

TECHVIEWS

The making of a software engineer

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WHAT does it take for a fresh IT graduate, strong in technology but lacking in engineering experience, to become a mature, productive and professional software engineer? In wealthier countries, companies offer training to new college graduates. However, many firms in Bangladesh cannot afford this luxury.

In the following, I draw on my 20+ years of experience in software engineering in Silicon Valley - first as an engineer, then as a manager mentoring engineers - to discuss the skills that grow a novice engineer into a mature one. I assume that the novice engineer is - through their education, or being self-taught - already technically competent and knows how to quickly build working software using today's tools and technologies.

I started working in software after obtaining my Master's degree. With the necessary educational foundation, I began my journey to a mature software engineer. I did not know it then, but this journey would encompass learning these skills: a) direct application of academic knowledge, b) learning design, specially, differentiating "what" and "how", c) communication, d) value of testing, e) estimating tasks, f) leading a team and g) understanding customer value and selling it.

My first job had a "Software Engineer" title. I now realize it really emphasized the skill a) above. I had just completed a graduate thesis in Image Processing and my new employer manufactured an Image Processing System. Using my knowledge, I researched new ways of manipulating digital images. When research results were successful, we quickly incorporated these into our product. The distinction between the "what" and "how" was blurred because we often changed the product's definition based on the results of my research.

However, I started learning about engineering design at this job. By the time I started my second job, I had learned about the *internal* and *external* design of a product. This is a common but serious area of confusion for many. So I will elaborate using an example from architecture.

Last June, while visiting Italy with my family, we saw the *Duomo* of Florence. This cathedral with its beautiful, massive

dome has an instructive and compelling story behind it. During the 13th century Florence emerged as a powerful city-nation. So Florentines decided to build the *Duomo* to show off Florence's new wealth and status to her neighbors.

What captured my engineering imagination was this: the size and shape of the *Duomo* was decided in 1296. By the time Filippo Brunelleschi solved all the technical problems and built the cathedral, it was 1418!

In other words, the "what" of the problem was defined before Brunelleschi - who answered the "how" - was born.

The *external design* (also called the *functional specifica-*

During this time I had to explain and defend my ideas in front of peers, managers and customers. I was learning skill c), communication, which is critical because if one cannot explain one's ideas to others, the value of those ideas diminishes. The keys are: a) realize your audience may not know as much about your subject as you do, and b) speak in a language they understand.

At this time, a story about the software running medical diagnostic machines started circulating among engineers. A bug in the software, the story went, had exposed a patient to extremely powerful rays and done much harm. It was not clear if it was an X-ray, ultrasound or some other

contract to deliver a new computer system to General Electric, one of the largest and most powerful companies in the US. Unfortunately Sun's project was behind schedule. Jack Welch, the CEO of GE, threatened to buy a full-page ad in the Wall Street Journal exposing Sun's incompetence. Somehow a crisis was averted, but engineers at Sun became extremely particular about project estimates and project schedules.

This was the opportunity for me to learn skill e), estimation. The estimation of how long/how many people it will take to complete a software task is very difficult. Being able to do so accurately is an extremely valuable skill. One needs to cut up a task

this by setting good examples, by being calm and logical during times of crisis and by setting and demanding high expectations from the team.

What about skill g), customer value? During my undergraduate days I had the good fortune to meet late Dr. F. R. Khan, the famous (Bangladeshi) structural engineer. Dr. Khan, like Brunelleschi, had solved hard technical problems required for building Chicago's Sears Tower, the world's tallest building at that time. I sought his advice on how to be a successful engineer. His advice surprised me. Instead of dwelling on technical prowess (which, I think, he assumed) he said, "Whatever kind of engineering you do, always think about its value to the customer and how to sell your work."

As an engineer, whenever I have followed this advice I have succeeded with the effort. Whenever I did not heed this advice - perhaps I became too absorbed or enchanted with the technology itself, or allowed myself to become distracted - my efforts succeeded less.

No doubt, learning and applying the above skills take hard work and patience. Moreover, IT is a tough field and success is never guaranteed. However, I hope that knowing about these skills will help budding engineers recognize and grab the opportunities for learning and excelling.

I finish today with the story of a successful software engineer. Jawed Karim, son of a Bangladeshi father and a German mother, is based in the US. He recently became famous as a co-founder of YouTube, a company which Google bought for USD 1.6 Billion. If you peruse his website, www.jawed.com, you can see how he has approached software engineering, blending technological know-how and innovation with brilliant design, discipline, and a keen eye for customer's interest.

I met Jawed in 2000, and immediately recognized the spark in him. I am encouraged that I have met several young Bangladeshis in the last year who also have a similar spark. What they need is the right guidance and support to create technological breakthroughs. It will not be easy, but I am confident that we have the talent and it can be done.

