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# Who Needs Tablets? We Do

*By George K. Thiruvathukal, Editor in Chief*

IT'S A GREAT PRIVILEGE AND HONOR TO HAVE BEEN NAMED THE NEW EIC OF *COMPUTING IN SCIENCE AND ENGINEERING*. IT WAS PRECISELY 11 YEARS AGO THAT I BEGAN WRITING FOR *CiSE*. PAUL DUBOIS, WHO EDITED THE SCIENTIFIC PROGRAMMING DEPARTMENT, INVITED ME TO WRITE ABOUT the state of Java in computational science, which I had worked on with a group that was affectionately named the Java Grande Forum. Geoffrey Fox had coined the term *grande*, which is the Spanish word for large (or grand). As well, there was great interest in solving so-called grand challenge problems, which remain of interest in what I now term the postmodern supercomputing period—a period characterized by the move to exascale and the hybridization of clusters, accelerators, clouds, and other emerging platforms yet to come. Shortly after this invitation, I began co-editing the Scientific Programming department with Paul Dubois so that he could begin a well-deserved retirement.

Since 2002, much has happened in my life as the Scientific Programming department editor for *CiSE*, and subsequently as an associate editor in chief, where I've worked with two tough acts to follow: Norman Chonacky and Isabel Beichl. We've been fortunate to maintain high standards of quality and interesting content during a decade that has been characterized by great uncertainty, marked by the simultaneous economic contraction and advances in technology that have proven to be disruptive and threaten the "business as usual" paradigm. As we all know, eBooks, open access, and open courseware promise a continued transformation of two "businesses:" print publishing and the hallowed halls of education. I've written about these topics for *CiSE* and *Computing Now*. Although there are headwinds coming, the American in me (as in US American) truly believes that better days are ahead, if we rise as a world to embrace the innovation that leads to technological change and forces us to rethink the business side of how we do things.

## Enter Tablets

Perhaps no other technology in recent memory has been part of the overall disruption more than tablet computing. Depending on what numbers you believe, at least one quarter of the people who own computers in the US are owners of tablet devices. Tablets in one form or another will be ubiquitous and are here to stay. In various studies, tablets are displacing PCs as we know them, especially PCs running heavyweight operating systems and increasingly bloated applications. With more and more cloud-based services, the personal computing device (now a tablet) is effectively relegated to being an access layer. This displacement, ironically, is also a story of reduced power consumption and the ability to get by with "less," including the applications that come with the device. Tablets running Android and iOS use significantly less power—a good thing for our planet—and in various studies they use less power to recharge annually than it costs to run compact fluorescent light bulbs. This is the "engineering" that we often refer to in *CiSE*.

Many tell me that tablets aren't a revolution. I disagree. Much of the perception of it not being revolutionary has to do with the illusion created by none other than Steve Jobs, wherein an iPad appears to be nothing more than a supersized iPhone. (Admittedly, when the iPad first came out, I joked that I could get an iPad for free by putting a full-screen magnifying lens in front of my iPod Touch.) Then the apps started coming like a runaway freight train. Seemingly every app that was once unpleasant to use on a PC became better with the touch interface (as the primary interface) and the tablet form factor.

The tablet happened to coincide with my children growing up and entering elementary school. There were apps for everything: reading, math, art, science, photography, and so on. My kids don't spend all of their time on tablets, but when they do, they seem to do some rather amazing stuff. Before long, my children drew several hundred works of art using a free drawing program on the iPad (affectionately named Draw Free, and it is *still* free). Lest you think

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that children will spend all of their time on the iPad, think again. At least when it comes to art, my kids are just as happy (happier, perhaps) to still use real paints, color pencils, and crayons. They also read books and like math and science. Having a tablet, however, allows for *experimentation* and use in certain settings (for example, a restaurant), where bringing paints might not be an option.

The other part of the revolution is *price*. Yes, you read that correctly. In October, I held a friendly competition in my research group to see who could come up with the cheapest 7-inch tablet. By now, everyone knows that Google unveiled a 7-inch tablet to compete in a space that many people want, especially when using the device primarily as a reader. (I will comment shortly on why 7 inches doesn't work for me and my noncomputing interests.) This device was unveiled at what many thought was a rock-bottom price of $199. Similar to the famous limbo dance, the question is now how low can it go? And sure enough, 7-inch tablets are now "surfacing" at the stunning $50–60 price point.

Ordinarily, I don't get excited about prices dropping in computing. Sure, it's great that I don't have to pay thousands for a desktop computer to run serious computational tasks, but a price point of hundreds or thousands of dollars in computing doesn't put computing within everyone's reach. One project that had hoped to, though, was the One Laptop Per Child project (which now focuses on tablets), but since this project's inception, tablets are now being produced by companies that nobody has even heard of. The Indian government created its own tablet for education that's priced at US$100 (but only available in India). I was able to find a 7-inch tablet being directly shipped from China for $54. By the time you read this, it will probably be cheaper. The question now is, will it become free? It's entirely possible.

