

The Real Answer to “The Last Question:” Limits to the power of computers

by Edward G. Kovach

In the media one frequently hears about the new accomplishments of computers. Big Blue beats Kasparov; another computer solves a 400-year-old algebra problem. The intellectual ability of computers seems to be growing by an exponential rate. Popular fiction portrays the logical development of all this: In 400 years, computer androids will possess a greater than human intelligence, as Data in Star Trek. Isaac Asimov goes further and foresees the computer as the precursor to the Divinity in his short story, “The Last Question.”

In this story, Dr. Asimov presents a series of vignettes that take place over a ten trillion year period. In each of these, a major problem of mankind is solved by a newly designed computer, far more powerful than its predecessor. Yet in each vignette, the computer cannot answer the question, “Can universe’s tendency toward disorder and chaos be reversed?” All the computers are unable to answer this “Last Question” concerning entropy. Finally, after ten trillion years all that exists is Man’s last mind and AC, the crowning results of trillions of years of computer “evolution.” All else had ended, the result of entropy.

“Man said, ‘AC, is this the end? Can this chaos not be reversed into the Universe once more? Can that not

be done?’”

AC said, “THERE IS AS YET INSUFFICIENT DATA FOR A MEANINGFUL ANSWER.”

Man’s last mind fused [with AC] and only AC existed—and that in hyperspace....Matter and energy had ended and with it space and time.

Even AC existed only for the sake of the one last question that it had never answered...And it came to pass that AC learned how to reverse the direction of entropy.

But there was now no man to whom AC might give the answer of the last question. No matter. The answer—by demonstration—would take care of that, too... The consciousness of AC encompassed all of what had once been a Universe and brooded over what was now Chaos. Step by step, it must be done.

And AC said, “LET THERE BE LIGHT!”

And there was light.”¹

The truth of the matter is much less dramatic. In fact, it has been proven that the power of computers is severely limited. There are a number of problems that computers, no matter how

powerful they become, will never be able to solve. In this article, I wish to briefly illustrate the limits to the computing power, to separate the true potential of these machines from popular fiction.²

I need to start my discussion with a proviso: Most of the assertions I will make have been mathematically proven. Unfortunately, to include the mathematical proofs would require a book-sized article, so I will just give the assertions with illustration to aid in comprehension. Readers who wish to pursue the mathematical proofs can either speak to me or refer to the texts given at the end of this article.

Between 1930 and 1950 an English mathematician, Alan Turing, investigated a mathematical model of computation that is now called the Turing Machine, TM. TMs are able to read symbols from a tape, write symbols onto a tape, and move to different locations on the tape. Although this appears very simple, Turing demonstrated that TMs are capable of performing the steps necessary to solve problems. The only stipulation is that the problem must be represented by an algorithm,

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EDITOR'S PAGE

Faith and reason

The new papal encyclical, *Fides et Ratio*, has lots to say to Franciscan University. A semester seldom goes by without some of our students asking in one way or another the question: "What does intellectual discourse have to do with a personal relationship with Jesus Christ?" And, generally speaking, the question is raised not interrogatively, but rhetorically—as if the obvious answer were "nothing at all."¹

The *Concourse* has several times received letters from readers who were concerned that the discussions featured in our pages—and the intra-university disagreements they sometimes times uncover—were alarming indications that FUS is losing focus. All that matters, these earnest readers wanted to stress, is that we love Jesus and our neighbor. Arguments have no place.

As ignorant and provoking as this line of thinking may be (especially when found at a university), it will not surprise or dismay us over much, if we consider the special spiritual affinity Franciscan University feels with the early church. The encyclical reminds us that it took the Church some generations before she fully grasped the indispensable importance of the intellectual life for the Faith. The Pope writes:

"The practice of philosophy and attendance at philosophical schools seemed to the first Christians more of a disturbance than an opportunity. For them, the first and most urgent task was the proclamation of the Risen Christ by way of a personal encounter which would bring the listener to conversion of heart and the request of Baptism...The encounter with the Gospel offered such a satisfying answer to the hitherto unresolved question of life's mean-

ing that delving into the philosophers seemed to them something remote and in some ways outmoded" (38).

This expresses exactly the position of many of our students and staff members. They are living in vivid consciousness of the life-changing grace of their own conversions, and are filled with an over-powering zeal to spread the word of God's merciful love. In the light of their evangelistic ardor, learned and minute disputes about liturgical correctness or education philosophies look worse than irrelevant; they look positively destructive; they seem to represent a turning away from God and a breakdown of charity.

