LSI Journal

Divine Design: A Christian Approach to Technology--Part 2

by Dr. Ronald A. Buelow (March/April, 1991)

Man has mimicked many designs found around us. Of course, those designs which we mimic were designed and built by the Great Designer and Creator, our loving God. The computer is one example of how the human brain and reasoning continue to be models for computer hardware and software to emulate. “Ever since the early days of computer science, the brain has been a model for emerging machines. But compared with the brain, today's computers are little more than glorified calculators.”**2** Computers sometimes seem smarter than humans. They can zip through mind-boggling equations or plot a space probe's path past Jupiter. Yet teaching computers the most basic human activities, such as recognizing objects or understanding speech, has proved far more difficult than researchers expected.

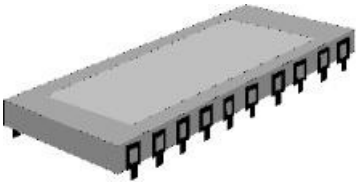
“Nothing we do,” says one computer scientists, “can match a baby's ability to recognize its mother.”**3** A really amazing aspect of a newborn's ability to recognize its mother is that the baby uses a mathematical concept to achieve this skill. According to noted psychiatrist Dr. Eugene J. Mahon, the newborns use a ratio (or proportion). This ratio happens to be the same as the famous proportion known for centuries by artists and architects as the “Golden Ratio” or “Golden Section.” The Golden Ratio has been proven by experiments as particularly harmonious and pleasing to the human senses. Dr. Mahon, who is on the faculty of the Colombia University Psychoanalytic Clinic for Training and Research as well as Columbia College or Physicians and Surgeons, presented his findings in a study in “The Psychoanalytic Study of the Child”, an international publication of psychoanalysis.**4**

The Ultimate Processor: The Human Brain

Engineers are now imitating the human brain itself to produce radical new computers called neural networks. “Researchers are modeling this new breed of super powerful computers after the ultimate processor: the human brain.”**5** The brain was once thought to operate in a centralized step-by-step process much like computers do, but researchers now know that it actually shares information simultaneously among many nerve cells, called neurons. Neural network computers mimic this structure. Present versions provide the equivalent of only a few hundred of the 100 billion neurons in the human brain – but they already seem to beat conventional computers at some tasks. To recognize the letter A, for example, a current computer must sort through all of the letter patterns it knows, looking for a fit. The more patterns it contains, the longer the search. The brain doesn't work the same way: “Otherwise,” says neural network theorist, Stephen Grossberg, “ as you grew older and had more faces in your memory, it would take you longer to recognize your parents.”**6** “According to one expert, the visual system of one human being can do more image processing than all the supercomputers in the world put together.”**7**

This new concept of computing (neural networks) could mean a totally different approach to controlling computers. Programming would give way to 'training' of computers. Neural network computers can 'learn' from their mistakes. The human brain does this learning in an interesting way. Simply put, if two neurons are active at once and they're connected, then the synapses (connections in the brain) between them will get stronger. . .the network appears to 'learn by experience' because connections that are used often are

reinforced.**8** Neural networks, according to a Defense Advanced Research Projects Agency study, are a long way off from achieving the connectivity of the brain; at this point a cockroach looks like a genius."**9** At Synaptics, Cal Tech's Carver Mead is designing analog chips modeled after the human retina and the cochlea. Building chips like these can take two to three years each. To make the very smallest electronic parts, one Maryland research company thinks we should enlist the aid of living cells. State-of-the-art components are already small compared with cells, but EMV Associates believes that future circuit parts could be smaller still if they were nothing more than organic molecules, such as proteins, made by living cells. "This is the next logical step down," says James McAlear, president of EMV. Certain natural proteins, such as the hemoglobin in red blood cells, change shape slightly when the electric charge they carry is altered.



This change in shape means a protein such as hemoglobin could be used as an electronic switch, says McAlear. One shape would mean on; the other, off. Information in this form – the ones and zeros of binary machine language – is the basis of computer functioning.

God is the Author of Logical Reasoning

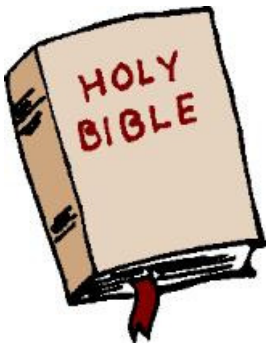
People cannot communicate or function successfully without using logic. Whether you regard yourself as a logical person or not, you must use logic to do your job, to learn, to listen, to talk, to write, to calculate, to estimate and to make the thousands of decisions you make each day to live in society. God chose to make logical reasoning part of the gifts which he gave us to operate with. And He chose to communicate with us using the same logical ability He gave us.

