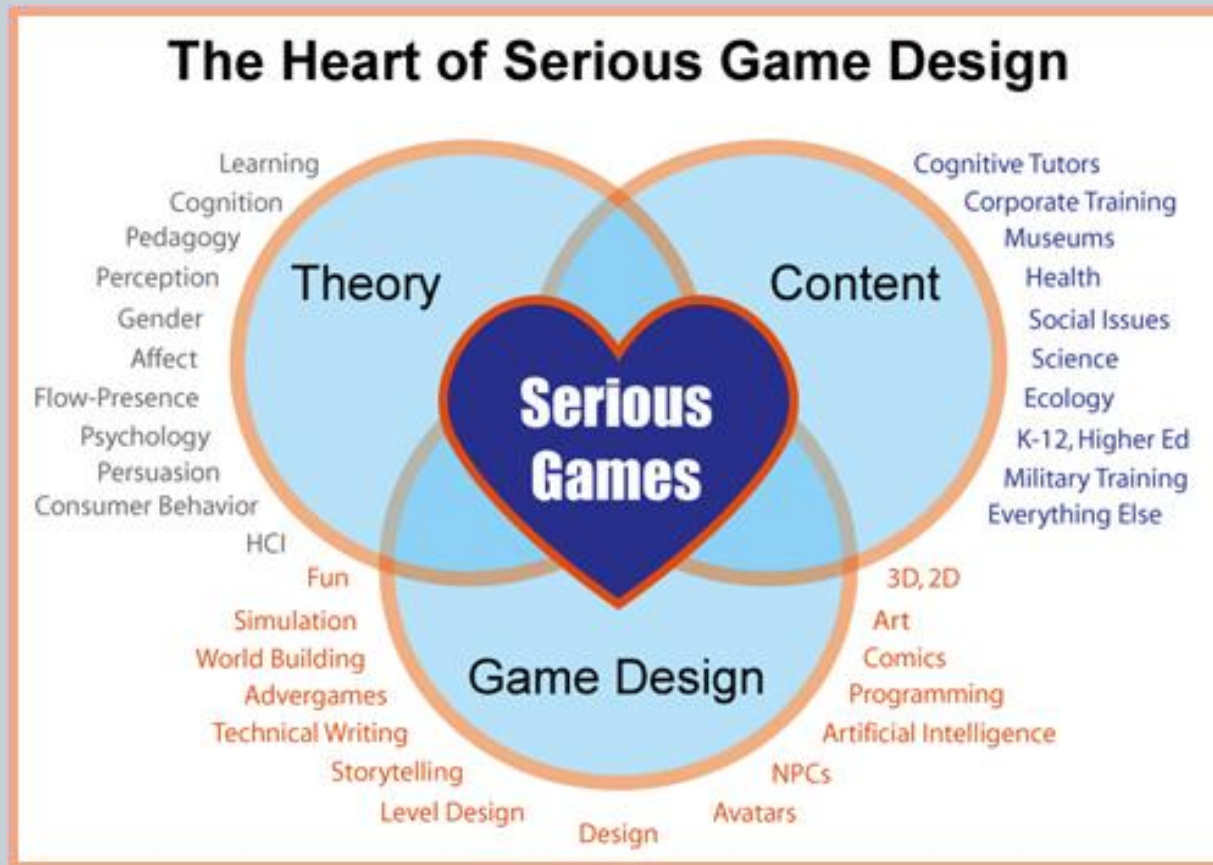
Table IV. Identifying Simulation Games and Serious Games

<i>Identifying Characteristics</i>		<i>Simulation Games</i>	<i>Serious Games</i>
1.	<i>Involves simulation</i>	1. A virtual environment is present. 2. The application interactively engages the user in a form of simulation.	
2.	<i>Imaginative experience</i>	1. May provide an imaginative or fictitious simulated environment.	
3.	<i>Entertaining, fun, and engaging</i>	1. Provides entertainment. 2. Provides interesting and engaging challenges. 3. Provides a fun experience.	1. Built for non-entertainment 2. Can provide interesting and engaging challenges. 3. Can provide a fun experience.
4.	<i>Skills development</i>	1. Does not provide an application-specific skill development. 2. Possible, although not as a primary feature.	1. Usually designed to provide some form of skill development, especially in training applications.
5.	<i>Type of challenge</i>	1. Ideally, a continuous and intelligent challenge.	1. The challenges vary with the type of simulation.
6.	<i>Gestalt</i>	1. Presence of game-play patterns. 2. Game-play patterns may vary. 3. Possible development of a game-play <i>gestalt</i> .	1. Presence of game-play patterns and <i>gestalt</i> vary, depending on the application.
7.	<i>Goal-oriented</i>	1. Goal-oriented activity present.	
		2. No obvious end-state.	2. May or may not have an obvious end-state, depending on application.