You can read Ihtisham Kabir's blog at backtobangladesh.blogspot.com



Duomo of Florence

tion) is the "what" of the product. The *internal design* (also called the *engineering specification*) is the "how". You must know what you are going to build before you figure out how to build it.

Ok, back to my second job which was to design and build software to drive a medical ultrasound imaging system. I worked very hard to write a complete external design, which described the was a doctor would use my software. Only when I was satisfied that it was complete did I attack the problem of building that software by writing the internal design. The resulting software proved robust and popular among customers.

type of scanner.

This - possibly apocryphal - story pushed me to learn skill d), the value of testing. I was worried that if there was a bug in my program, it might harm the patient. Lesson: the programmer and quality assurance engineers must be utterly ruthless in testing their own software as early as possible. By the time a customer encounters a bug it is often too late.

Sun Microsystems was a rapidly growing company when I came to work there as a software engineer in 1989. I faced a different type of challenge here because of a recent close call Sun had.

A year earlier, Sun had signed

into smaller, predictable pieces, and then add in some anticipated setbacks to arrive at a reasonable estimate. You need some experience before you can do this well.

Soon our work expanded and our group needed a leader. I stepped in, enabling me to learn skill f). As team leader I provided technical guidance to the team: for example, helping a more junior engineer choose which technology to use for his or her task, or reviewing code. But my most important role was to supply inspiration and confidence, so that the team believed "Yes, we can do it!" and overcame the various uncertainties usually associated with IT projects. I did

BBC Micro

The BBC Micro, affectionately known as the Beeb, was an early home computer. It was designed and built by Acorn Computers Ltd for the British Broadcasting Corporation (BBC). In the early 1980s, the BBC started what became known as the BBC Computer Literacy Project. The project was initiated largely in response to an extremely influential BBC documentary *The Mighty Micro*, in which Dr Christopher Evans from the National Physical Laboratory predicted the coming (micro) computer revolution and its impact on the economy, industry and lifestyle of the United Kingdom.



TECHNEWS

Microsoft unleashes local language computing

STARTECH DESK

AS part of Microsoft's long-term commitment towards Bangladesh, Microsoft Bangladesh has been actively working to prepare the kickoff of the Local Language Program (LLP) to offer computing interface in Bangla language.

LLP is designed specifically to collaborate with governments around the world and to provide them with the tools and technologies needed to realize the societal and economic benefits of the growing IT industry by enabling computer usage in the local language.

The Local Language Program provides great opportunities to people of all cultures, regions, locales and languages by facilitating access and promoting communication and interaction. Through this program, local and regional government participants can localise Windows Vista and Office 2007 to one language interface through a Language Interface Pack (LIP). Hence, creating great opportunities to make computers more relevant to common people and creating opportunities for education, public and private services and addressing the digital divide.

Partnered by Bangladesh Computer Council (BCC) and BRAC University (BU), Microsoft Bangladesh announced the kickoff the Bangla Language Interface

Pack on November 8 at a local hotel.

As part of this localisation effort, BCC to provide the guidelines and glossary of IT terms to be made available to the public upon completion of the LIP. BCC will ensure the appropriate standardisation of terminology so that local developers can benefit from this initiative. In addition, Microsoft will partner up with BRAC University to localise Windows Vista and Office 2007. The localisation will be focus on the User Interface of Windows Vista and Office 2007 Standard applications (Word, Excel, PowerPoint and Outlook).

Microsoft believes that the kickoff will ensure equal footing of all languages and aims at bridging the language and digital divides. LIP will provide a strategic growth opportunity for local developers to augment their development skills, enhance the IT Ecosystem and propel the nation towards prosperity. Hence, through Microsoft's Localisation initiative, computers will evolve as a truly 'language independent' tool enabling every citizen the opportunity to realize their full potential.

Commenting during the launch, Feroz Mahmud, country manager, Microsoft Bangladesh said, "Our partnership with our local partners is a testimony of Microsoft's commitment to Bangladesh." Chris Atkinson, president, South-

East Asia, Microsoft Asia Pacific added, "Microsoft has been a forerunner in the localisation revolution, extending the reach of IT across a diverse set of multi-lingual communities in languages they are comfortable with. Worldwide our flagship products will offer language localisation for 100 languages. We have focused R&D teams working round the clock to create new benchmarks on the product localisation front".

"Microsoft's endeavours to enable it's world's favourite OS and Office Suite with Bangla language consistent with Bangladeshi culture will be a big boost in our effort to adapt the ICT as a tools for development and increased efficiency," said the executive director of Bangladesh Computer Council.

"We are delighted that Microsoft has decided to create Bangla Language Interface Packs (LIP) for Windows Vista and Office. This is the first step to enable access to the information age by the masses in Bangladesh," said Dr. Mumit Khan, associate professor and head of Centre for Research on Bangla Language Processing of BRAC University.