Yes, God's Word in the Holy Bible is presented with logic. No, the truths presented are not necessarily logical to the human mind, but the truths are presented to us logically.

There are thousands of passages in Scripture which use the if/then form. Many other passages are written in parallel form so that we can make the logical comparison and application to our lives. These passages are usually called parables. When the Jews would try to trap Jesus with logic (very often) during his ministry on earth, Jesus would respond with logical questions of his own. This logic was recognized by his non-believing enemies to have turned the question back to themselves, and they could not answer. Another form of logic used in Holy Scripture is the either/or situation. God tells us that either we serve Him or we serve man, there is no partial service possible. This form of logical reasoning (called the exclusive or), is used very frequently in mathematics and computer programming.

Many times these forms are combined by God in the Bible to logically presented His truth. An example is "Whoever believes and is baptized will be saved, but whoever does not believe will be condemned." (Mark 16:16) This passage is really two different if/then logical statements. The first tells that if we believe and are baptized, then we will be saved. The second says that if we do not believe, then we will be condemned. The conjunction of two logical statements is another logical ability needed in mathematics and computer programming.

As Christians We Should Use Logic and Reasoning Well



Our God-given abilities in these areas can be enhanced and fine-tuned with the study of mathematics and computer programming, as well as with other studies.

We have a responsibility to develop and use this gift of God. The Christian needs to know God's truth and to be able to communicate it to others. Christians are not required by God to appear as dumb or dumbfounded by logic and technology. Rather, they should master these gifts of God and use them as God-given gifts to help with their mission in life.

Powerful Tools Demand Responsible Use

In the computer and its logical abilities we have a very powerful tool whose speed, design and logical abilities were made possible by God's creation. With power we must also carry responsible use. When you write a computer program, you have tremendous power at your fingertips. You can design an operation your way. You are responsible for how it works. This is a great feeling, a feeling of power.

There are also times when your program does not work or allows errors to be output. This is not completely avoidable. The programmer is constantly testing his program to eliminate any possibility for error or misleading output. Especially if you are preparing a program for public use, you must attempt to anticipate a great variety of approaches to the use of your program. It is probably not possible to anticipate all of these possibilities, but the success of your program could well rest on your ability to anticipate as many as possible and on the time it takes to plan for these possibilities.

<u>Some examples of software programming errors which caused personal grief or disaster are listed below:</u>

1) In 1986 bugs in the Space Shuttle STS-6 mission software caused mission aborts to be shut out.
2) In 1984 the Gemini V craft landed 100 miles off course because the software ignored orbital motion around the sun in its calculations.
3) In 1986 an F-18 jet crashed because of a missing exception in the program logic. The pilot was O.K.
4) In 1984 an F-14 jet went into an uncontrollable spin and crashed because of faulty software.
5) In 1987 a hospital received 120 phone calls from a computer with faulty software, encouraging a vote for Ronald Reagan.
6) In 1987 a faulty computer program blocked the promotion of a fifth grader.

(Source: “Illustrative Risks to the Public in the Use of Computer Systems and Related Technology,” compiled by Peter G. Neumann, June 26, 1987)

This aspect of programming can be discouraging. It can also cause a great deal of anxiety. Knowing that if something goes wrong, you are the one responsible can be a good monitor for you to produce quality, but it may also cause the programmer to make mistakes under pressure. It is no different with any other powerful tool.

Someone skilled and careful must do his very best. The Christian will look at his programming work (as well as all other work) as if he were doing it for the Lord. “Whatever you do, work at it with all your heart, as working for the Lord, not for men.” (Col. 3:23) *LSI*

Notes

2. Freundlich, Naomi J., “Brain-Style Computers”, Popular Science, Feb., 1989, pages 69-70, 110.
3. Rogers, Michael, “Mimicking the Human Mind,” Newsweek, July 20, 1987, pages 52-53.
4. Tsunoda, Waka, “Newborns Recognize Mom's Face by ‘Ratio’ of Her Facial Features”, The Herald Palladium, page 15, 1985.
5. Freundlich, p. 69.
6. Rogers, p. 52-53.
7. Freundlich, p. 69.
8. Ibid, p. 70.
9. Ibid, p. 110.