

# TUG 2001

## A T<sub>E</sub>X Odyssey

- what way are we heading
- will there be documents
- is typography still needed
- are we still talking T<sub>E</sub>X

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Until now, the main source of information is books. In the next couple of slides, I will present some quotes from books I read the last couple of years, written by: Arthur Clarke, Greg Bear, Graham Hancock, Peter Wilbur and Michael Burke, Jared Diamond, Edward Tufte, Peter Ward and Donald Brownlee, Steve Reich and Beryl Korot, Richard Kadrey, Brian Butterworth and of course Donald Knuth.

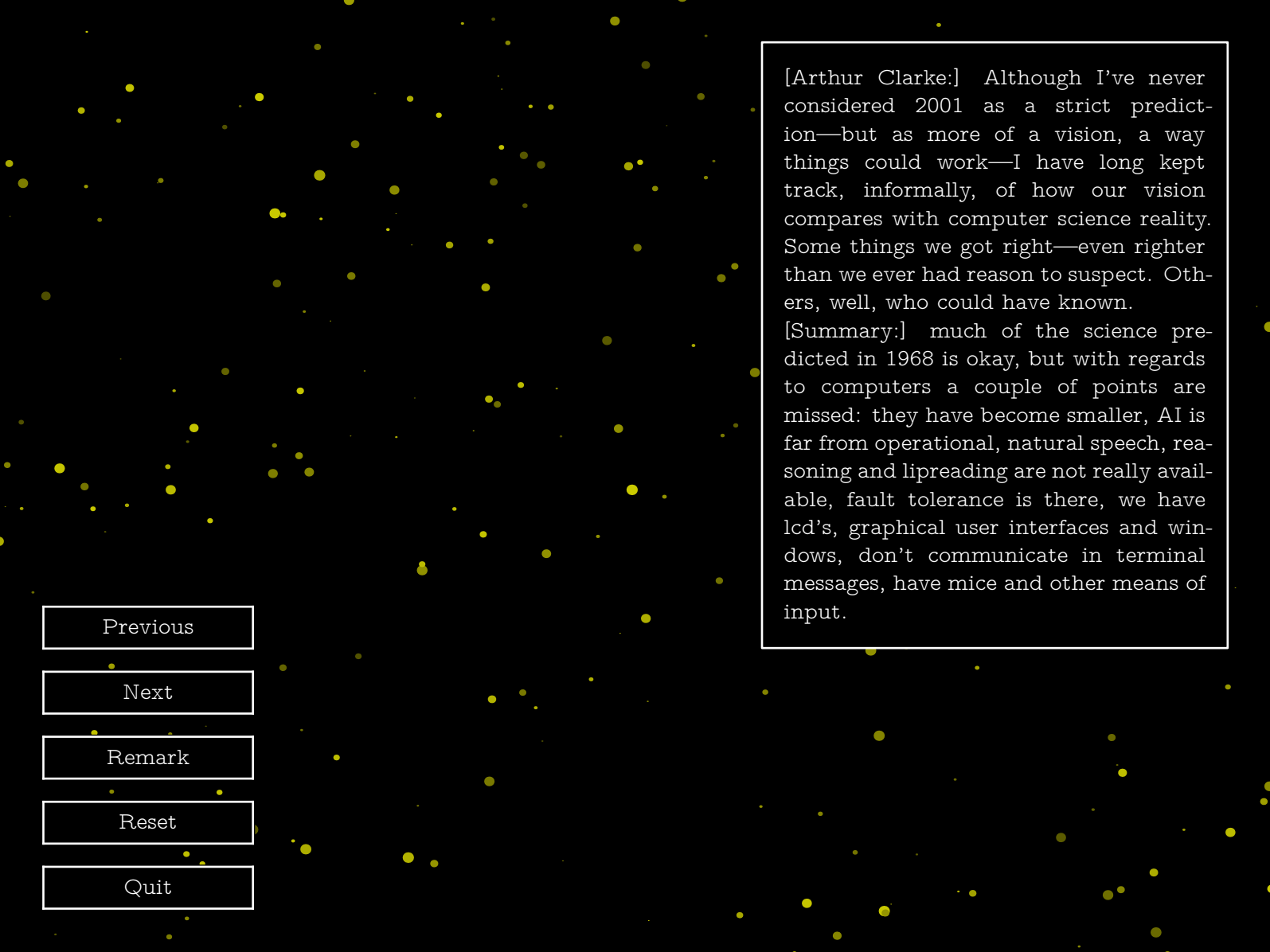
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[Arthur Clarke:] Although I've never considered 2001 as a strict prediction—but as more of a vision, a way things could work—I have long kept track, informally, of how our vision compares with computer science reality. Some things we got right—even righter than we ever had reason to suspect. Others, well, who could have known.

