

A Force of Nature

David Alan Grier

George Washington University



Our educational system does little to prepare computer science students for making the transition to the working world.

When I first met them, Jeff, Jeff, and Will were inseparable. *Un pour tous, tous pour un*. As far as I could tell, they spent every waking moment in each other's presence. I could commonly find them at the local coffee shop or huddled together in some corner of a college building. The younger Jeff would be telling an elaborate story to whatever audience was ready to listen. The elder Jeff would be typing on a computer keyboard. Will might be doodling in a notebook or flirting with a passerby or playing garbage can basketball with pages torn from the day's newspaper.

Among colleagues, I referred to them as the Three Musketeers, as they seemed to embody the confidence of the great Dumas heroes. They were masters of technology and believed that their mastery exempted them from the rules of ordinary society. The younger Jeff, for example, believed that he was not governed by the law of time. When given a task, he would ignore it until the deadline was bearing down on him. Then in an explosion of programming energy, he would pound perfect code into his machine.

The elder Jeff was convinced that specifications were written for other

people, individuals with weaker morals or limited visions. He wrote code that was far grander than the project required. It would meet the demands of the moment, but it also would spiral outward to handle other tasks as well. You might find a game embedded in his programs or a trick algorithm that had nothing to do with the project or a generalization that would handle the problem for all time to come.

Will was comfortable with deadlines and would read specifications but he lived in a non-Euclidian world. He shunned conventional algorithms and obvious solutions. His code appeared inverted, dissecting the final answer in search of the original causes. It was nearly impossible to read, but it worked well and generally ran faster than more straightforward solutions.

DISRUPTION

The unity of the Three Musketeers was nearly destroyed when Alana came into their circle. She was a force of nature and every bit the intellectual equal of the three boys. She took possession of their group as if it were her private domain. Within a few weeks, she had them following her schedule, meeting at her favorite places, and doing the things that she most liked

to do. She even got them to dress more stylishly, or at least put on cleaner clothes.

Alana could see the solution of a problem faster than her compatriots, and she knew how to divide the work with others. For a time, I regularly saw the four of them in the lounge, laughing and boasting as they worked on some class project. One of their number, usually a Jeff, would be typing into a computer while the others discussed what task should be done next. Paper wads would be scattered around a wastebasket. A clutch of pencils would be neatly balanced into a pyramid.

It was not inevitable that Alana should destabilize the group, but that is what eventually happened. Nothing had prepared the boys for a woman who had mastered both the technical details of multiprocessor coding and the advanced techniques of eye makeup. For reasons good or ill, Alana was able to paint her face in a way that made the souls of ordinary men melt into simmering puddles of sweat.

Steadily, the group began to dissolve. The end was marked with little, gentle acts of kindness that were twisted into angry, malicious incidents by the green-eyed monster of jealousy. Soon Jeff was not speaking to Jeff, Will was incensed with the Elder, the Younger had temporarily decamped for places unknown, and Alana was looking for a more congenial group of colleagues.

Eventually, the four were able to recover the remnants of their friendship and rebuild a working relationship, but they never completely recovered their old camaraderie. Shortly, they moved to new jobs and new worlds, where they faced not only the pull of the opposite sex but also had to deal with the equally potent and seductive powers of finance and money.

MOVING ON

The younger Jeff was the first to leave. He packed his birthright and followed the western winds, determined to conquer the world. With a

few friends, he built an Internet radio station, one of the first of the genre. They rented space in a warehouse, bought a large server, and connected it to the Internet. They found some software to pull songs off their collection of CDs and wrote a system that would stream music across the network while displaying ads on a computer screen. They christened their creation “intergalactic-radio-usa.net.”

For a year or two, the station occupied a quirky corner of the Net. It was one of the few places in those days before MP3 downloads where you could listen to music over the Internet. Few individuals had a computer that reproduced the sounds faithfully, but enough people listened to make the business profitable.

One day, when he arrived at work, Jeff was met at the door by a man with a dark overcoat, a stern demeanor, and a letter from one of the music publishing organizations, BMI or ASCAP. The letter noted that intergalactic-radio-usa had not been paying royalties on the music it broadcast, and it demanded satisfaction. A date was set. Seconds were selected. Discussions were held. Before the final confrontation, the station agreed to a payment schedule and returned to the business of broadcasting music.

Under the new regime, the station had to double or triple its income in a short space of time. This pushed Jeff away from the technical work of the station. His partners had grown anxious over his dramatic programming techniques. They wanted steady progress toward their goals, not weeks of inaction followed by days of intense coding. They told him to get a suit, build a list of clients, and start selling advertising.

Jeff was not a truly successful salesman, but he also was not a failure. His work allowed him to talk with new people, an activity he loved, but it did not give him the feeling of mastery that he had enjoyed as a programmer. “It’s all governed by the budget,” he told me when he started to look for a new job. “Everything is controlled by the budget.”

AN EVOLVING BUSINESS

The elder Jeff left shortly after his namesake. He and some friends moved into an old house in a reviving part of the city, a living arrangement that can best be described as an Internet commune. They shared expenses and housekeeping duties and looked for ways to make money with their computing skills. Slowly, they evolved into a Web design and hosting company. They created a Web page for one business and then one for another and finally admitted that they had a nice, steady line of work.

Overcoming the pressures and demands of the commercial world requires qualities learned over a lifetime.

As the outlines of their company became clearer, Jeff decided that they were really a research and development laboratory that supported itself with small jobs. He took a bedroom on an upper floor and began working on a program that he called “the ultimate Web system.” Like many of the programs the elder Jeff produced, the ultimate Web system was a clever idea. It is best considered an early content management system, a way to allow ordinary users to post information without working with a programmer.

