

# WIRED

July 1995

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## Richard Dawkins:

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Jonny looks around, confused, his train of thought disrupted. He collects himself and stares at the teacher with a steady eye.

# Demo or Die!

"I want to code demos," he says, his words becoming stronger and more confident as he speaks. "I want to write something that will change people's perception of reality. I want them to walk away from the computer dazed, unsure of their footing and eyesight. I want to write something that will reach out of the screen and grab them, make their heartbeats and breathing slow to almost a halt. I want to write something they are reluctant to leave, knowing that nothing they experience that day will be quite as real, as insightful, as good. I want to write demos."

Silence. The class and the teacher stare at Jonny, stunned. It is the teacher's turn to be confused. Jonny blushes, feeling that something more is required. "Either that or I want to be a fireman."  
— from *PC Demos Explained*, on the Web at <http://www.mcs.net/~trixter/html/demos.html>.

You're a teen hacker,  
you want to impress

by Dave Green

Demos are the last bastion of passionate, enthusiast-only programming.

It's not a true story, but it sums up the demo coding ethos just fine. If you're young, like computers, and have plenty of free time, there are three main ways to impress your peers. You can hack into other people's systems, you can crack the copy protection on games software, or you can code demos.

Years ago, young people used the term *demo* as shorthand for a political march or rally. Now, to thousands of computer-obsessed kids across Europe (and a growing number in the US), it's more likely to mean a short, self-contained graphics-and-sound demonstration program. But it isn't a demonstration of a game or business application, and it hasn't been commissioned for

any ulterior commercial purpose. The only thing it demonstrates are the skills of its programmer—or, more often, the skills of a group of coders, graphic artists, and musicians who've grouped together. And the only reason it has been written is to show off.

Demos are the last bastion of passionate, crazed, enthusiast-only programming, crafted purely for the hell of it by inspired teenagers working entirely in their spare time. The teens create jaw-dropping audiovisual effects beyond the dreams of most multimedia designers. Constantly striving to better their rivals, devotees of the demo scene cram spectacular three- or four-minute presentations onto a single 800-Kbyte floppy disk, fitting them

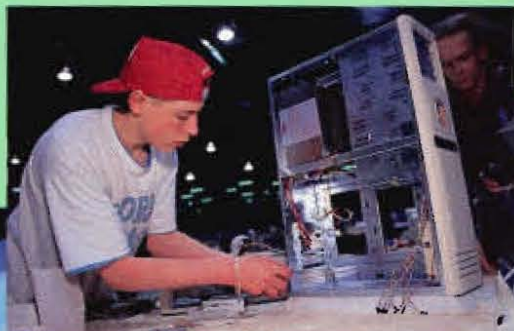
into tiny amounts of memory. Freely spread by disk-swapping over bulletin boards and other sites on the Internet, then re-played on home computers all over the planet, each demo becomes a piece of digital graffiti, proclaiming the superiority of the gang that created it. Demos are made by the rock-and-roll groups of code.

The demo scene is driven by competition, visible at its best in huge three- to five-day demo parties, which take place during the school holidays in mainland Europe. Thousands of young coders attend these events, their latest works proudly on display. Most demos follow a traditional structure—vivid animations, spinning polygons, and assorted

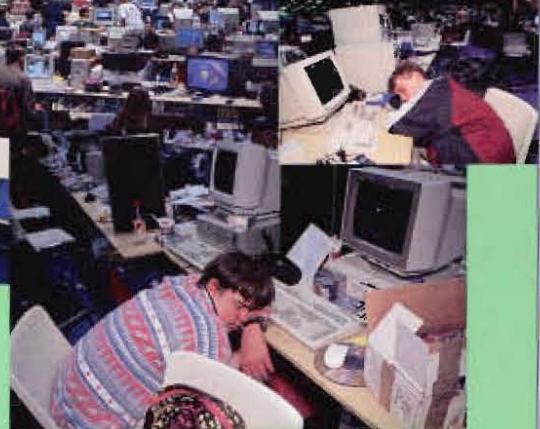
video effects, all pulsing to a techno, rock, or jazz soundtrack. (A second, quieter sequence scrolls the credits, comments, and greetings to other coders, often in charmingly bad English.) But the discussions and voting that decide the best are always heated and controversial, because what drives every demo coder is the overwhelming desire to create something new, something spectacular, something cool.