[Summary:] much of the science predicted in 1968 is okay, but with regards to computers a couple of points are missed: they have become smaller, AI is far from operational, natural speech, reasoning and lipreading are not really available, fault tolerance is there, we have lcd's, graphical user interfaces and windows, don't communicate in terminal messages, have mice and other means of input.

After a short walk through a tunnel packed with pipes and cables, and echoing hollowly with rhythmic thumping and throbbings, they arrived in executive territory, and Floyd found himself back in the familiar environment of typewriters, office computers, girl assistants, wall charts and ringing telephones.

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There was plenty to occupy his time, even if he did nothing but sit and read. When he tired of official reports and memoranda and minutes he would plug his foolscap-sized newspad into the ship's information circuit and scan the latest reports from Earth. One by one he would conjure up the world's major electronic papers; he knew the codes of the more important ones by heart, and had no need to consult the list on the back of his pad. Switching to the display's unit's short-term memory, he would hold the front page while he quickly searched the headlines and noted the items that interested him. Each had its own two-digit reference; when he punched that, the postage-stamp-sized rectangle would expand until it neatly filled the screen, and he could read it with comfort. When had finished he would flash back to the complete remark page will we keep on using composed mixed content pages and select a new subject for detailed examination.

Bowman had been a student for more than a half his life; he would continue to be one until he retired. Thanks to the Twentieth Century revolution in training and information-handling techniques, he already possessed the equivalent of two or three college educations—and, what was more, he could remember ninety per cent of what he had learned.

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The information flashed on the display screen; simultaneously, a sheet of paper slit out of the slot immediately beneath it. Despite all the electronic read-outs, there were times when good, old-fashioned printed material was the most convenient form of record.

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The office was neatly organized but still looked cluttered. A small desk manufactured from OTV tank baffles was flanked by chromium bins filled with rolls of paper. A narrow shelf of real books hung next to racks of memory blocks sealed behind tough, alarm-equipped plastic panels. Maps and diagrams were taped to the wall.

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Still, she agreed with a nod and settled into the seat, manipulating the controls with one hand. A simple circular graphic display hovered before her, as crisp and clear as something solid. Takahashi had misinformed her on one point, and her fumbling triggered a tutorial. It corrected her errors and informed her—in only slightly accented American English—how to operate the equipment properly. Then it provided her with call numbers and codes for other types of information.

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The illusion was perfect—even providing her with a memory of what her apartment looked like. She could turn her head and look completely behind her if she wished—indeed, she could walk around, even through she knew she was sitting down. . . . The information had come in printed displays, selected visuals and even more selected sounds. Where documentation of the multimedia sort was lacking, print took over, but with subtle and clear vocal accompaniment. Compared to this, simple reading was torture and current video methods as archaic as cave paintings.

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“The P.M. has no suspicion of this when you alone were sent?” Toller picted. The symbols that flashed between the two men came from pictor torques around their necks, devices that had developed over the centuries in the Thistledown and in the Axis City.