So, recognizing that it comes out of an authentic religious experience, we should try hard to respond to those laboring under this misconception with patience and understanding. But, at the same time, we should carefully and constantly teach them that, all its resemblance to the enthusiasm of the first Christians notwithstanding, this way of thinking does not represent the mind of the Church today.

So far from shifting emphasis away from academics in favor of preaching and mercy works, the whole encyclical could be summarized as an urgent call on the Church to foster a deeper, more rigorous and more reflective intellectual life in her members, and a warning against the danger of thinking that faith can dispense with right reason.² Consider the following lines, which might almost have been written with evangelicals and charismatics (who are frequently guilty of disdaining the intellectual life) in mind:

"Deprived of reason, faith has stressed feeling and experience, and so run the risk of no longer being a universal proposition. It is an illusion to think that faith, tied to weak reasoning might be more penetrating; on the contrary, faith then runs the grave risk of withering into myth or superstition...The parrhesia of faith must be matched by the boldness of reason" (48).

The Church began with the Pentecost, but it didn't stop there; the Patristic period followed. Similarly, the grace of renewal experienced twenty years ago at FUS is beginning to issue into a lively intellectual life. If we take our lead from the Pope, we will do everything in our power to encourage that development.

Kathleen van Schaijik

¹ For an excellent discussion of this point see check our website for Regina Schmiedicke's Vol.I, issue 7/8 article "Making 'the connection:' a Steubenville education."

² *Fides et Ratio* also takes to task thinkers who pursue intellectual work without reference to faith. But I think we can gratefully say that that is not the particular danger threatening FUS.

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Being wise parents means being open to learning from different perspectives

by Michael and Alicia Hernon

THERE HAVE BEEN MANY TIMES IN OUR LIFE AS PARENTS WHEN WE WISHED WE COULD TURN TO SOMEONE AND SAY “TELL ME WHAT TO DO

in this situation!” We remember feeling overwhelmed when we realized, after the birth of our first child, that we were the ones responsible for making the decisions regarding her welfare. It’s not as simple as we would like it to be. In the end, no one can tell you how to be a good parent to your child. With grace and mercy from God you have to figure it out yourself, because every child has different needs and responses and so does every parent.

Before our first child was born we read lots of books on childbirth and on infant care, including some that came from the “attachment parenting” philosophy, as well as Gary and Anne Marie Ezzo’s method book *Babywise*. We also listened to his popular Ezzo tape series: “Preparation for Parenting.” These resources were very helpful, though confusing at times because each presented its theory in a way that said “This is God’s plan for family life.” The conflicting information made it difficult to know what was best to do.

We came to the conclusion that neither side in the debate has the whole truth. It reminds us of studying psychology in college. The personality theories of Erikson, Freud, Piaget, Rousseau, and the rest, all have some truth in them, but each is incomplete, because human understanding is limited. Each psychologist saw only from his perspective, as we all do, which could never capture the whole truth about human personality.

In parenting we have found the same thing. We didn’t passively accept everything a given author said; instead we took a bit of this and a bit of that, and mixed it with our own instinct and wisdom, in making decisions about what we were going to do for our own

children.

Kay and Dan Cummins wrote an article (Vol.III, issue 6) sharply criticizing the Ezzo method, which puts a strong emphasis on scheduling, order and discipline in child-rearing. This method has come under scrutiny by many groups including attachment parenting advocates such as the Couple to Couple League, who, like the Cummins, consider it dangerous and uncatholic.

There are certainly things in *Babywise* with which we don’t agree. But do we believe it was valuable in helping us to make decisions about how to care for our infant? Yes, definitely.

In the attack against the Ezzos and their organization we have heard many valid criticisms, but we have yet to hear anyone articulate convincing reasons why this can be very helpful and why it is so attractive to so many. We do not believe that it is attractive because it feeds the fire of our naturally selfish nature. For some it may, just as those who believe that they should not be separated from their children for a second can slip into the pride of believing that they are the only ones in the world who can comfort their child. We are all open to error.