Despite growing European press coverage, demos have remained part of the computer underground—they first appeared in Northern Europe in the early '80s as add-on introductions to illegally "cracked" computer games. Terrified of playground piracy, software compa-

Demo parties combine reckless adolescent enthusiasm with hard-core technical advice.



emo code.



nies experimented with means of making their games disks copy-proof. For hard-bitten hackers sitting at home looking for a fresh programming challenge, this was like putting a red rag in front of a bull. They'd spend hours (or days) cracking the copy protection, and then, pleased with their achievements, would write a brief audiovisual intro sequence claiming credit for it before redistributing the pirated warez to their contacts and friends.

As the abilities of home computers (and programmers) grew, the intros to cracked games

Dave Green is the technology editor of Wired UK. Additional research for this piece came from Reward of Complex and Stelios of CnC'd.

became more and more impressive, and they began to get distributed in their own right. And so the demo scene was born.

Today's demo scene is packed with works of astonishing sophistication. Everyone you ask has a favorite: *Human Target*, from French coding team Melon Dezig, was one of the first to synchronize all the graphics to the music; the groundbreaking *Jesus on E's* by UK group LSD combines a rave soundtrack with flickering counterculture imagery. *Switchback* by Rebels takes you on a rendered high-speed roller coaster ride, while *State of the Art* by Spaceballs replays vast digitized video sequences as collections of animated polygons. The

coding groups responsible for these (and many other) titles average about two or three big releases a year, each representing many teen-hours of programming, art work, and design.

Until fairly recently, demos like these have been almost exclusively a European phenomenon, running on the Euro-coders' favorite home computer, the Commodore Amiga. Historically, demo origins can be traced to early 8-bit home micros like the Commodore 64 and Apple II, but demos (and their corresponding culture) really took off when Commodore's 16-bit Amiga hit the market in 1985, with its hi-res graphics, 4,000-color palette, powerful video handling, and four-channel digitized sound.

As one coder put it, "We could really start experimenting with all sorts of stuff that made noncomputer people turn their heads."

Like games before them, demos swiftly evolved to a point where they were too complex and time-consuming for individuals alone to write. Inevitably, coding groups appeared, featuring a minimum of a programmer, a graphics designer, and a musician. Sometimes these would be groups of school friends with a common interest in computers, although larger groups started to form, working across national boundaries via bulletin boards, e-mail, and the Internet. They exchanged music, pictures, code, and homemade development tools, but never met in person.

At first, these groups retained close links with the illegal pirate scene: traders would exchange demos for cracked games if they didn't have any warez of their own. "They were a currency at one point, a great currency to buy pirate games," explains ex-coder Jolyon Ralph, technical director of the Croydon, England-based Almathera Systems Ltd., publisher of several demo compilations.

This is still reflected in the demo scene's unique terminology – with its world of BBSes, busts (police raids on BBSes), and lamerz (noncoders, bad coders, or generally clueless individuals).

group) or stay with his friends in NVX – his mind was made up for him when NVX split up. Destiny then linked up with the famous Swedish group, Talent, so Oedipus formed a new group, Nebula, which he headed for a year, until arguments with co-manager Antichrist prompted him to take up an invitation from Pazza of LSD. Incidentally, Oedipus is 16.

Much of the demo scene's impetus came from the intense rivalry between manufacturers of two of the most popular 16-bit home computers of the time, the Commodore Amiga and the Atari 520ST. (In Europe, the high price

**Cyberman 2 by Complex shows w**



Ralph. "How do I prove that my Amiga's better?"