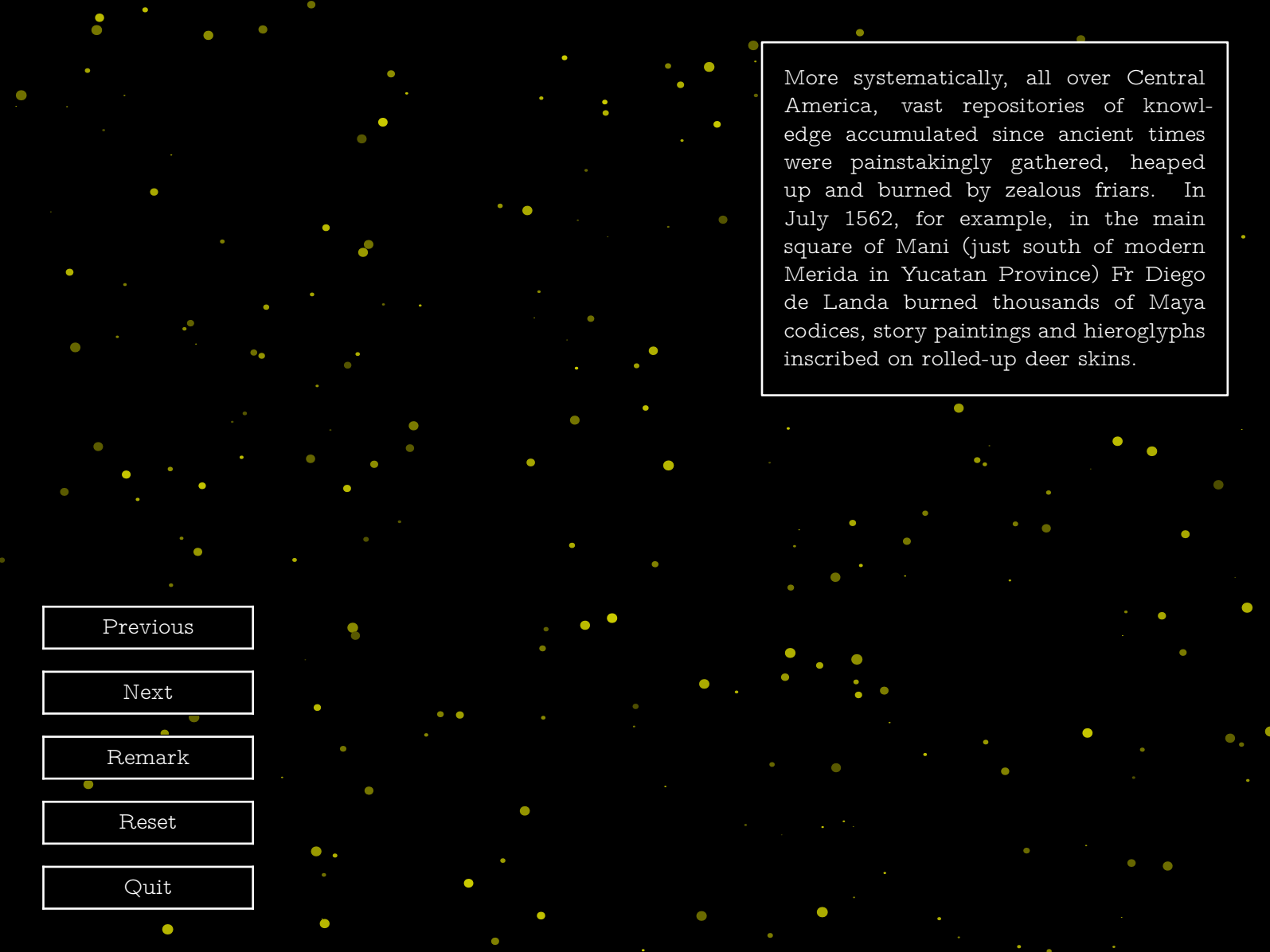
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More systematically, all over Central America, vast repositories of knowledge accumulated since ancient times were painstakingly gathered, heaped up and burned by zealous friars. In July 1562, for example, in the main square of Mani (just south of modern Merida in Yucatan Province) Fr Diego de Landa burned thousands of Maya codices, story paintings and hieroglyphs inscribed on rolled-up deer skins.

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We know that our late twentieth-century, post-industrial civilization is about to be destroyed by an inescapable cosmic or geological cataclysm.

We know—because our science is pretty good—that the destruction is going to be *near-total*.

...

I'm sure that we'd want to say more than just 'Kilroy was here'.

...

And, yes, they found an ingenious way to tell us that they were here.