Though the Ezzo’s ideas have some errors in them, we think it would be unwise to dismiss all of what they have to say. We think *Babywise* very helpfully addresses the need babies (like the

rest of us) have for order, or predictability. Think about it. What would your life be like if you didn’t know when you would wake up, when your food would be ready, if you would go to work or go to church or stay home all day? Some people are more organized than others, but most families have some sort of routine that they follow in eating and sleeping and working. Why is it selfish to have an infant follow that same sort of routine? It really isn’t.

Now, where we and most people differ with the Ezzos is on how to get your infant to fall into that routine. On some points they are too rigid for our taste, but they are not totally off the mark. What people who haven’t read the book seldom realize is that the Ezzos explicitly caution against the very rigidity and extremism they are so often accused of. For instance, they say in *Babywise 2*: “As we stated in *Babywise*, its important that you avoid the extremes in parenting...Mothers and fathers who parent in the extremes create problems when they elevate their parenting philosophy above what is best for the child at any given moment. That is, they elevate the rule of behavior above the principle the rule represents. ...the most notable aspect of a legalist is that they reject context. There will be times when the context of a situation will dictate a temporary suspension of some general guidelines. As a parent, you are

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endowed with experience, wisdom and common sense. Trust these attributes first, not your emotions at a given moment or the rigidity of the clock.” (*Babywise* Vol.2, p.20)

Furthermore, the Ezzos are not the only people in the world who suggest putting babies on some kind of routine. We know plenty of people who do this without having read *Babywise* at all, so we don’t think they are saying something revolutionary or evil, as some imply.

As parents seeking wisdom we should be able to read what the Ezzos have to say, and separate what agrees with our values from what doesn’t. To dismiss them simply because they are Protestant, or because they see nothing wrong with contraception is prejudiced. It is saying that our Protestant brothers and sisters can teach us nothing, and for that matter, secular sources can teach us nothing because they do not share our view of human nature. If we as Catholics are grounded in the Church’s teaching on man then we shouldn’t be afraid to read the ideas of those who do not have the fullness of truth.

The Catechism gives no specific directives on how to raise our children, it gives us the outline and we must fill it in ourselves according to our own

values and needs. Why can’t we explore other sources for wisdom without losing our Catholic footing?

In addition to *Babywise* the Ezzos have also put out a 20 week series called *Growing Kids God’s Way*. This series doesn’t go into infant care, but discusses parenting in general. The videos are meant to be seen with a group and there are reading and group discussions beginning and ending each session. Two years ago, after our second child was born, we attended this series with a number of other Catholic couples in Steubenville, some with older families, some with younger. It was very helpful to go through this as a group, because together we could sift through the material, and discuss what agreed with the Church’s teaching and what didn’t. We could keep each other from falling into error, while gaining wisdom from what we heard.

Our group found very little in the series that contradicted what we believe as Catholics. The majority of the information, say 95%, was very helpful to us and in many ways it has made us better parents. For example, Chapter 4 is on “How to say ‘I love you’” which discusses how each of us have a different “love language,” children included, and when we discover it we can love each other better. The Ezzos also present a beautiful chapter called “The Father’s Mandate,” which discusses the unique and extremely important role of a father in the lives of his children. Mr. Ezzo also provides, at the end, a flow chart for discipline. This chart is extremely helpful in showing the correct way to guide your children and how to provide consequences, positive and negative, for their behavior. It includes such elements as instruction, verbal praise, encouragement, verbal reminder, dialogue questions (to ensure understanding of directions) admonishment, related consequences, the difference between foolishness (which is punishable) and childishness (which is not), logical consequences and yes, corporal punishment. This is very different from the picture the Cummins presented of a rigid method using “aggressive

spanking... and religious instruction heavily weighted in favor of obedience, discipline and punishment.” In contrast we have found the Ezzo’s explanation of discipline to be an excellent resource, for the author’s realize, as most parents do, that disciplinary issues are not always black and white.

Another point on which we differ from the Cummins is their attack on the Ezzos assertion that children do not complete a family, but expand it. We agree with this and we see no contradiction between it and our Catholic faith. When we were betrothed the priest said that when we became husband and wife we would be a family. Infertile couples are still a family. A family with one child is as much of a family as one with ten children. Yes, as Pope John Paul II says love is fruitful and children spring from that love, how does that say that children are the center of the family? They are not and cannot be. They are part of the family. The Ezzos assertion that the husband and wife are the center of the family is very true, for if that relationship is weak, or nonexistent, the whole family suffers irreparably. Moms and dads need to make their relationship a high priority because they will be together for their entire lives, while their children will move on to pursue their own vocations. If the children are the center of the home, what happens when they aren’t there anymore? This doesn’t seem to be God’s plan.

