

Using Technology and Innovation to Simulate Daily Life

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I knew something was up when I saw my daughter shouting at our computer, scolding one of her Sims—a simulated male who kept making a mess of his house. To undo the damage, my exasperated daughter had to give him specific and detailed cleaning instructions. Just like a guy!

Yet hers must have been the sort of reaction Will Wright dreamt of when he first settled on the concept of *The Sims* several years ago: To create a synthetic dollhouse and embody it in a computer game. Besides topping sales charts and generating endless discussions among computer gamers, *The Sims* has received attention from such prestigious publications as *The New York Times* and *The Wall Street Journal*, where Dean Takahashi (9 July 1999, Page B1) points out that “In an industry best known for blood and gore, computer-game designer Will Wright is an alternative thinker. Intellectual may be more like it.”

Far more than a dollhouse, *The Sims* evokes comparisons to a Greek myth in which you can play the deity, manipulating the lives of unaware humans. The trouble with this model—and what makes the game so intriguing—is that just like mortals in Greek mythology, your Sims often frustrate your plans with their own autonomy.

Moreover, Wright’s game demonstrates how game development can influence computer science. *The Sims* achieves its success through both advanced computing technology and an understanding of its users. It brings players into the

game through a combination of great technology, a believable simulation environment, a superb user interface, and a fun game design.

An original design, superb interface, and extraordinary AI combine to make a computer game of everyday life more compelling than the reality it models.

PAST AS PROLOGUE

The Sims recalls two previous efforts: The 1986 Commodore 64 game *Little Computer People* and the 1996 Tamagotchi *Virtual Pets*. In *Little Computer People*, developed by David Crane and Sam Nelson for Activision, you control the life of a minute person who has come to inhabit your computer. You interact with your guest by typing keywords. Activision still sells a version of the game for Windows, and a shareware version can be found at http://members.xoom.com/_XMCM/lcp_research/links.htm.

Debuting first in Japan and a year later in the West, the Tamagotchi were sold in toy stores as a tiny handheld LCD video game attached to a key chain or bracelet. The game’s object is to simulate the proper care of a virtual chicken, accomplished through performing the digital analog of certain parental responsibilities that include feeding, playing games, scolding, medicating, and cleaning up after the Tamagotchi (see [\[Identity/FINAL/bac.htm#1\]\(http://info.berkeley.edu/courses/is296a-3/s97/Focus/Identity/FINAL/bac.htm#1\)\).](http://info.berkeley.edu/courses/is296a-3/s97/Focus/</p>
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With *The Sims*, however, Wright has created a deeper game that embodies a philosophy based on the writings of Christopher W. Alexander, an Austrian-born architect long popular among software engineers. Alexander developed a theory of “fit” to describe how homes and sites work spatially and psychologically (http://www.greatbuildings.com/gbc/architects/Christopher_Alexander.html).

For Wright, basing his work on the theories of leading thinkers is familiar territory. *The Sims*’ predecessor, *SimCity*, draws on the urban planning theories of MIT’s Jay Forrester. *SimCity* lets players construct and manage whole cities and respond to crises like fires and earthquakes. (Information on the latest version in the series, *SimCity 3000*, can be found

at <http://www.simcity.com>.) *The Sims*, however, offers a much more intimate experience. The game works at the level of a single household you create and manage. You control every aspect of your Sims’ lives, from searching for a job, to buying furniture, to helping them develop relationships with their friends and lovers.

NUTS AND BOLTS

Your Sim family measures its success in the game by tracking its personal wealth in an ongoing effort to acquire new material items, bigger homes, and higher paying jobs. Although many game reviewers have criticized the Sims materialistic pursuits, it would have been difficult to construct the game otherwise: Good game play requires a measurable objective.

That game play is realistic and logical. To obtain good jobs your Sims need to network with friends, can’t miss work without risking termination, and must keep their kids happy so that they’ll obtain A’s. Thus the primary skill you need to play the game is the ability to plan

and queue instructions for your Sims. Appropriately, according to Will, the code name for The Sims was Jefferson—as in Thomas Jefferson of “life, liberty, and the pursuit of happiness” fame.

Agent architecture

Although The Sims represents a micro-perspective of urban life, its design is far more complex than the SimCity series. As Maxis general manager Luc Barthelet explained, SimCity’s AI architecture most closely resembles cellular automata. The Sims AI, on the other hand, takes an agent approach. In his notes for Imagina 99, Jamie Doorbos, the simulation engineer for The Sims, states that “The Sims uses a fairly straightforward model to simulate human behavior. Several sets of variables in each character describe and control the instantaneous needs of a person, their preferences for activities, their abilities, and their relationships to other Sims and their environment.”

Characters have motives such as hunger, while players can adjust personality values such as neatness. Using these parameters, you could even create the Odd Couple, if you wished. The real intelligence, however, lies embedded in the objects with which the Sims interact. To implement this design, Doorbos wrote a real-time scripting language called Sim-Antics to create object behaviors. Sim-Antics has a visual programming front end called Edith, which is similar to the object-oriented graphics program Visio.

Individual Sims achieve autonomy by attempting to find the best action for every object and each interaction with that object. To avoid performance hits from state explosion, however, not every object is queried every time a Sim searches for the best action. The Sims must search, move, reach, and use the wide variety of objects available in the Sim world, such as chairs, telephones, showers, and so on.