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Human technology developed from the first stone tools, in use by two and a half million years ago, to the 1996 laser printer that replaced my already outdated 1992 laser printer and that was used to print this book's manuscript. The rate of development was undetectably slow at the beginning, when hundreds of thousands of years passed with no discernible change in our stone tools and with no surviving evidence for artifacts and of other materials. Today, technology advances so rapidly that it is reported in the daily newspaper.

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The decision could have gone to another keyboard at any of numerous stages between the 1860s and the 1880's; nothing about the American environment favored the QWERTY keyboard over its rivals. . . . For example, if the QWERTY keyboard of the United States had not been adopted elsewhere in the world as well—say, if Japan or Europe had adopted the more efficient Dvorak keyboard—that trivial decision in the 19<sup>th</sup> century might have had big consequences for the competitive position of the 20<sup>th</sup>-century American technology.

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It was generally agreed at that time that products which tried to fulfil two or more functions were compromises and therefore inferior to a single-function product.

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All of this implies that design students of the future will need to have a much wider range of skills than most graphic and multimedia students possess today. The coming together of typography, graphics, the moving image, sound and music requires training in both aesthetic judgment and technical skills, as well as the ability to implement and commission multimedia productions. Such a program hardly exists today, and it may be that designers of the future will find themselves on courses equal in duration and related in structure to those followed by architects.

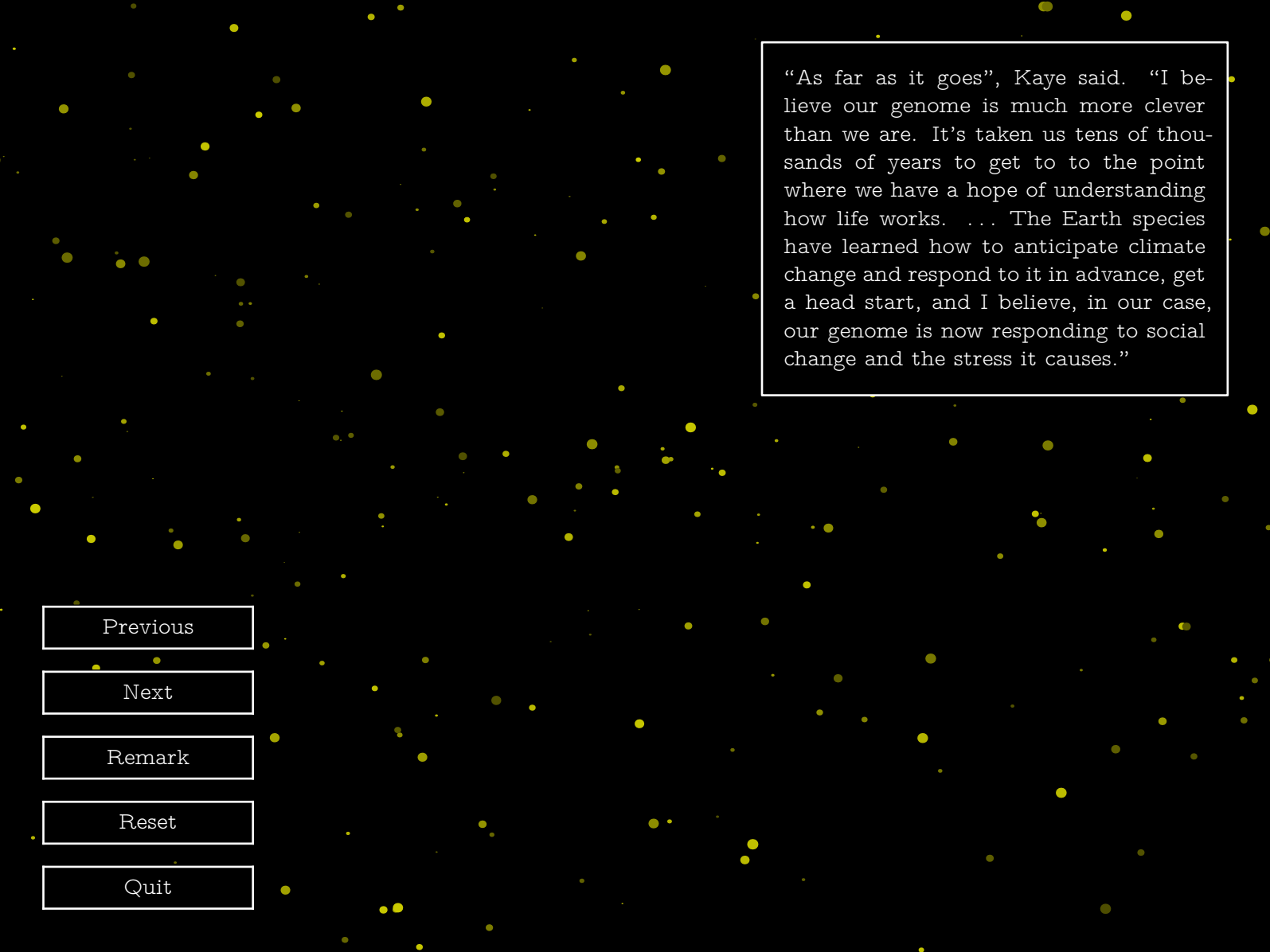
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“As far as it goes”, Kaye said. “I believe our genome is much more clever than we are. It’s taken us tens of thousands of years to get to the point where we have a hope of understanding how life works. . . . The Earth species have learned how to anticipate climate change and respond to it in advance, get a head start, and I believe, in our case, our genome is now responding to social change and the stress it causes.”

