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Abstract:	The article focuses on the development of the video game Zoo Tycoon 2 by video-game production company Blue Fang Games. The development begins with the designers' creation of the story. Lead game designer Linda Currie comments on communicating ideas with co-designers. Software expert Matt Kimmel compared video game programming with a house construction.

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Gamers Get Down to Business

It takes a team to create a cool video game.
Uh-oh! Maybe that Bengal tiger exhibit should have been constructed with a taller fence. With no warning at all, two of the huge cats have hopped the enclosure and are chasing screaming guests around the park! Better rein them in before anybody gets hurt!...

Anyone playing the video game Zoo Tycoon 2 (ZT2) learns quickly that running a zoo involves many decisions and challenges--from stocking the zoo with animals and caring for them, to attracting zoo visitors and keeping them entertained and safe, to managing costs.

Creating ZT2 from a huge collection of ideas to one final product involved a lot of challenges too. Team members at Blue Fang Games, a video-game production company in Waltham, Mass., applied their creativity and technical skills to about 8,000 separate tasks in developing the game. For example, they imagined how each animal would look, right down to the cone-shaped tooth of the Nile crocodile. They created a three-dimensional model and a skeletal structure for each animal, animated it, and placed it inside the game. "[The game] needs to be fun. It needs to look good, sound good," says J. R. Suprenant, the producer of ZT2. "It really takes a lot of teamwork."

CREATING THE STORY
Game development begins with a designer's vision. Designers figure out the story behind the game and how it will be played. "During the design phase, you're dreaming it all up to start with," says Linda Currie, ZT2's lead game designer. Currie notes that even when

creating a sequel, as ZT2 is, "there is still a point where you have a blank slate.... What is my new story? Who are my new characters?"

Some ZT2-specific questions that designers pondered: Could a moat or a waterfall make an animal's habitat more exciting? How would the player's experience be different if it was possible to walk around the zoo as a guest rather than as a zookeeper? What kinds of concession stands should a zoo offer its patrons?

Currie's first big task was to dream up photo-taking actions for players. She planned when the action would come up during the game and what reward to offer. For example, a player gets points for photographing animals performing specific activities, such as a cheetah eating meat out of an artificial carcass. But the player can't complete that task until his or her zoo has reached a certain level of success. Currie-had to decide what that level would be.

Communicating ideas with other departments is key. Designers need to make sure their ideas are both possible and appealing. "I don't think a day goes by, even an hour, that I haven't talked to someone in engineering or art," says Currie.

The details of the game can be challenging. "It's much more difficult than it sounds-- thinking through what you're experiencing during the game," Currie says. But it's a great job for a creative person who loves dreaming up stories and also enjoys the logic puzzle of planning a game.

CONSTRUCTING THE CODE

Designers' outlines become virtual reality as their ideas are split up for different engineers to program. "[Creating a game is] like building a house from the ground up, brick by brick," says Matt Kimmel, a software expert who oversees a team of 15 engineers.

In the beginning of the programming process, the engineers already know the game's basic story. They'll have spoken with designers about which game features are possible (or impossible) within technology and time constraints. In the ideal world, there's time for it all, Kimmel explains. But when a publisher is paying a developer to accomplish a job, meeting deadlines is serious business.

At each deadline, or milestone, in the programming process, Blue Fang submits the game to Microsoft, which reports back about any bugs that need squashing. Suppose the testers find that when a player takes a certain action, an animal munches on its scratching post instead of its food. Engineers would then get busy writing the code that makes the animal "see" its toy as a toy, not as dinner.

Kimmel appreciates working within Blue Fang's team environment, where everyone shares ideas and people solve problems together. "It's a rare day that I come in and feel like things haven't gelled," he says.

TWENTY LIONS LATER

If it weren't for Blue Fang's concept artists, three-dimensional modelers, texture artists, and animators, programming code would never come to life.

Art manager Fred Galpern especially likes the concept art process, in which artists are free to draw their wildest imagined illustrations of the various characters in the game. The first round of ZT2 concepts included 20 drawings of possible lion styles, from which one was selected.