Professor Jamilur Reza Chowdhury, vice chancellor of BRAC university along with the senior officials of Bangladesh Computer Council were also present during the event.

TECHNEWS

Samsung unveils 3-way WiMax gadget

AP, Seoul

SAMSUNG Electronics Co. on Tuesday showed off a three-way gadget that's a phone, personal computer and music player tailored for an emerging wireless broadband technology.

The Mobile Intelligent Terminal was unveiled at a Samsung-sponsored industry conference on Mobile WiMax, which is just coming into use and promises fast broadband connections over long distances.

The device weighs about a pound and contains a fold-out keyboard, 5-inch screen and 30 gigabyte hard drive. It runs the full version of Microsoft Corp.'s Windows XP operating system and also supports the CDMA mobile phone communications standard, which is used in

South Korea and other countries including the United States.

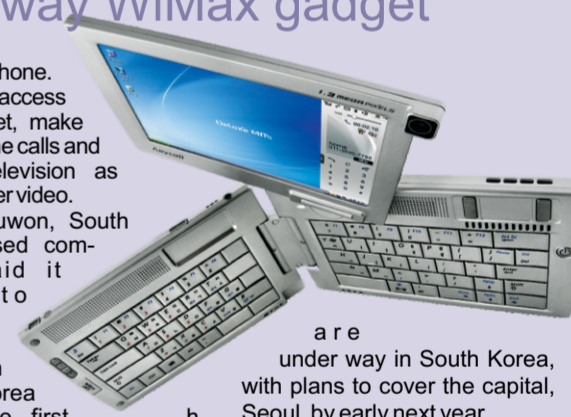
Kim Hun-bae, Samsung vice president for mobile research and development, told reporters that the gadget is the world's first WiMax device that also works as

a mobile phone. It also can access the Internet, make video phone calls and display television as well as other video.

The Suwon, South Korea-based company said it plans to launch the device in South Korea during the first half of 2007. Samsung didn't mention any plans for marketing the device in the U.S. and other markets. It also didn't provide a price.

WiMax has been strongly backed by Samsung, which is cooperating with U.S. companies Intel Corp., Sprint Nextel Corp. and Motorola Inc. to commercialize it in the United States.

South Korea is the first country to commercialize WiMax, which promises fast wireless broadband connections and mobile roaming. Limited trials of Mobile WiMax



are under way in South Korea, with plans to cover the capital, Seoul, by early next year.

Sprint Nextel has said it aims to launch WiMax networks in some U.S. markets by late 2007, working with Samsung, Motorola and Intel.

Samsung is confident WiMax technology will soon become a global standard, a top executive said Tuesday.

"We have established a standard in (South) Korea, but it won't take long to spread throughout the world," Lee Ki-tae, president of Samsung's telecommunication network business, told reporters.

PHOTOTECH



THE BIG FISH

A waterproof Verizon Wireless G'zOne Type-V mobile phone is seen functioning underwater at the 2007 CES Consumer Electronics Show on November 8 in New York City. The show features new electronic technology and consumer product trends ahead of the holiday shopping season.

PHOTO: AFP

STARTECH DESK

GLOBAL Brand Pvt. Ltd, the local distributors of Asus recently introduced the ASUS P525 quad-band PDA phone in Bangladesh market, which incorporates Push E-mail, Wi-Fi support and built-in numeric keypad to deliver a complete mobile business solution, says a press release.

Users can now stay connected no matter where they are. "Business Anywhere" is the design concept behind the P525. As enterprises continue to globalise, business professionals should no longer be confined by their office desks or even wireless hotspots.

Supporting Microsoft Windows Mobile 5.0 operating system, the Asus PDA phone supports office applications, including Excel and PowerPoint Viewer etc., permitting completion of everyday tasks even on the road. With both Wi-Fi and GPRS support built in, the P525 provides wireless online con-

nection for research and instant messaging even when wireless hotspots are not available.

Skype-in and Skype-out functions further reduce costs on long distance phone calls. Combined with Bluetooth wireless technology for quick file sharing without the tangling cables, the P525 delivers true mobile office. The 2M-pixel digital camera of the PDA also acts as a business card recognition device. Simply take a picture of a business card, the P525 will automatically convert information on the card into Outlook's contact list. In two steps, organising business cards collected from conventions and conferences is no longer such a hassle.

The 5-way joystick enables

one-hand menu navigation for accessing and managing the various powerful functions. The smart PDA phone also comes equipped with a numeric keypad for easy input. For those who prefer using a stylus, the 2.8" display is a touch screen as well. For sensitive information, the P525 offers MySecret. Whether it's word documents, spreadsheets, videos or photos, users can save them in MySecret files and protect them from unauthorized personnel. The PDA has a price-tag of Taka 45,000/-.