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She looked at the cover and laughed out loud. It was a copy of WIRED, and on the brilliant orange cover was printed the black silhouette of a curled fetus with a green question mark across the middle. The log line read "*Human 3.0: Not a Virus, but an Upgrade?*"

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We thrive in information-thick worlds because of our marvelous and everyday capacity to select, edit, single out, structure, highlight, group, pair, merge, harmonize, synthesize, focus, organize, condense, reduce, boil down, choose, categorize, catalog, classify, list, abstract, scan, look into, idealize, isolate, discriminate, distinguish, screen, pigeon-hole, pick over, sort, integrate, blend, inspect, filter, lump, skip, smooth, chunk, average, approximate, cluster, aggregate, outline, summarize, itemize, review, dip into, flip through, browse, glance into, leaf through, skim, refine, enumerate, glean, synopsise, winnow the wheat from the chaff and separate the sheep from the goats.

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I believe that the real reason underlying the fact that Computer Science has become a thriving discipline at essential all of the world's universities, although it was totally unknown twenty years ago, is *not* that computers exist in quantity; the real reason is that the algorithmic thinkers among scientists of the world never before had a home. We are brought together in Computer Science departments *because we find people who think like we do*. At least, that seems a viable hypothesis, which hasn't been contradicted by my observations during the last half dozen or so years since the possibility occurred to me.

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Nevertheless, it is now abundantly clear that infants are born with a capacity to recognize distinct numerosities up to about 4, and to respond to changes in numerosity. They also possess arithmical expectations: ....