The game determines how each Sim moves via path planning that uses a modified A* search algorithm. This algorithm finds the optimal path from the Sim to its goal by using a best-first search in which the cost of any search state is the cost of getting to the state from the start state, plus a heuristic estimate of the distance

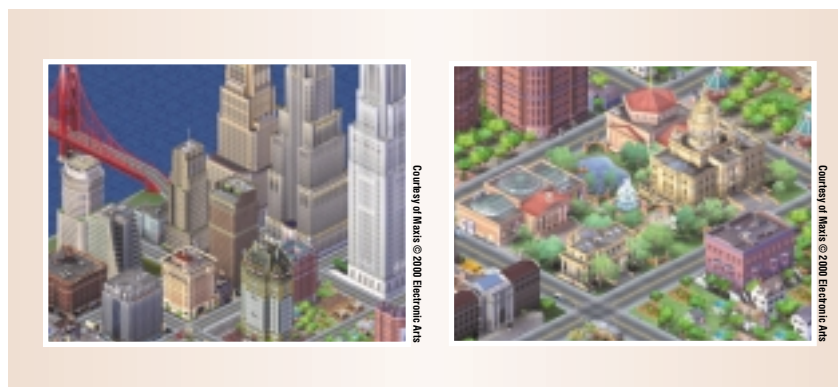


Figure 1. SimCity, Will Wright’s most famous game to date, looks at city management from a macroperspective. Inspired by the urban planning theories of MIT’s Jay Forrester, the game confronts players with several economic and political challenges, then throws random disasters into the mix to keep the excitement level high.

from the state to the goal.

Each object in the world describes to the Sims how it operates. For example, a stove would contain the behaviors put food in, cook food, take food out, serve food, and eat at the table. The objects advertise their capability to satisfy each Sim’s needs, such as hunger, as part of an interaction protocol. The benefit attenuates depending on distance and intensity of need. So if a Sim isn’t very hungry, it’s unlikely to forage by moving from another room to the kitchen.

User interface

Eric Bowman is the chief graphics developer for The Sims. He and his team chose to present the Sim household from an isometric view. Bowman’s team also developed the attractive sprite animations that key off the behaviors of each Sim. Sims sometimes turn to the player to express themselves with a combination of visual conversation balloons and audio clips of the unintelligible Sim language SimSpeak—a dialect that many gamers say sounds like the gibberish adults mouth on Peanuts animated specials. As Sims move through their homes, the walls become cutouts to keep the Sims’ actions visible.

IMMERSIVE GAMEPLAY

Despite all its technical bells and whistles, The Sims’ ultimate beauty lies in its ability to immerse you in the Sim world and captivate you with each Sim’s auton-

omy. Will Wright and his team have done extensive research into what makes this game attractive to players. The role of the player is to set the stage and make the key decisions about a Sim’s life. The player must decide to build or buy the house, design or modify it appropriately, make appliance and furniture purchase decisions, design the personalities of each Sim family member, select the Sims’ jobs, and overcome the Sims’ tendency to obey their baser instincts, such as pleasure seeking, which interfere with their ability to achieve happiness. For example, a Sim may find it gratifying to fall in love with his neighbor’s wife, but doing so will probably destroy both Sim families—a consequence that transforms the game into a morality play. The game also encompasses tragedy: Your Sims can die.

The simplicity of the game’s user interface deepens player immersion. Although always present, the controls remain unobtrusive. Most all input occurs via mouse, and the game can be learned in a few minutes from the tutorial that introduces you to the Newbie family. (See Don Hopkins’ Web site at <http://catalog.com/hopkins/simcity/WillWright.htm> for more insights into designing simulation user interfaces. Hopkins is a member of The Sims programming team.)

Much like SimCity, The Sims also allows a variety of extensions for customizing players’ worlds. Players can create new body types called “skins” for their characters and can even apply their



(a)



(b)



(c)

Figure 2. Unlike *SimCity*, *The Sims* works at a more intimate, microperspective level. Characters can (a) pursue a variety of leisure activities to gain skills and increase their happiness; (b) network with others to acquire better jobs, make friends, and find romance; or (c) forego all these activities for a solitary and depressing life as a couch potato.

own textures from digital photos. It's spooky to see Sims moving through the game wearing real people's faces.

Like many of the gamers who discuss the game on Usenet, my teenage kids enjoy designing their own Sim homes. With the appropriate cheat codes, you can even give yourself the unlimited funds you'll need to build your dream house.

BUILDING A COMMUNITY OF PLAYERS

Another Sims innovation lets players share their families with others by publishing their stories on The Sims Web site at <http://www.thesims.com>. Maxis technical director Grantley Day has built the equivalent of a major e-commerce site to support the game, with over half a terabyte in storage. Players are encouraged to write about their families and chat online with other players. Each story is housed in an online family album that includes in-game screen shots, an exported Web page, and uploaded files of Sim homes and families. One home uploaded to the site is worth 175 million Simoleons, the Sim currency, and occupies 29,000 square feet. The site also has new objects available—such as clocks, a slot machine, and a moosehead—and will likely contain more objects created by third parties with the release of the Edith object editor. Maxis hopes that all these features will work to build a community of players emotionally involved in the game.

According to Wright, Maxis plans to release the SimAntics language and compiler so that the developer and hardcore player community can develop new objects and behaviors. "We're in the process now of putting together what information we can about how our file formats and object structures work.... I'll probably put this stuff on our server but not link it to our main site," Wright said. "I don't want our casual users to download this and then get all confused about it. I'd rather just post the link in a few hardcore areas—such as Usenet boards—and mail it to technical people who request it. Unfortunately we can't afford the programmer's time to fully support this stuff so it will mostly be a WYSIWYG, no questions please, figure it out if you can type of thing."

Will Wright and his team are creating a large story on top of the many small stories and myths invented by the millions of people who buy his game. The technology behind The Sims may be transparent, but the connection between players and their synthetic characters is real. ★

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