Competition between groups also helped advance the demo coder's art – Jolyon fondly recalls the BOB wars, an ongoing contest to animate the greatest number

**Nine Fingers, by Spaceballs, converts digitized video into animated polygons.**



Group members play with nicknames or handles, which means that news sheets (found on the scene's numerous bulletin boards and disk magazines) read like sports transfers or soap opera updates. They keep fans informed of new recruits and summarize the antics of existing members.

Groups form swiftly, poaching members from other teams; if your skills are in demand, you can expect to move around. Oedipus, currently with the UK group LSD, gives a detailed account of joining the relatively small group Trance UK as a C coder in April 1992: he was poached by rivals Nerve Axis (NVX), wondered whether to join Destiny (a larger

of IBM PC-compatibles kept them out of the home market until the early '90s.) In the early days, commercial software support was thin on the ground and technically disappointing, so users wrote

of BOBs (Blitter OBjects, or independently moving graphics) on an Amiga screen at one time. "Somebody released a demo saying, Look at this, we can get 64 BOBs running around on screen.



**LSD's Jesus on E's could easily pass for a low-budget pop**

their own routines to demonstrate their machine's superiority. "I've got an Amiga and my friend's got an ST," mimics Jolyon

So, of course then somebody said, 64? I can get 68. – 68? I can get 80. – 80? And so on... It got to around 200. One of our guys was

**Switchback by Rebels climaxes with a high-speed roller coaster ride.**



achieved in just 66 Kbytes.



a particular fan of the BOB war and was determined to win it. Eventually," says Jolyon, "it was won by someone who did infinite BOBs, but that was really a big cheat. But they were *all* cheats, so it didn't really matter."



Trained by cracking the protection on game disks, demo coders show little respect for the work of other programmers. Armed with memory-scanning routines called *rippers*, they can page through

demo scene handles Steve and THP.) "When Spaceballs's *State of the Art* first came out, it didn't run on every version of the Amiga operating system," he explains. "So Skid Row took it, disassembled it, fixed the bugs, then re-released it with a sarcastic message at the end."

Coders generally don't set themselves any restrictions. "There've been a lot of attempts to do 3-D *Doom*-style graphics on the Amiga," Steve smiles, "simply because it's difficult, because of the way the display hardware is set up. Which means everyone has to prove that it *can* be done." As a result, 3-D environments are a common feature on current demos, and coder Gengis (erstwhile member of the French group Complex, now in

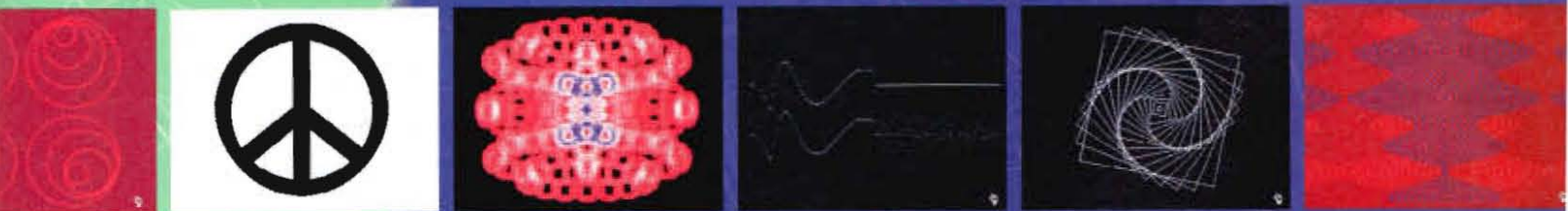
world environment of pirate bulletin boards – rather than how many useful commands you can add to the standard Unix kernel. It's how many assembler instructions you can execute in a single video frame (usually about one-fiftieth of a second). But the challenge, still, is to come up with the ultimate hack, the piece of code that makes other programmers stop and ask themselves, *How do they do that?*

Nowhere is this more apparent than at demo parties, the huge European conventions hosted by coding groups and organized entirely by amateurs. Funded by ticket sales and sponsor contributions, the largest include The Gathering (held in Norway at Easter), and The Party (held in

also cafeterias, showers, and sleeping areas – although most owners prefer to sleep with their computers for security – and, one imagines, some small amount of reassurance.