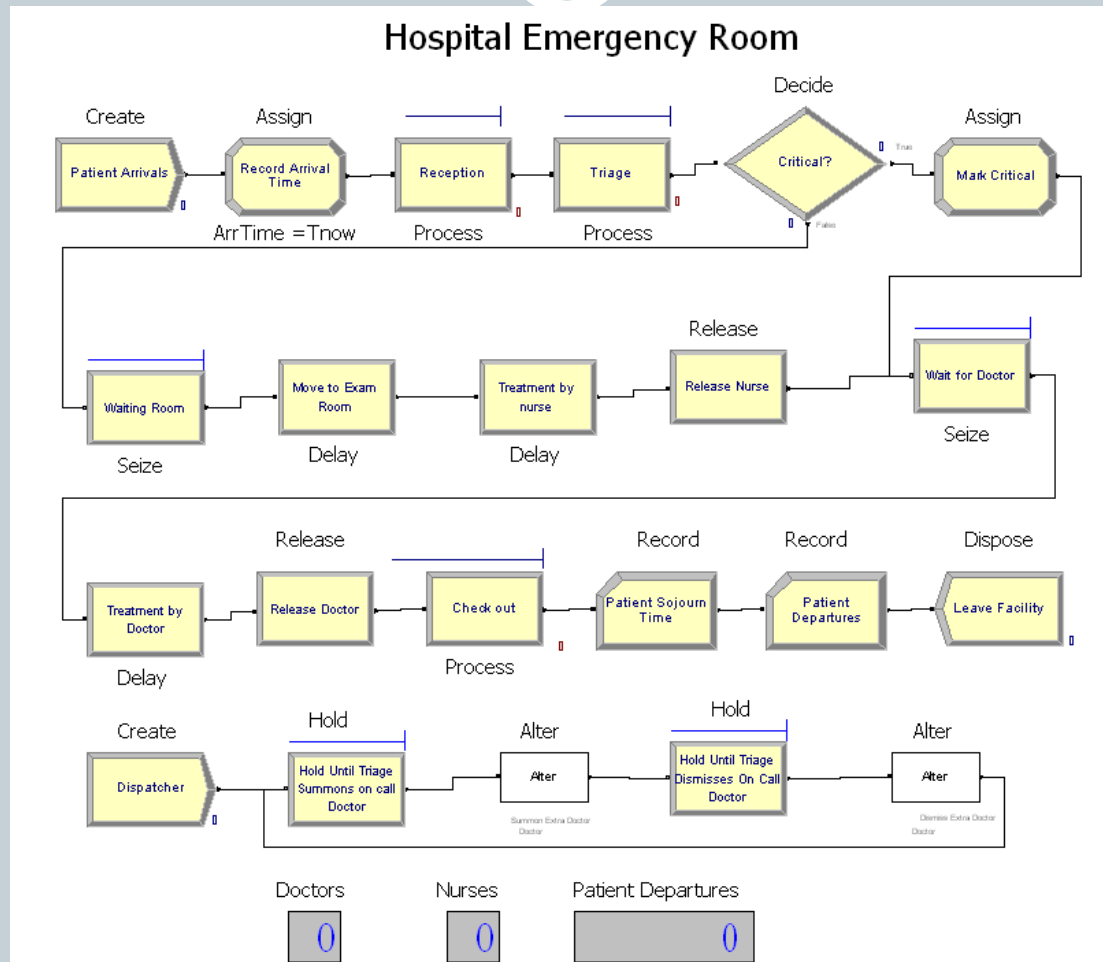
Serious Games & Simulation Modeling



Serious Game Design Disciplines

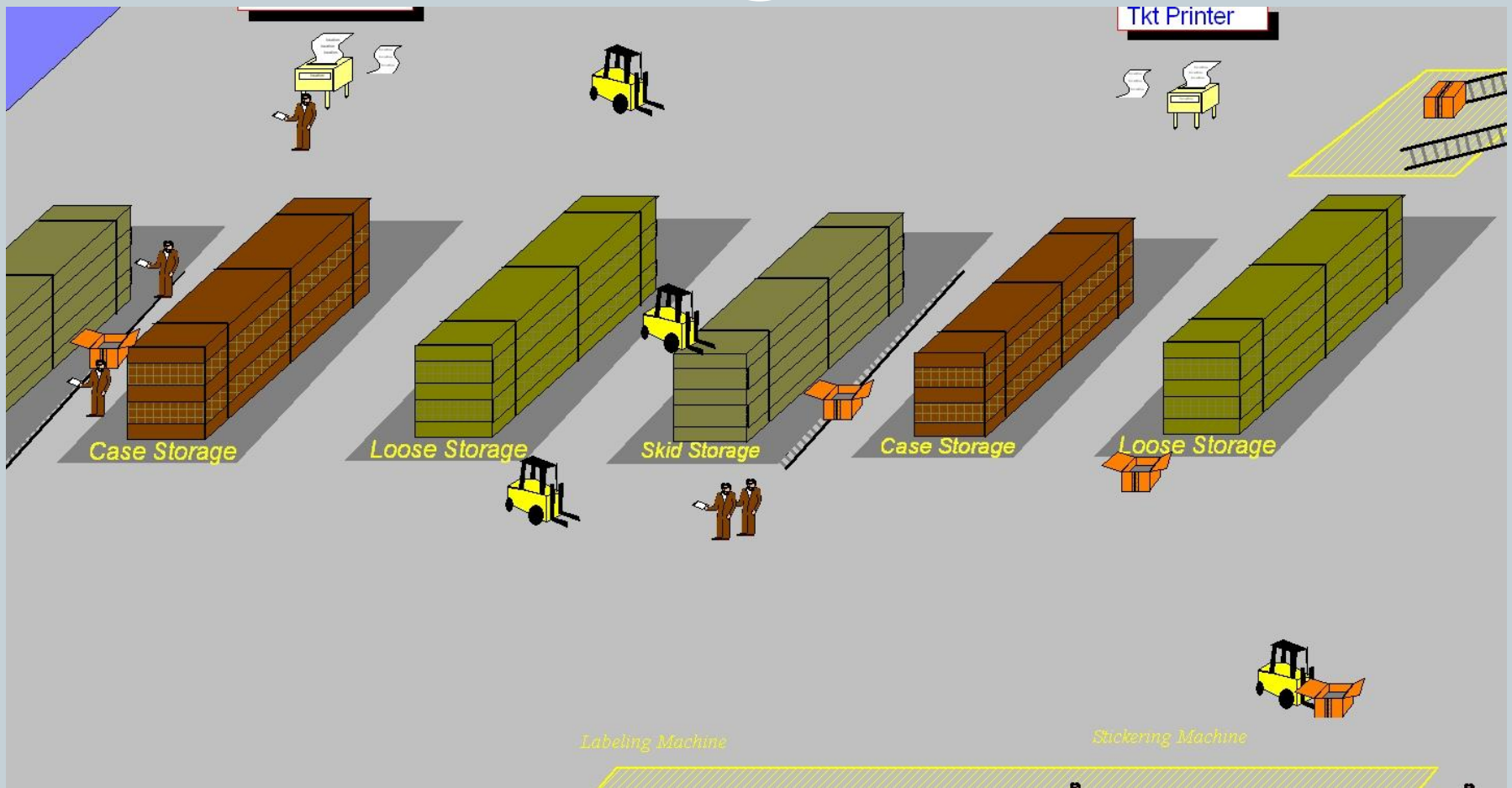


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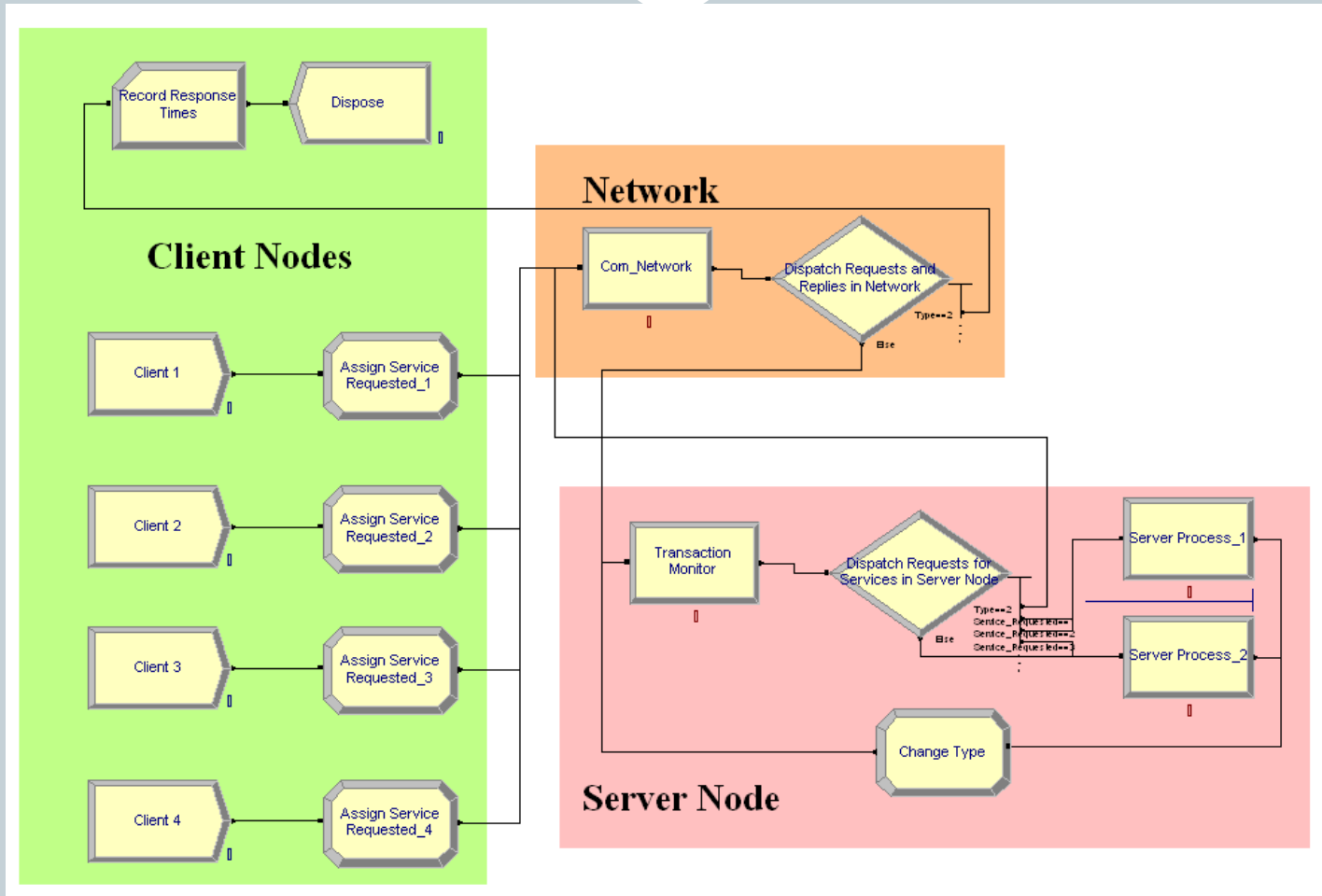
DES model in Arena

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DES model animation view in Arena

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DES model in Arena

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NORTHROP GRUMMAN

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- Here is the description of the MODSIM 2009 serious games track:

Even before computers, people performed complex modeling and simulate activities – directing state-of-the-art technologies – to explore and understand complex phenomena. Over the years, computer hardware and software developments have made increasingly advanced computation covering a broader range of issues possible. *Recently, the application of game concepts, design and technologies has brought new perspectives to modeling and simulation. This track focuses on the area of “serious games” – the discipline that leverages game concepts, design and technology for modeling and simulation, training, advertisement, education and social change.*

<http://www.modsimworld2008.com/>

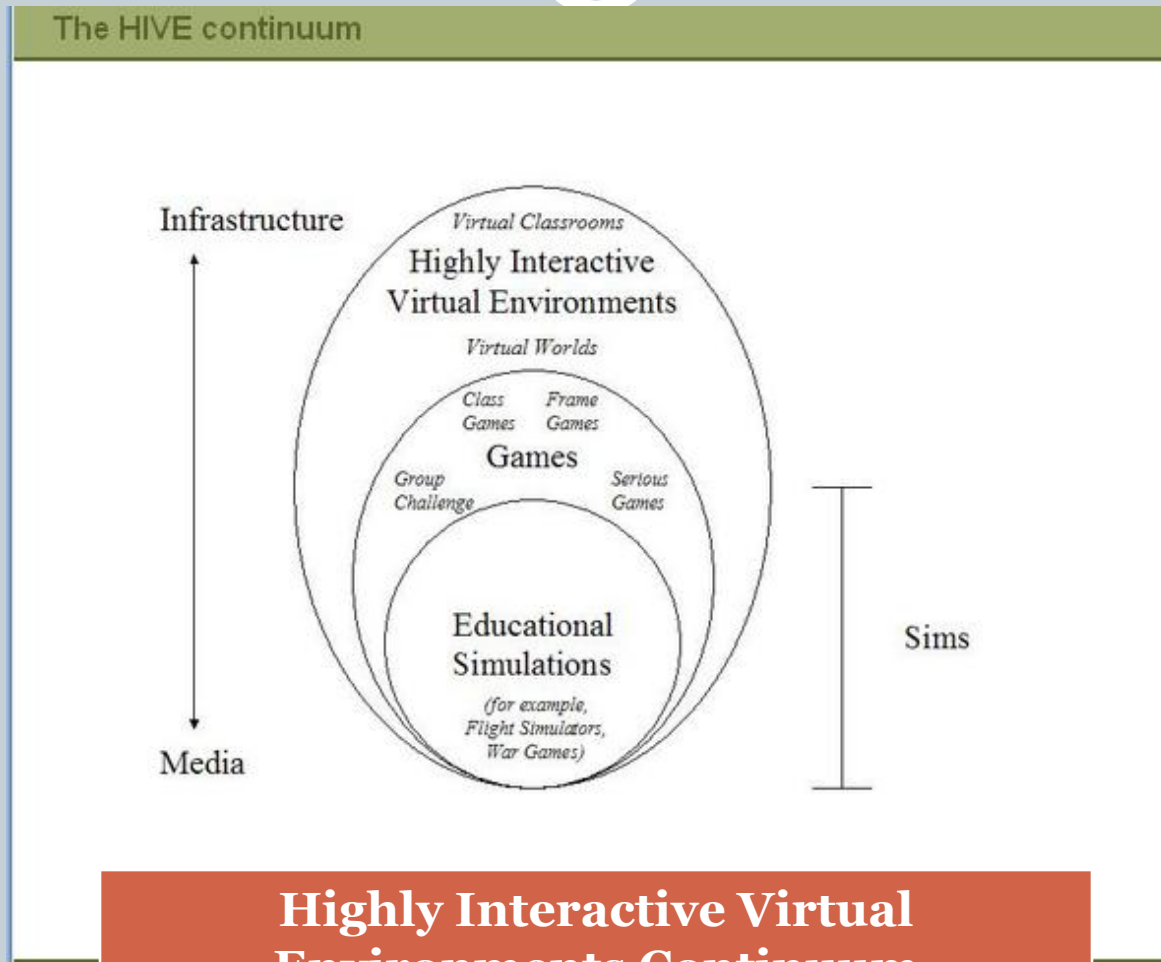
Serious Games & Simulation Modeling



- Here is the description of the MODSIM 2009 serious games track: (continued)