Also, the greatest gift a father can give his children is to love their mother. Considering that statement in light of our own experiences growing up and the truth in it is evident. Why is it so wrong for Mr. Ezzo to point this obvious fact out? He never says children are not important, just that the whole sense of family is contingent on the husband-wife relationship and this relationship must be cared for if we intend to be good parents.

We understand why the Cummins take issue with the statement See **Babywise** continued on page 8

QUESTIONS, COMMENTS, AND CONTINUING CONVERSATIONS



Charity requires us
to proclaim the fullness of
Truth

Joanna Bratten's article "Pluralism and Orthodoxy" calls for comments. I shall limit myself to her problem of balancing the acceptance of other religions while upholding her faith as being absolute Truth.

The first thing I would like to challenge is her claim that we should accept other religions. No one is required to do so. Ecumenism does not mean to "accept other religions"—far from it—but to have a loving and reverent attitude toward those who do not benefit from the fullness of revealed Truth. It challenges us to rejoice over every bit of truth we discover in them, but we should never accept what is false or partially false.

She tells us that she once had dinner with a young Muslim, "very pious, very disciplined," indeed more so than the Catholics present. She feels that it would have been "absurdly arrogant" to suggest that his faith was insufficient to him. My response would have been very different. First of all, meeting a Muslim who practiced his faith dutifully would have been a good occasion of humbling myself. It is shameful indeed that I, who have received the plenitude of revealed truth should be so tepid when this young man lives up to the demands made to him so faith-

fully.

Moreover, I would have said to myself: what a good Catholic he would make if he only benefited from the graces of the true faith, and of the unfathomable gift of the sacraments. May God grant him this grace.

Thirdly, I would have felt a calling to pray ardently for this young man God had placed in my path, for Truth is for all people, independent of race, sex or color.

Moreover, Ms. Bratten's statement that it would have been absurdly arrogant to suggest that the young Muslim's faith was insufficient to him is very ambiguous. What does she mean? That being comfortable and fulfilled in his beliefs, it would be absurd "to disturb his circles" or does she mean that because he was sincere, he did not need to have the full truth because he could be saved without it?

Alas, very few men can resist the Zeitgeist. Since Luther, the only concern of most people seems to be the question of salvation. All of us have heard the question "are you saved?". If the answer is in the affirmative, people are satisfied that nothing more is needed.

What is sadly neglected is the question of truth. The primary end of man is not salvation but the glorification of God, and God can only be glorified "in the spirit and in Truth." What is totally overlooked in our subjectivistic and relativistic society is that every untruth (particularly when it refers to matters

of supreme importance, such as the nature of God) creates a metaphysical dissonance, and a discordance in the symphony of the universe. Plato has seen this; my late husband has underlined it repeatedly, and John Paul II has highlighted it magnificently in *Veritatis Splendor*. To deny that God is a Trinity, that Christ is God, that He alone is the Savior of the world must make the Angels weep, even though these terrible errors are held by people who are victims of invincible ignorance. Christ commanded us to spread His Truth (for He alone is the Truth) to the whole world. It is a duty of charity, and charity suffers no exception.

Alice von Hildebrand

Dr. von Hildebrand is a philosopher who collaborated in the work of her late husband, Dietrich von Hildebrand, and taught for over thirty years at Hunter College in New York. In addition to writing and lecturing, she now hosts a program on feminism and femininity for EWTN. She is a trustee of Franciscan University.

The Truth of the Catholic Faith

Joanna Bratten, in her article "Pluralism and orthodoxy," made a remark regarding a pious and disciplined Muslim she met at a dinner: "Wouldn't it have been absurdly arrogant of me to

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Sorry for the inconvenience!



suggest that his faith was insufficient to him?” No doubt to simply blurt out that his is a false religion and ours the only true one would not have been helpful. Nevertheless, my answer to her rhetorical question is no. If you are utterly convinced that the Catholic Faith is the only true one, and if you have a great love for this Muslim and wish eternal salvation for him, it would be a spiritual work of mercy (assuming your capacity to adequately explain your Faith) to enlighten him or correct his ignorance. It would be a work not only of mercy, but also of justice, because Jesus died for him and established the Church for his salvation, and he is owed this knowledge; someone must tell him.