Sometimes when people talk to me about how other people will no longer read or be able to afford eBooks, I find myself wondering, Compared to what? The default condition of our world used to be that owning or reading books was mostly a crisis of being affluent. One of my students even told me that he hopes he can build a library for his small town in Africa, but he's thinking that he might just create a virtual library of known works in his country and make eBooks instead. Many books not even in copyright status cost $10 apiece to own (because, you know, we just *have* to print them), only to be thrown away later. This makes the publishers happy to pocket what's almost pure profit in this case, but in many parts of the world, owning books remains a luxury. At the price levels that tablets are reaching, it strikes me that owning one is going to be much cheaper than owning even a small collection of books. If anything, the cost of the tablet is the price of many books, and you get thousands of free books by virtue of owning one. All you need is the occasional Internet connection—say, at a local cafe, library, or school—and you suddenly have access to thousands of free, high-quality books from Amazon (http://freekindlebooks.org) and Project Gutenberg (www.gutenberg.org).

Houston, I think the iPad really was the beginning of the revolution. History nuts like me, however, prefer to think of the Apple Newton as where it all started. Seriously, it even recognized handwriting!

## PC versus Tablet—and Beyond

For me, I don't have to choose between a computer or a tablet. The choice is actually an "and" choice, because I keep at least one of each. Owing to my employer, I'm richly blessed to own a MacBook Air, which itself is approaching the thickness of a tablet, and two tablets (iOS and Android based) for more mobile needs. Even when I carry the Air and one or two tablets, it's lighter than many of the laptops I see others carrying. Overall, though, I think I prefer a larger tablet in most situations.

Being a student of jazz piano, I keep two apps with me—iReal b (www.irealb.com) and forScore (www.forscoreapp.com)—at all times for reading and turning sheet music and for practicing in a virtual ensemble. The total cost for these apps runs about $10, and upgrades seem to keep coming at no charge. Although this might change, it's abundantly clear that the price pressure on the hardware is leading to a corresponding price change on software. Nevertheless, the sea change is that software on tablets has much less bloat and is designed (much like in the original spirit of Unix) to do one task extremely well. This makes it possible to focus on what you're doing at any given time with as little distraction as possible. (And believe me, as a parent of two young children, I have an insane amount of distraction.)

So what does this all mean for *CiSE*? First and foremost, tablets are part of the user-facing side of computing, so we should be thinking about how to make *CiSE*'s content tablet-friendly. I love print publications and the way *CiSE* looks when printed. We can get this same look without changing anything by making an app, similar to what *Computer* has done, including the page turns and all. Not all publications provide a compelling technical and visual presentation. In our case, we do. This experience can easily

## *CiSE* Welcomes a New Board Member

Manish Parashar is a professor in the Electrical and Computer Engineering Department at Rutgers University, and is also the director of the Rutgers Discovery Informatics Institute (RDI2) and the NSF Cloud and Autonomic Computing Center (CAC) at Rutgers, and associate director of the Rutgers Center for Information Assurance. His research interests focus on applied parallel and distributed computing and computational and data-intensive computing. Parashar has a PhD in computer engineering from Syracuse University. He received the IBM Faculty award twice, as well as a US National Science Foundaton CAREER award, and he is an AAAS and IEEE Fellow. Contact him at parashar@rutgers.edu.

be translated to tablet reading, much like other compelling magazines in the noncomputing space, such as *Food & Wine*, *The Economist*, and *The New Yorker*. (Okay, now you know at least part of my reading list.) Were I to guess about the *CiSE* readership's preferences, we'd really like to "take it with us," so to speak. I'd like *CiSE* to be the fourth magazine on my list, even in the Apple Newsstand. But I would like to go beyond just having an e-magazine for tablet devices. What more can we do? Can we add value to readers by having compelling visualizations and other value-added content? Can a simulation be distributed as an app for viewing on a tablet device? I think it could be done, and we would be at the forefront for having achieved it.

As I was teaching my "Introduction to Computer Science" course this term, I started looking into other programming languages that can provide this experience. One of the particularly interesting ones is Processing, which came out of the arts/design community. As it turns out, this language could help us offer such functionalities through the Processing-Android effort (http://wiki.processing.org/w/Android). At least on the Android platform, a Processing app can be shrink-wrapped as an executable Android app, which can then be run directly on the tablet device. In a nutshell, executable articles seem like something we should be thinking about, and I would like to hear from anyone who wants to write an article for us that has an executable app component (read: I would find some way to fast track it as EIC).



I'd be remiss if I didn't disclose that this article has been a bit of a brainstorming exercise for me. I think what continues to excite me about the intersection between computer science and science in general is what designers often refer to as *possibility spaces*—an idea Steve Jones and I covered in our recent MIT Press book about the Nintendo Wii platform (http://mitpress.mit.edu/books/codename-revolution). There's a certain nonlinearity to the thinking that's required to be prepared for the century in which we're living. From physics, we know that the one thing we can count on is change. If we don't change, others will change us and render us obsolete or, worse, irrelevant.

As EIC, I plan to continue the great editorial work and judgment of my predecessors but am convinced that we can reach even more readers, and I feel rather strongly that having apps and e-versions of our work is essential to continue our mission in the next decade. I'd certainly like to hear from you about things you'd like to see us do.

You can contact me and follow me on Google Plus (thiruvathukal), Twitter (@gkthiruvathukal), or use good old email at gkt@cs.luc.edu.