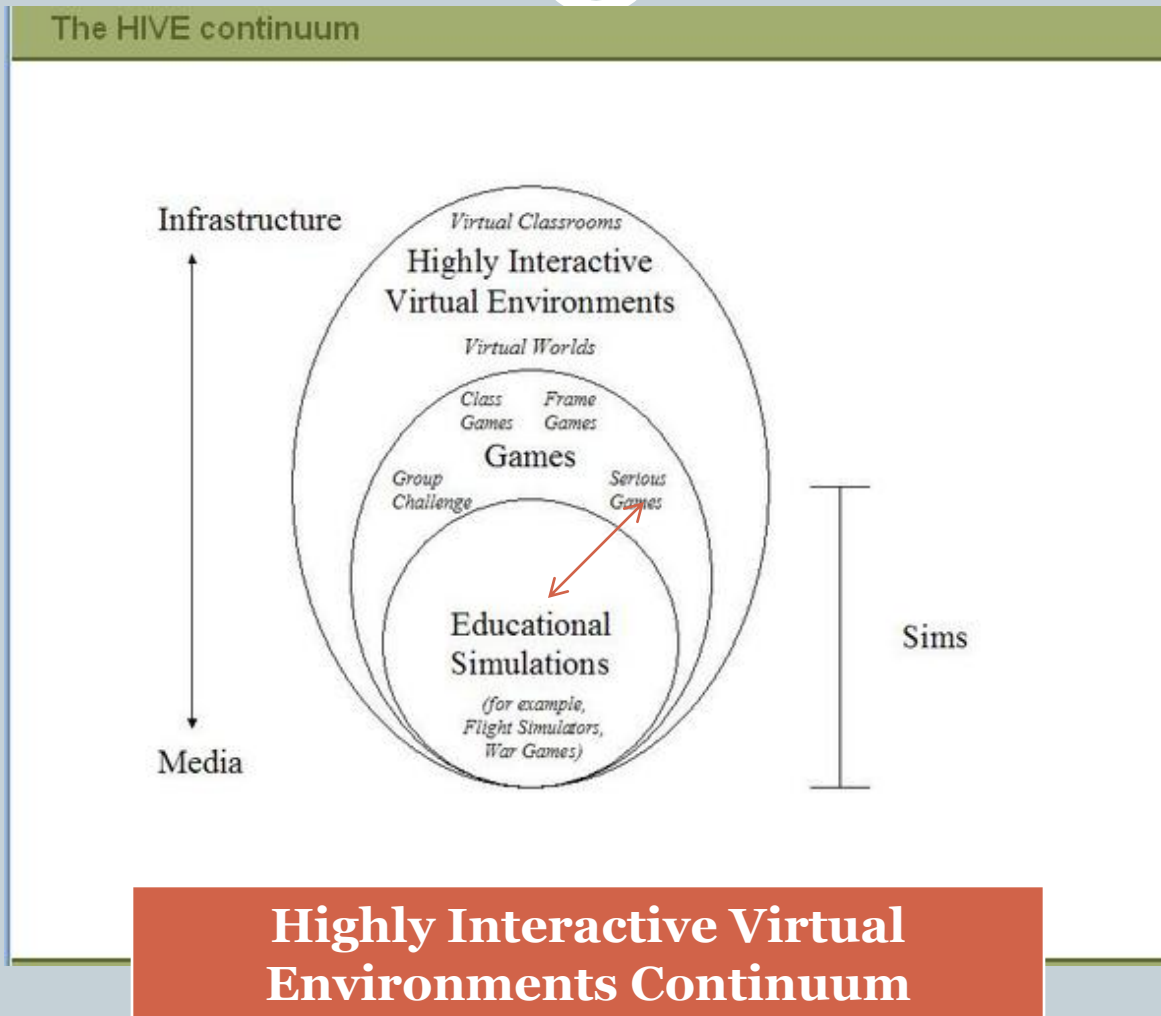
Presentations in this track will focus on exploring all dimensions of serious games including those relating to the broader MODSIM World 2009 tracks: Defense & Homeland Security, Education & Training, Engineering & Science, Health & Medicine, Transportation & Logistics, and the Human Dimension. By exploring the tools, technologies, design and implementations of serious games this track intends to challenge traditional perspectives to induce *new ideas* for how these capabilities can be applied to modern day challenges. (MODSIM, 2009)

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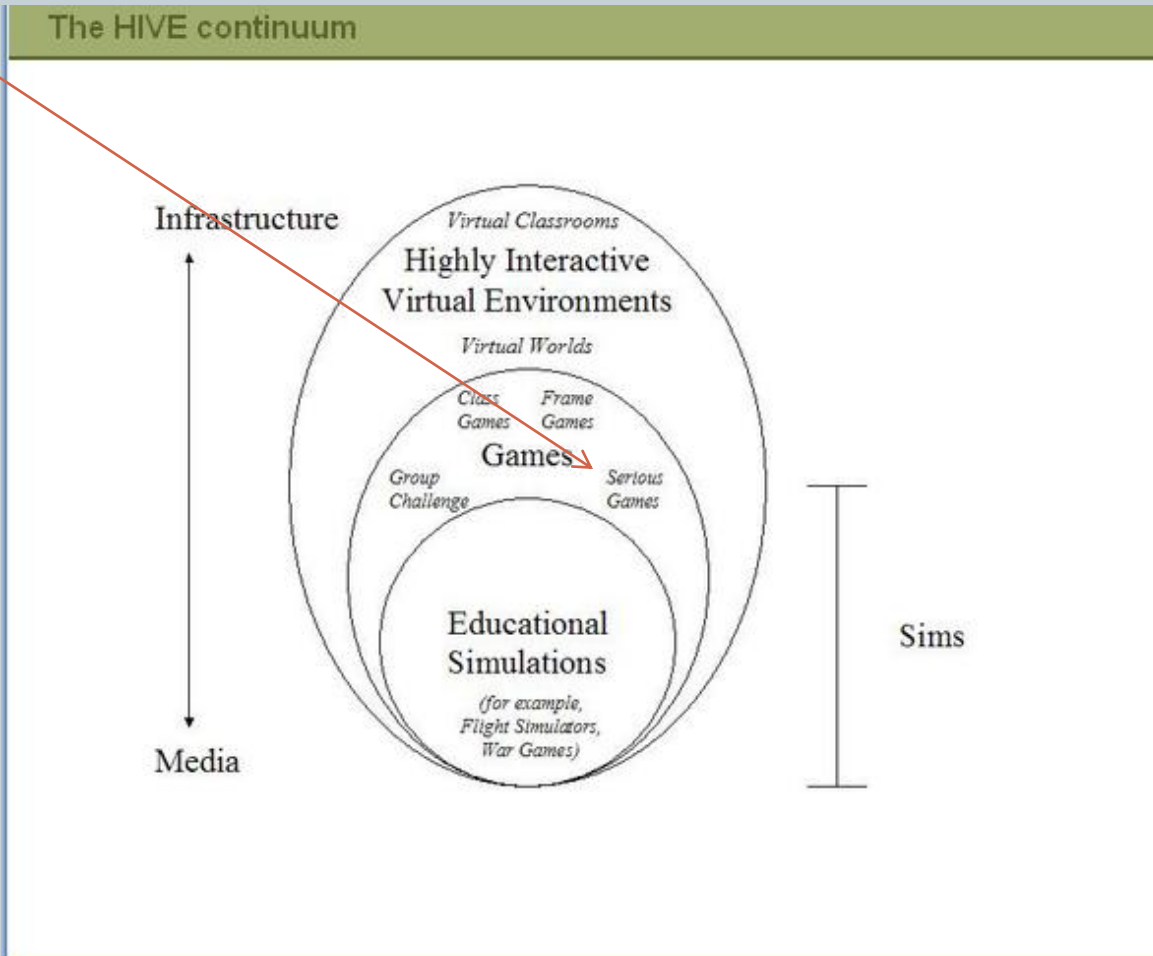
**Highly Interactive Virtual
Environments Continuum**