These are the trade shows – and the craft fairs – of the computer underground. "It's not often you can hook up with all the guys you've been talking to over BBSes, mail, and the Net," says Steve. If they're not working on producing a demo at a party, many coders spend their time socializing or indulging in the various group activities – networked *Doom*, in-jokes, gobbling pizza. "It's an absolutely electric atmosphere – you should see the web of power cables," he jokes.

Meeting these coders, designers, and artists for the first time is



the data of someone else's demo, extracting the graphics or sound as required. "The music is fair game," muses Jolyon. "If it hasn't been protected, the musician is happy for you to take it out. If the music *has* been protected, then it's obviously supposed to be a challenge, so again you're allowed to get at it."

"There's no mercy," agrees Almathera's CD cutter and self-confessed demo groupie, Steve. (Steve prefers not to give his surname, favoring instead his

smaller group Bomb) is putting the final touches to *FEARS*, a commercial *Doom* engine for the Amiga, based mainly on routines from his own award-winning demo *Motion*.

Listening to demo fans tell these and other tales, it's hard not to think of coders as modern-day equivalents of the '70s MIT pioneers in Steven Levy's *Hackers*. Rather than the rarefied atmosphere of time-sharing mainframes in academic institutions, now it's out there in the real-

Denmark every New Year); each resembles nothing so much as a cross between a computer show and a science fiction convention.

These events hire out conference halls with thousands of square meters of floor space, accommodating up to 2,500 people, their computers, desks, and tables for the equipment, as well as alternative sources of entertainment – video cinemas, laser-tag games – in case the appeal of checking out hundreds of demo routines wears thin. There are

a curious experience. If you're expecting wild-eyed cyberpunks on the cutting edge of industrial fashion, what's most surprising is how ordinary they seem. Sensible haircuts sit next to heavy-metal T-shirts, and the grunge look is as popular as sports-casual. It seems to be a cross-section of European teenagers who happen to like computers – the most overwhelming surprise is how young they are (many under 16, few over 20). They are almost all male – for whatever rea-

# Demo Coders

◀ 145 son, the other half of European youth manage to resist the temptation of the ticket-price publicity, which always proclaims "Girls – free!"

Because of the age range, demo parties usually place a blanket ban on alcohol and drugs; to cover themselves, organizers put out a disclaimer regarding software piracy. "Besides, a typical party is a stamina and endurance test to match anything a game show could devise," Steve reports. "External stimulants are the last thing you need if you're trying to keep your mind on your latest demo release. You're exhausted, you're running low on sleep and high on adrenaline, and you're starting to smell bad. But the competitive nature prevails."

Because of the size of the events, the demo contests are divided into categories: best overall demo, best music, best intro under 40 Kbytes. There are separate classes for different machines: chiefly the Amiga and its new archrival, the PC. Steve estimates that, across the board, cash prizes can total more than £10,000 (about US\$15,500). "It's a hell of an incentive to write something that's really respectable," he observes. Comparisons with large-scale commercial computer graphics fairs are obvious. "That's what they are," he agrees. "They're the poor man's SIGGRAPH."

## The skills that hackers learn from coding demos can transfer to more commercial applications – typically, writing games.

Although broadly despised by the Amiga community, the PC has helped revitalize the demo industry, especially now that the old enemy, the Atari ST, has disappeared from the scene – a disappearance hastened, if you believe the coders, by the sheer superiority of Amiga demos. Even PC coders – like Trixter of the US group Hornet – admit that Amiga releases have much more flair, style, and presentation, although IBM demos have more horsepower. "3-D Gouraud-shaded, light-sourced, texture-mapped polygons will tax the average Amiga. A 486-66 can do them quite nicely," he quips. "But Amiga coders are generally 95 percent European, and about 40 percent are from Finland. Something about those wacky Finns just keeps them churning out stuff with style."