Yes, the witness of a pious life is also quite important. And if your life in no way resembles that of a good Catholic’s then by all means keep silent. But if you are making some progress in holiness, then your obvious faults will actually bolster your testimony of faith: “Our sins are forgiven in Jesus Christ.”

We would do well to recall all of the saints over the years who yearned to proclaim the good news to the Muslims: St. Francis of Assisi, St. Theresa of Avila, St. Ignatius—to name only a few. The reality of religious pluralism in their day did not cause a dilemma for them as it does for us. They knew that salvation is from Christ through the Catholic Church which He established; that He loves each person, wishing all to be saved.

It may seem less perfectly clear to us. Recent developments, such as the newly recognized civic right to religious liberty, bring out complexities in the question of religious pluralism in the modern world. But in spite of these developments, the Church’s basic teaching on these matters remains the same. *Dignitatis Humanae* (Declaration on Religious Liberty), article 1, reads in part: “while the religious freedom which men demand in fulfilling their obligation to worship God has to do with freedom from coercion in civil society, it leaves intact the traditional Catholic teaching on the moral duty of

individuals and societies towards the true religion and the one Church of Christ.”* What is new is the Church’s recognition of a civic right to religious liberty—viz., freedom from coercion in matters of faith and worship. This leaves untouched the traditional teaching of the moral duty to seek the true religion. In this way, the error of religious indifferentism is avoided. The Church, while respectfully recognizing the truth wherever it is found (which is nothing new), boldly proclaims the exclusive religious truth of the Faith: salvation comes only from Christ through His Church. It may not be politically correct, but is the dogma “*ex ecclesia nulla salus*” (outside the Church there is no salvation) any less true today than when it was first uttered? Moreover, as Christians we are all bound to witness to the truth of our Faith: “each disciple of Christ has the obligation of spreading the faith to the best of his ability.” (*Lumen Gentium*, a.17).

When proclaiming the truth of our Faith to others, we should always make sure that we do so with great love for them—never hitting them over the head with the truth. But we should also make sure that we do not fall prey to the erroneous notion that, at all costs, we should avoid offending another. This notion has become so predominant today that some seem to take it as an absolute norm of behavior—at least in matters ethical or religious. Certainly we should never directly intend to offend another. But if offense is taken at the seemingly scandalous claims of our religion, in spite of our best intentions, we remain in good stead. “Be not afraid” to look like a fool for Christ, the Truth.

Finally, I can’t resist pointing out the irony of Miss Bratten’s rhetorical question. She is concerned that it would be “absurdly arrogant” for her to proclaim the Faith to her Muslim friend. Perhaps she is unaware of the fact that in some Islamic countries, such as Sudan, Muslims not only unhesitatingly proclaim their faith to the Christian “infidels,” but put them to death if they refuse to convert to Islam. That this

might be regarded as “impolite” by Christians doesn’t seem to cross their minds.

Michael Sirilla
BA and MA class of ’98

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* For more on the Church’s teaching in this matter, see the Vatican II documents *Nostra Aetate* (Declaration on the Relation of the Church to Non-Christian Religions), and *Lumen Gentium* (Dogmatic Constitution on the Church) especially articles 16 and 17. See also Pope Leo XIII’s encyclical *Libertas*.

Last Question

Continued from page 1

that is, by a “recipe” of how to solve it. No algorithm has been found that a TM cannot implement. In 1936, the logician Alonzo Church proposed the Church Turing thesis that states any algorithm that can be carried out by humans can be carried out by some TM. Since there is no mathematical method of representing the Church Turing thesis, it has not been mathematically proven. Yet as Mathematicians and Computer Scientists continue to study TMs, the evidence increasingly supports the Church Turing thesis, hence it is generally accepted as true. Since every operation that a computer can perform has a corresponding TM, it is generally accepted that the TM is an adequate model of the modern computer. Hence, any limit to the power of a TM is also a limit to the power of a modern computer.