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DES as a serious game situated inside an interactive virtual world



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The screenshot displays the IBM 3D Innov8 2.0 interface. At the top, the IBM logo is on the left, and "United States [change]" is on the right. Below the logo is a search bar. A navigation menu includes "Home", "Solutions", "Services", "Products", "Support & downloads", and "My IBM". A welcome message reads "Welcome [IBM Sign in] [Register]".

The main content area features a virtual avatar named "Mike" in a central window. To the left of Mike are four smaller video thumbnails. To the right is a text box with the following text: "MIKE: Let's focus on productivity. How can we make this more efficient? Our call takers spend lots of time on simple problems, like warranty questions. That's an expensive waste of skills." Below the text box is a green "CONTINUE" button.

Below the video area is a 3D process flow diagram on a dark grey floor. The flow starts with a green ball on the left, leading to a box labeled "COLLECT CALL INFO" above a "VOICE RESPONSE UNIT" label. A blue arrow points to a decision diamond labeled "NFLEX?". From the diamond, two paths emerge: one goes up to a box labeled "LOW SKILL", and the other goes down to a box labeled "HIGH SKILL". Both paths then merge and lead to a box labeled "SURVEY CUST. SAT." above a red ring on the right.

At the bottom of the interface, the score is "SCORE: 000000" and the best score is "BEST SCORE: BOU:20423". Below the score are links for "E-mail this page", "Print this page", "Digg this", and "Save to del.icio.us". At the very bottom, there are links for "About IBM" and "Privacy".

Demo of 3D Innov8 2.0 – the avatar

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20 Minute Group Activity–Using the Innov8 2.0 Online Simulator

- Group members pair up (2 pairs/each group).
- Point your browser to:

<http://www-01.ibm.com/software/solutions/soa/innov8/index.html>

- Choose the Smarter Customer Service Scenario and work through it to the end. Make notes of the choices you make and why. Be sure to take screen shots (you can use <http://www.icyte.com/> software to keep track).
- This is a business process management simulator.
- Your goal is to relate this simulator to the business process reengineering article you read and to imagine what it would be like to embed Arena (or some such DES) into this simulator or others like it.
- Pairs report to each other. Each group create one response and post to Bb Discussion Forum. Then, groups report to the class.

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Class discussion about Innov8 2.0 and Arena embedded in the context of business process reengineering.

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MIKE: Take a look below to see how the deployment of your solution has affected the business ecosystem. Roll over the customer location and call centers for more feedback.

Mike

KEY PERFORMANCE INDICATORS

PROJECTED REVENUE: \$6, \$0.85

AVERAGE CALL TIME: 4.75, 7.06

SCORE: 012174 BEST SCORE: BOU:20423

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Innov8 2.0 and Arena embedded in the context of business process reengineering.

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MIKE: Take a look below to see how the deployment of your solution has affected the business ecosystem. Roll over the customer location and call centers for more feedback.