All on the scene have their own theories as

to why Europe – and Scandinavia in particular – has become the heart of the demo coding scene. Some cite the long, cold evenings, the easy overland access from one country to another, or the lack of decent commercial software. This also suggests where demo innovation will come from in the future: Eastern Europe. "Hungary, Slovenia, Russia – they've all got a good demo scene," Jolyon Ralph explains. "They're in exactly the same situation we were in during the late '80s – brilliant computers but no proper programs for them, so they write their own."

The skills learned from coding demos can transfer to more commercial applications – typically, writing games. The best-known products of this include the much-acclaimed *Pinball Dreams/Fantasies/Illusions* series (published by 21st Century Entertainment, written by Swedish demo group Digital Illusions), and the graphically astonishing *Asteroids* clone, *Stardust* (from Finland-based Bloodhouse). But some companies, wary of pirates, are still reluctant to take on demo programmers. And besides, as the games magazines never tire of pointing out, there's more to gameplay than good graphics and sound.

That said, the guys at Almathera still estimate that games-writing careers are a powerful lure. "The big two killers for demo groups are people going off into the games industry, and conscription into the army," says Jolyon. This is particularly true of the Scandinavian

countries, where a year of national service is mandatory. (Jolyon and Steve have seen several groups appear almost out of nowhere and produce several startling and successful releases, only to fall apart just as quickly when key members go off to spend 12 months in the armed forces.) Nevertheless, Jolyon suspects that this "may be why the Scandinavian countries have particularly good demo coders – because they have to get it done quickly!"

Despite (or because of) these real-world intrusions, a glance at disk magazines and demo newsgroups (alt.sys.amiga.demos, for instance) shows that the demo culture is still going strong. This unique mix consists in part of standard fan quibbles over the merits of particular coders and their demos. One posting reads: "First of all, Dweezil's intro

from Ass93 is not called *Bananamen* but *Tequila*. The intro by Shining was running about 125 percent slower than the one in Tequila. Dweezil did a great job of optimizing the method! But, it was Tizzy who used the method first."

*Lame* and *kewl* (or *k00l*, depending on who's talking) are the two big buzz words of the demo scene, forever debated in the demo forums – *lame* in this case referring to any scanned or copied graphics, sound samples, or visual effects that are previously worked out rather than calculated in real time, and the uploading of old software to BBSes. *Kewl* is equated with winning competitions, coding difficult routines and making them look easy; obtaining, cracking, and spreading prerelease versions of commercial software; and having a life outside the digital underground. Other hot topics include, "Are mail-swappers needed in a demo team?" "Is piracy really killing the machines?" "Rave and hard-core techno versus heavy-metal and rock." And the old chestnut, "Who is a lamer?"

Nowhere else in teen culture (except, perhaps, on the Web, where demos are thriving) will you find this reckless adolescent enthusiasm coupled with intense discussion of detailed physics and mathematical theorems, arguments over excerpts from professional computer-graphics textbooks, and all-out hard-core technical advice on coaxing the most from your machine. Take this example regarding saving extra microseconds when coding on the Amiga 4000: "At the extreme, an '040 will have to dump out 4k of copyback, and will have to read in the 4k of cache, which is  $(4096+4096)/4=2048$  memory accesses, which will take a minimum of  $2096 \times 40$ ns ('040 clock cycle), or 80ms to get back to how it was before the flush."

As long as there are home computers and scores to be settled, kids will be writing demos. Although the prospect of large cash prizes and programming careers are powerful incentives, the months of effort required to create a demo transforms the process into a labor of love. In a world where programs are a plaything, where the clicking of an empty Amiga disk drive is as challenging as the ball-bearing rattle of a spray can, it's simply about proving who's the best. As Jolyon Ralph says, "It's a completely underground thing that's completely harmless. No one gets hurt. Apart from Atari owners, of course." ■ ■ ■

*The best source for downloading Amiga demos are Aminet sites: ftp.luth.se, ftp.wustl.edu, or http://src.doc.ic.ac.uk. PC demos can be had from ftp.mpoli.fi or ftp.cdrom.com.*