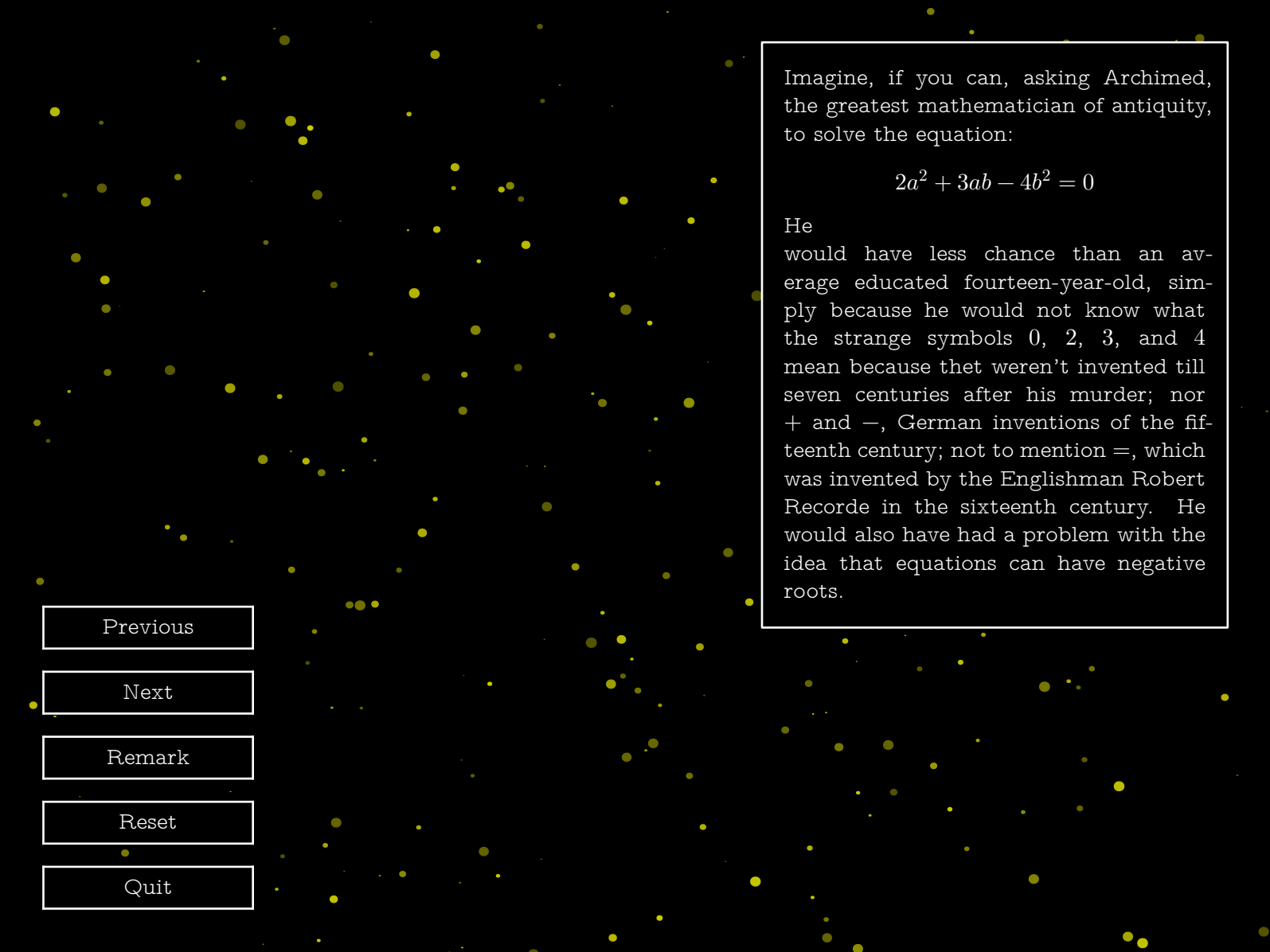
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Imagine, if you can, asking Archimed, the greatest mathematician of antiquity, to solve the equation:

$$2a^2 + 3ab - 4b^2 = 0$$

He would have less chance than an average educated fourteen-year-old, simply because he would not know what the strange symbols 0, 2, 3, and 4 mean because they weren't invented till seven centuries after his murder; nor + and -, German inventions of the fifteenth century; not to mention =, which was invented by the Englishman Robert Recorde in the sixteenth century. He would also have had a problem with the idea that equations can have negative roots.

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Some of basics of the D'ni bookmaking are known, but the most important details have been lost over time. . . . From the few existing records lost it appears that the D'ni have been using their Linking books for millenia, and that they linked to the earth around 10,000 terrestrial years ago.