It sounds almost like a contest, but it's not. "It's just about finding the best idea," Galpern says. "More often than not, the best ideas are collaborative, a combination of drawings."

Capturing the vision of designers is equally important. "Because [the designers] are not artists, they need us to execute," he notes. The artists ask, for example, what the lions need to be able to do. The team knows a missed art deadline sets back others in the team, so "on time" and "done right" are crucial.

An example of "not right" took place during a deadline crunch. The animals started walking straight through their fences! Luckily, the production schedule leaves time at the end to fix bugs like that. After an artist suggested a possible cause of the animals' illogical powers, several workers got together and solved the problem.

IS THIS GAME WORKING?

How would you like to play video games for a living? That's Rick Baker's job as Blue Fang's senior quality-assurance (QA) engineer. He tests the game to make sure it doesn't crash or run improperly.

But he's swatting bugs at the same time. When animals chase zoo guests or guests continually walk in circles for no apparent reason, a programming bug is obvious. Sometimes Baker anticipates a problem with a new game feature and tests it. Other bugs aren't spotted until Microsoft's extensive lab runs the game through numerous tests. ZT2's bug database contained more than 4,000 specimens. Baker then works with other departments to fix the problems.

Although QA jobs are for detail-oriented people, it's not necessary to be a perfectionist. "It's impossible to find and fix all the bugs," Baker says. "Every time you fix one, there's a certain probability that you'll introduce another," so the focus is on major bugs. "In the end, you have this really cool game you can be proud of."

GETTING THE JOB DONE

J. R. Suprenant has the greatest sense of pride in the team's work when he's all alone. Whether it's 7 p.m., midnight, or sunrise the next morning, he's the last one in the office at milestone time, sending the product to Microsoft. The building is dark and quiet, and he has the chance to think back on the merry chaos of the previous week. "To think about everything we get accomplished [is] very rewarding," he says. As a producer, Suprenant keeps the team moving.

He ensures deadlines are hit and organizes weekly update meetings and and demos of the game. Toward the end of each milestone, the team focuses on a master to-do list that he keeps. As team members complete one task, he redirects them to help out on other tasks. When obstacles come up, he informs Microsoft so that there are no surprises later.

When Suprenant is in a store, he sometimes sees a shopper pick up a ZT2 box, look at it, and put it in his or her shopping cart. "That," the producer says, "is worth more than anything."

SMART MOVE!

With U.S. spending on video games projected to increase from $7.6 billion in 2003 to $15.3 billion in 2008 (with even faster growth expected in the Asia-Pacific region), choosing a career in game development is most likely a winning move. Console games make up the largest segment of the market, and the online games market is also expected to grow. Spending on PC games is expected to drop.

SOURCE: GLOBAL ENTERTAINMENT AND MEDIA OUTLOOK: 2004-2008, PRICEWATERHOUSECOOPERS

Get in the Game
Considering a career in video games? Here's what Blue Fang staffers say you'll need to succeed in various positions.

ARTIST

Educational background: illustration, fine arts

Skills/Characteristics needed: drawing sculpting, animation, problem-solving skills: proficiency in design software and hardware: openness to criticism: ability to give constructive feedback

DESIGNER

Educational background: video game design. Liberal arts, creative writing, communications, computer science

Skills/Characteristics needed: creativity: communication and interpersonal skills: flexibility: open-mindedness: attention to detail

ENGINEER

Educational background: computer science, software engineering Skills/Characteristics needed: computer programming: dedication: interpersonal skills

PRODUCER

Educational background: business/ management

Skills/Characteristics needed: Management (people and schedules), organizational, and research skills: attention to detail: ability to see big picture: responsible attitude: ability to handle stress

QUALITY ASSURANCE ENGINEER

Educational background: computer science

Skills/Characteristics needed: computer troubleshooting and analytical skills: attention to detail

PHOTO (COLOR): The wild world of Zoo Tycoon 2 was created by the team at Blue Fang Games (center row, second from left).

PHOTO (COLOR): While an artist creates textures for a 3-D animal model (left), the engineering team members share updates of their progress on the game development (right).

PHOTO (COLOR): Computer illustrators and animators bring a tiger to virtual life.

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By Melissa M. Ezarik