As good as it was, the ultimate Web system never became a profitable product. Jeff had to abandon it as he and his partners began to realize that their company needed stronger leadership than the collective anarchy of a commune. They needed to coordinate the work of designers, programmers, salespeople, and accountants.

As the strongest personality of the group, Jeff slowly moved into the role of president. As he did, the company became a more conventional organization. Couples married and moved into their own homes. The large house

uptown ceased to be a residence and became only an office.

Long after Jeff had begun purchasing Web software, he continued to claim that he was a software developer. “I’ll get back to it some day,” he would say. “It will be a great product.”

MAKING CHOICES

Will was the last to leave. He started a company that installed computers for law firms. Our city hosts a substantial number of lawyers, so his long-term prospects were good. I once saw Will on the street, pushing a cart of monitors and network cables. He looked active and happy. Things were going well, he said. He had plenty of work but still had enough time to do a little programming on the side.

We shook hands, promised to keep in touch, and agreed to meet for dinner on some distant day. That dinner went unclaimed for five years. It might have never been held had not I learned, through one of the Jeffs, that Will had prospered as a programmer and now owned a large specialty software firm.

I scanned his Web page and was pleased with what I saw. “Software in the service of good,” it read. “Our motto is people before profit. Do unto others as you would have them do unto you.”

I called his office, was connected to “President Will,” and got a quick summary of his career. He had started creating programs for disabled users and had found a tremendous market for his work. After a brief discussion, we agreed to a nice dinner downtown, with spouses and well-trained waiters and the gentle ambience of success. We spent most of the evening talking about personal things—families, children, and houses. Only at the end of the evening did we turn to work. “How is the business going?” I asked.

“Well,” he said, but the corners of his lips pursed.

I looked at him a moment. “Everything okay?” I queried.

He exchanged a glance with his wife and turned back to me. “Extremely

well. We have more business than we can handle.”

Again, I paused. “Starting to draw competition?”

He smiled and relaxed for a brief moment. “No,” he said.

I sensed that something was happening, so I took a guess. “A suitor sniffing around?”

He looked chagrined and shook his head. “Yeah.”

“A company with three letters in its name?”

“Yup,” he said.

“It would be a lot of money,” I noted.

“But then it wouldn’t be my firm,” he said. After a pause, he added, “And if I don’t sell, the purchaser might try to put me out of business.”

We moved to another subject, as Will was clearly not ready to talk any more about the potential sale of his company. It was months later that I learned that he had sold the company and had decided to leave the technology industry. The news came in a letter that asked me to write a recommendation for a young man who wanted to become “Reverend Will.”

Almost every technical field feels the constant pull of business demands. “Engineering is a scientific profession,” wrote the historian Edwin Layton, “yet the test of the engineer’s work lies not in the laboratory but in the marketplace.” By training, most engineers want to judge their work by technical standards, but few have that opportunity. “Engineering is intimately related to fundamental choices of policy made by organizations employing engineers,” notes Layton.

LESSONS LEARNED

The experiences of Jeff, Jeff, and Will have been repeated by three decades of computer science students. They spend four years studying languages, data structures, and algorithms and pondering that grand question, “What can be automated?” Then they leave that world and move to one in which profit is king, deadlines are queens, and finance is a knave that keeps order.

Our educational system does little to prepare them for this transition. An early report reduced the issue to a pair of sentences. “A large portion of the job market involves work in business-oriented computer fields,” the report noted before making the obvious recommendation. “As a result, in those cases where there is a business school or related department, it would be most appropriate to take courses in which one could learn the technology and techniques appropriate to this field.”

Of course, one or two courses can’t really prepare an individual for the pressures and demands of the commercial world. Overcoming pressures requires qualities that are learned over a lifetime. Individuals need poise, character, grace, a sense of right and wrong, an ability to find a way through a confused landscape.

Often professional organizations, including many beyond the field of computer science, have reduced such qualities to the concept of skills that can be taught in training sessions: communications, teamwork, self-confidence. In fact, these skills are better imparted by the experiences of life, by

learning that your roommate is writing and releasing virus code, that you have missed a deadline and will not be paid for your work, that a member of your study group is passing your work as his own.

“It is doubly important,” wrote Charles Babbage, “that the man of science should mix with the world.” In fact, most computer scientists have little choice but to mix with the world, as the world provides the discipline with problems, ideas, and capital. It is therefore doubly important to know how the ideas of computer science interact with the world of money.

One of the Three Musketeers, safely out of earshot of his wife, once asked me what had become of Alana. I was not in close contact with her. However, I knew that her life had been shaped by the same forces that had influenced the careers of her three comrades, although, of course, her story had been complicated by the issues that women must face. She had moved to Florida and built a business during the great Internet bubble. She had taken some time to start a family, perhaps when that bubble had burst in 2001, and was now president of her own firm. I didn’t believe that she had done technical work for years.

“You’ve not kept in touch,” I said more as a statement than a question.

“No,” he said.

I saw a story in his face, but that story might reflect more of my observations than of his experience. It told of a lost love, perhaps; a lesson learned; a recognition that he and his college friends were all moving into that vast land of the mid-career knowing a little something about how to deal with the forces of nature. ■

David Alan Grier is the editor in chief, IEEE Annals of the History of Computing, and the author of When Computers Were Human (Princeton University Press, 2005). Grier is associate dean of International Affairs at George Washington University. Contact him at grier@gwu.edu.

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