evident in Tanveer’s family, where her older brother is pursuing his bachelor of science in computer engineering and the younger one is in school. Furthermore, all of her female cousins are on strong career paths. “I have a doctor, a psychologist, an engineer, and a lawyer among my cousins,” Tanveer says, proudly. “The rest are still in school.”

Pakistan’s school system, like that in the United States, begins around the age of three, with preschool. Students venture through primary, high, secondary, and higher secondary schools, opting between various levels of instruction. They usually graduate higher secondary school at age 18 and can then choose to go on to college for four years. “The percentage of students attending college is very high in big cities like Karachi, Lahore, and Islamabad,” notes Tanveer. “But it is relatively low in underdeveloped areas. The government is trying to improve this situation by building colleges in remote areas of Pakistan.”

Naturally, school attendance is affected by cost. For Tanveer’s upper middle class family, the cost of an education is not too high. Many of her classmates are financially supported by their families as well. For others, there are scholarships and financial assistance available.

Fortunately, it seems equal opportunities are provided to men and women when it comes to getting an education. There are both single gender and coeducational institutions, though it is mostly the universities that are coed. If the university is coed, then the faculty is the same. Additionally, the same subjects of study are open to both genders. Though Tanveer estimates that, in Pakistan overall, more men than women go to school, she believes that the ratio is equal in her area. Even better, she observes, “most often women perform better than men in academics.”

Tanveer is currently in her third year at GCUL, where she is pursuing a bachelor of science degree in software engineering. “I was always interested in computers,” she says. “The creativity and diversity computers offer really interests me.”

There are 40 students total in her class and, together, they appoint one representative to communicate between the students and faculty. Tanveer is proud to have been chosen as that representative. Classes can be lectures or labs, and each classroom is equipped with a state-of-the-art audiovisual system. Tanveer’s favorite teacher is her computer programming professor who she describes as “a very dynamic personality.” He is also the counselor for the IEEE-GCUL Student Branch.

As the chair of her student branch, Tanveer is very active in planning the group’s special projects. Within the branch’s first year, they put together a cricket tournament, various lectures and seminars, recruiting events, and a movie night. “The female students in my branch like working in a combined male and female environment,” explains Tanveer so, unlike the students in Balochistan, “they haven’t established a separate affinity group, though the option is still open.”

After university, Tanveer wants to enroll in graduate school. Despite the economic recession and rising unemployment, her hope is that there will still be plenty of jobs in software development when she finishes school. “I have great dreams for me, my family, and my country,” she says. “There are lots of expectations of me, and I will try my best to live up to them. I am hardworking and honest, so I have nothing to be afraid of. We have a religious saying that if God closes one door, he opens up a hundred more.”

With optimism and drive, it seems the opportunities for women engineers in Pakistan are boundless.

—Leslie Prives

**Media Madness**

Are your files sleeping with the fishes?

I was cleaning out my office recently and came across the media storage that contained my Ph.D. thesis simulations. I remember how proud I was that I had successfully simulated over 2 million simulations for a digital system containing over 1 million transistors on a conventional single CPU computer. I tried my best to make the simulator portable and thought it would be an interesting project to see how it performed on a modern quad-core computer.

Alas, the simulator was stored on something called a TK50 tape made for Digital Equipment Corporation MicroVAX computers. I was told I could go to the computer museum and have it ported to a more recent form of media. I decided that the two patents and Ph.D. degree the work earned me were mementos enough and tossed the tape into the trash, along with old Zip disks and hundreds of three-inch floppy disks. I also found a larger floppy disk with holes punched in it from push pins. Why on earth would I keep such a thing? This memento also had significance in my career. It came from my first internship at the Gillette Company.

I worked in the Management Information Systems department as a systems analyst. One of my responsibilities was designing custom database solutions for those individuals not skilled in using computers. The users loved my software and thought I walked on water. That was until one day when two managers came storming into my office complaining that they had lost their data and the floppy disks I gave them no longer worked. I looked at one of the disks and noticed

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that it was full of holes made from a thumbtack.

I asked him, “Why are there holes in the disk?” The manager replied, “I had it pinned up on my cork board to make sure I didn’t misplace the disk.”

I tried not to laugh but recorded a mental note that I needed to update the user manual I created for my noncomputer-savvy users to tell them that punching holes into the disk was a no-no.

The second manager’s floppy disk looked intact, so I asked him how and where he stored his disk. With a smile and look of confidence he replied, “I use a magnet to hold it up on the metal wall of my cubicle and I don’t use any push pins!”

I thought I would choke trying not to laugh and waited for them to tell me this was all just a joke to evoke a reaction out of the poor naïve intern. I then gave a short tutorial on the manufacturing and operation of floppy disks and explained why magnets and poking holes in the media storage meant certain death for their data. Data carved in stone seems to be the most fault tolerant form of media storage and can survive for thousands of years. What about our digital media? What would happen if power was lost and the knowledge of computers vanished forever? What would someone in the far off future discovering an ancient USB thumb drive, hard drive, or CD-ROM do with these ancient relics? They might do like my mother did and make a picture of a giant shiny fish using the CD-ROMs that I have thrown out over the years.

You may be asking what brought on this morbid train of thought. I’ll tell you. I was trying to find a picture I took with a digital camera. I have hundreds of images with randomly assigned names provided by the camera. In the old days, I would print out my pictures and stuff them in an album.

As powerful as the digital age is, the loss of data through the transition to new forms of media storage makes me wonder how much valuable history and other defining characteristics of our civilization will be lost over time.

Now, everything is on the computer. What is worse is that I literally kill my computers within two years of purchase, such that I have gone through more hard drives in my lifetime than I have new pairs of shoes.

I even bought an NAS to use as a backup system just to store my pictures on so I wouldn’t lose them. It doesn’t matter. I always seem to lose something during the transition from one computer to another or to some newer current state of the art media storage.

I have an arsenal of USB thumb drives. I should make a necklace out of them by hanging them off a rope like shark teeth, since I can’t remember what’s stored on the drives anyway. There isn’t a search engine on the planet that can keep up with my huge quantities of disorganized media and data.

I finally gave up on retrieving the picture for which I was looking. Like an ancient civilization, it was lost forever. Then, when I gave up all hope, my mother called me. I told her how I spent hours searching the computer for a specific picture, when she described with great detail the exact picture for which I was looking. I asked her how she knew and she said, “Because I’m looking at the eyeball of the fish I made out of those shiny circles you always throw out and one of them is labeled with that exact description. I also remembered that you told me that if I glued them, I would destroy the information on them, so I tacked them to the board using push pins in the hole in the middle to secure it in case you ever wanted them back.”

I borrowed her fish’s eyeball and successfully retrieved my picture. At this time, I really don’t need to etch my data in stone to have it survive. It appears that having it stored on a fish is sufficient.

—Karen Panetta