Mike

KEY PERFORMANCE INDICATORS

Metric	Value
PROJECTED REVENUE	\$6
AVERAGE CALL TIME	7.06

SCORE: 012174 BEST SCORE: BOU:20423

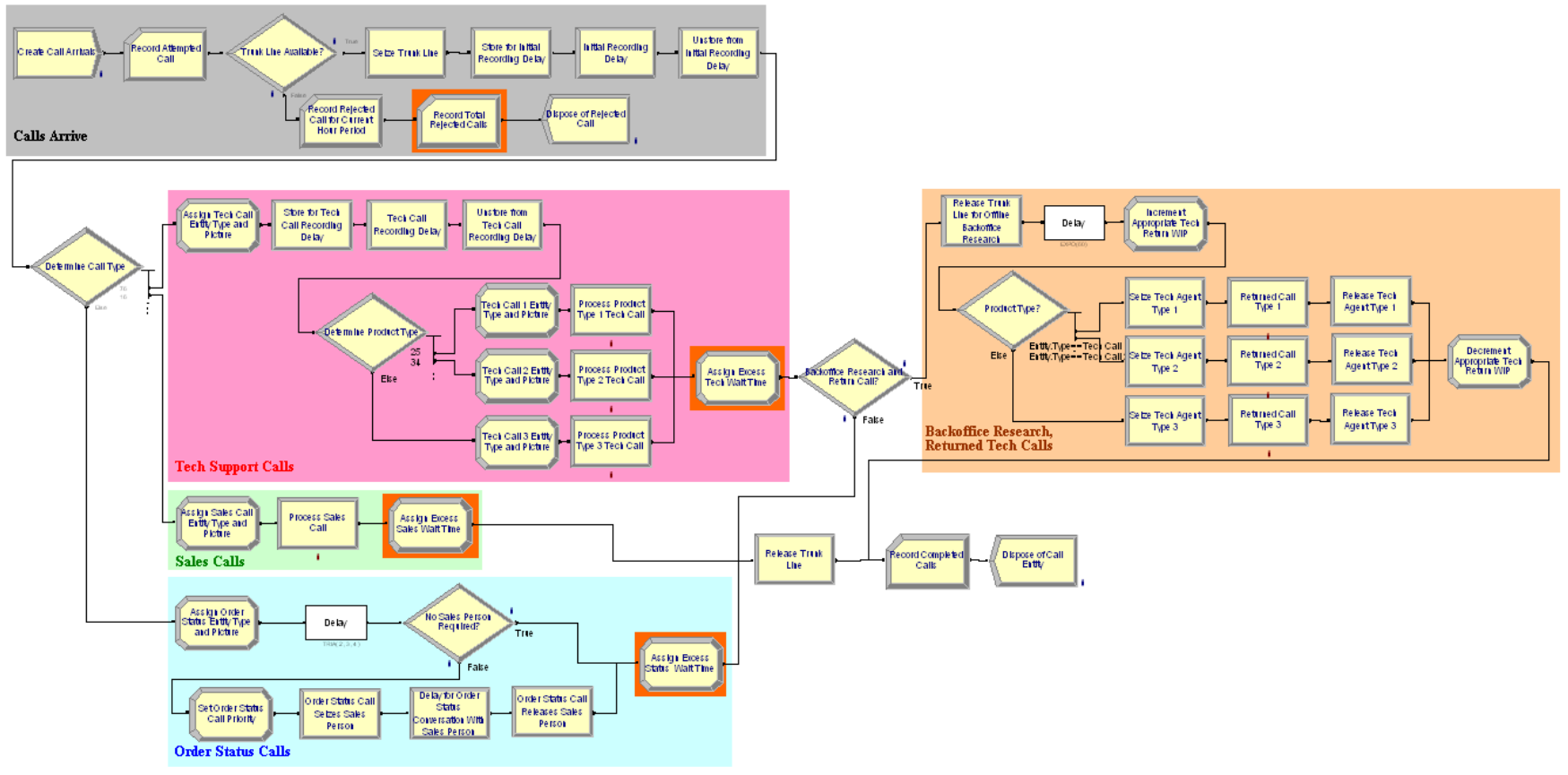
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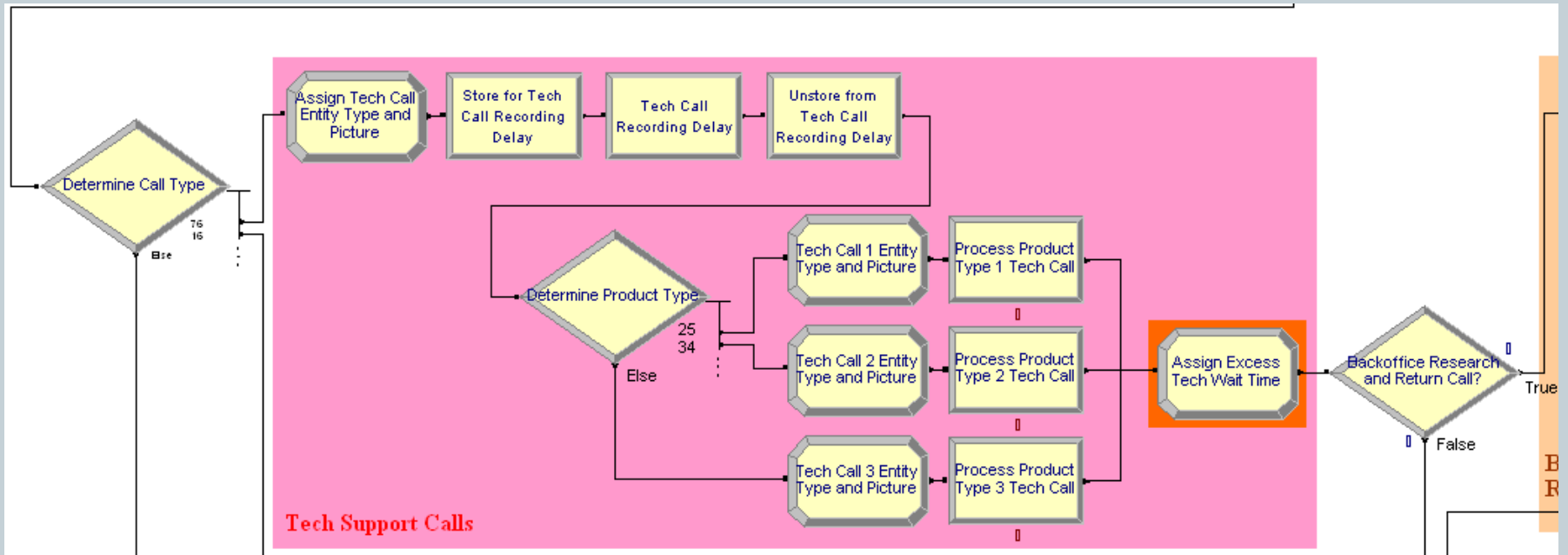
DES Call Center in Arena