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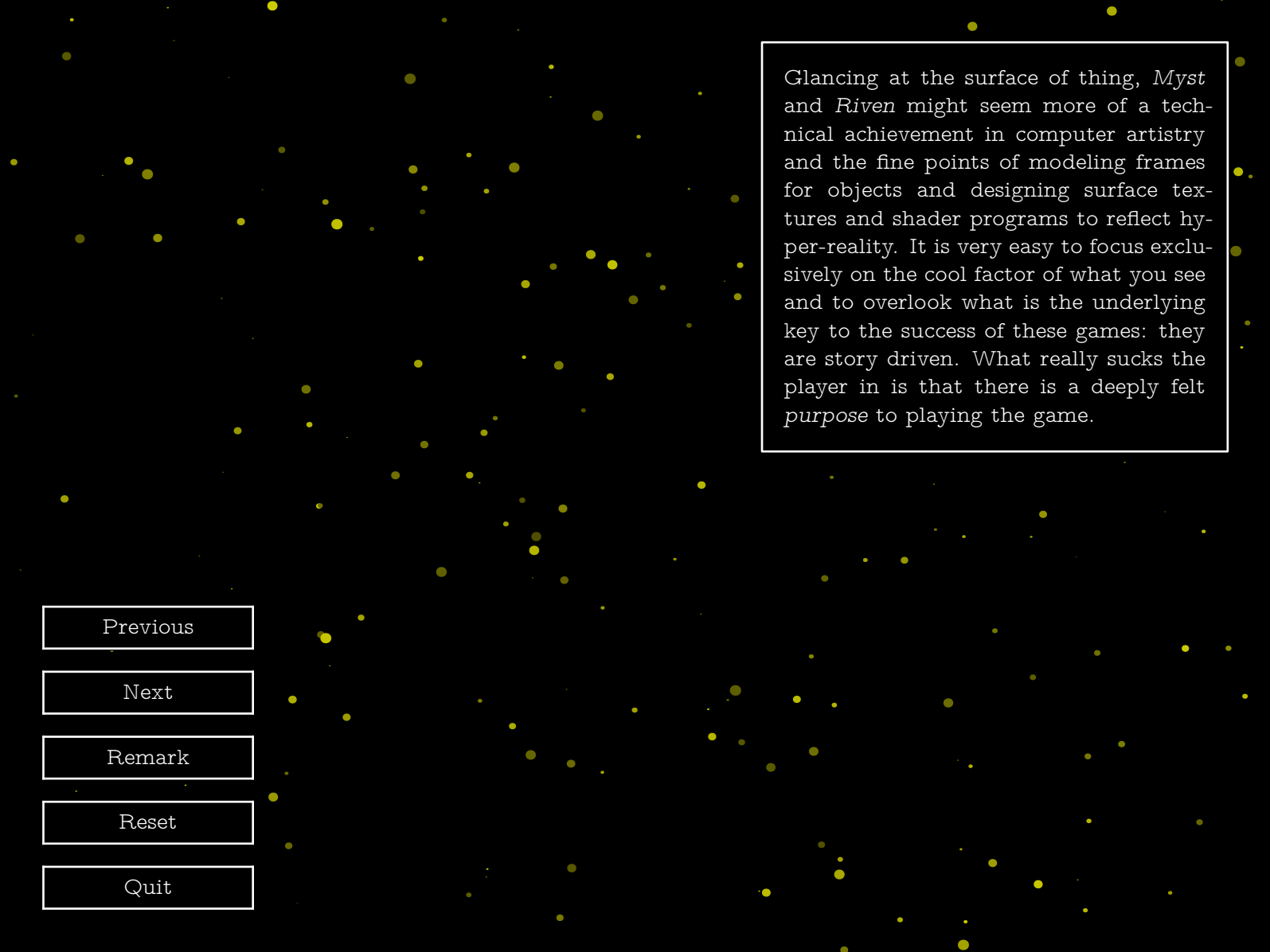
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Glancing at the surface of thing, *Myst* and *Riven* might seem more of a technical achievement in computer artistry and the fine points of modeling frames for objects and designing surface textures and shader programs to reflect hyper-reality. It is very easy to focus exclusively on the cool factor of what you see and to overlook what is the underlying key to the success of these games: they are story driven. What really sucks the player in is that there is a deeply felt *purpose* to playing the game.

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The true underpinnings were our interest in making a new kind of musical theater based on videotaped documentary sources. The idea was that you would be able to see and hear people as they spoke on the videotape and simultaneously you would see and hear on-stage musicians doubling them—actually playing their speech melodies as they spoke.

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If it is found to be correct, however, the Rare Earth Hypothesis will reverse that decentering trend. What if the Earth, with its cargo of advanced animals, is virtually unique in this quadrant of the galaxy—the most diverse planet, say, in the nearest 10,000 light-years? What if it is utterly unique: the only planet with animals in this galaxy or even in the visible Universe, a bastion of animals amid a sea of microbe-infested worlds? If that is the case, how much greater the loss the Universe sustains for each species of animals or planet driven to extinction through the careless stewardship of Homo Sapiens?  
Welcome aboard.

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