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DES Call Center in Arena: Tech Support part

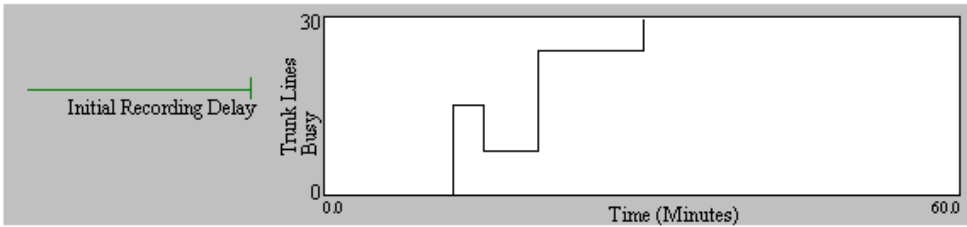


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DES Call Center in Arena: Graphical output

Model 5-3
Call Center, Version 3



WIP

Tech 1 Online

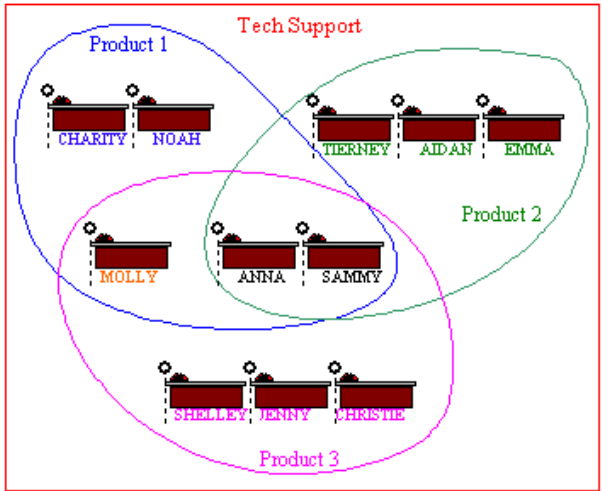
Tech 2 Online

Tech 3 Online

Offline Backoffice Research

Sales

Order-Status Delay



Serious Games & Simulation Modeling

Proposal to situate a DES serious game inside an interactive virtual world

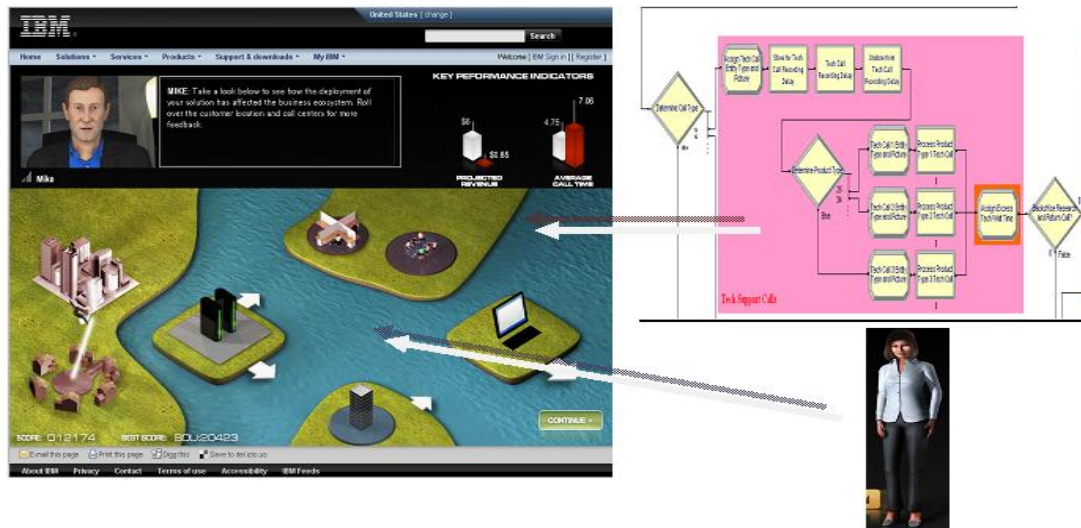


Figure 24. Full DES language capability embedded into a virtual world simulator such as Innov8 2.0 running in a cloud computing environment with user avatars immersed in a serious game.

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Proposal to situate a DES serious game inside an interactive virtual world



Figure 24. Full DES language capability embedded into a virtual world simulator such as Innov8 2.0 running in a cloud computing environment with user avatars immersed in a serious game.

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Proposal to situate a DES serious game inside an interactive virtual world



Figure 24. Full DES language capability embedded into a virtual world simulator such as Innov8 2.0 running in a cloud computing environment with user avatars immersed in a serious game.

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Proposal to situate a DES serious game inside an interactive virtual world



Figure 24. Full DES language capability embedded into a virtual world simulator such as Innov8 2.0 running in a cloud computing environment with user avatars immersed in a serious game.

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Homework Assignment – 10 Page (max) paper – library and internet

1. In 3 double-spaced pages, summarize the relationship between discrete-event simulation and serious games.
2. In 3 double-spaced pages explain and describe how business process reengineering (aka, BPM) concepts are taught and tested in IBM's Innov8 2.0 simulator.
3. In 4 double-spaced pages speculate how DES can be embedded in a serious game simulation/simulator and run in a cloud research is encouraged.
4. computing environment. Go beyond the instructor's ideas.

Post the completed paper to Bb Assignments page prior to our next class. You will be expected to discuss your paper and your ideas in class.

Paper graded on correctness, clarity, feasibility and creativity of your ideas.