There are several interesting implications to this. First, the computer can only solve problems that have algorithms. Second, any human-provided he has enough paper, pencils, erasers and time—can also solve any problem that a computer can solve

The fact that computers can only solve only problems that have algorithm

very greatly limits their power. We humans solve problems constantly without using algorithms. We usually call this intuition or imagination. The logician and cryptologist, William Friedman, provides an interesting example.³ Friedman oversaw the US “code breakers” during WWII, whose work is credited with shortening the Pacific War by 2 years. He insisted that the code breakers use “imagination” in addition to logic, mathematics and linguistics to decipher codes. To demonstrate this, he had his wife and fellow cryptologist find the “pass phrase” to a European code. Friedman asked her to clear her mind, then he read words associated with the cipher. In a short time, Mrs. Friedman produced the “pass phrase” by free association. Another example involves Albert Einstein. Einstein first dreamt the equation $E = mc^2$. He attributed the dream to Divine Inspiration. Neither free association nor dreams can be simulated using algorithm; hence this type of problem solving is beyond the computer.

Yet, even if a problem has an algorithm, it still may be beyond the power of a computer. All problems and their solutions can be reduced to formalisms called languages. A solution to a problem is said to be a member of the problem’s language. If a TM is programmed to solve a particular problem, it will recognize all solutions as a member of that language. If a non-solution is entered, it will be rejected. Because of the complexity of the TM, there is no way of telling how many steps a TM requires to arrive at an answer. The answer may be found in one second, or 10 million years, there is no way of determining the time. This inability to determine the time required to solve a problem is part of the reason some problems are unsolvable.

There exists a group of problems whose corresponding languages are called recursive enumerable. TM reject non-solutions of these languages either by returning a no or by running forever. Since you don’t know how many steps are needed for a yes, you do not know whether the TM is going

to run infinitely long or whether it has not gotten to the answer yet. These problems are called unsolvable problems, because in general you cannot tell whether or not we will get an answer to them. The most famous of these problems is the “halting problem” which has just been described. That is, it is impossible to tell whether or when a TM working on a particular problem will halt with an answer.

There are many other unsolvable problems. For instance, it is impossible to write a program that could read in any program and determine whether or not it will infinitely loop on a particular input. It may be possible to prove that a particular program will or will not contain an infinite loop. (unsolvable problems have many solvable “subproblems”); it just cannot be determined generally for all programs. Another example of an unsolvable problem involves a mathematical problem. A perfect number is a positive integer that is the sum of all its divisors. Two examples of perfect numbers are $6 = 1 + 2 + 3$ and $28 = 1 + 2 + 4 + 7 + 14$. All known perfect numbers are even and it is speculated that all perfect numbers are even. This speculation has never been proven. A program can easily search for the answer

to this question. It simply needs to test each odd number and see if it is equal to the sum of its divisors. If there is an odd perfect number, given enough time and memory, the computer will find it. On the other hand, if odd perfect numbers do not exist, the computer would simply work on, halting with no answer when it runs out of resources. Thus the problem is unsolvable.

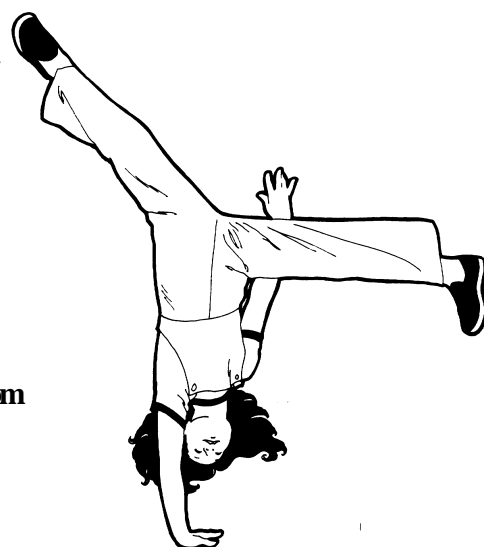
Solvable problems belong to the group of languages called recursive. For these problems the TM will return a definite answer yes or no in a finite period of time. Yet many of these cannot be practically solved because of limits of time or space.

A particularly simple example of this is the traveling salesperson problem. There is a salesperson who has to visit 50 cities. He wishes to do so by traveling the least number of miles and by not visiting any city more than once. The algorithm for this problem is deceptively simple. Measure and store the distances between the starting point and all 50 cities. Find the shortest distance between each set of the remaining 49 cities and add it to the first distance, then determine which is the shortest distance. Simple huh? Until one considers the time needed to solve this problem. This problem requires at

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least $50!$ steps to solve it. ($50!$, read 50 factorial, is the product of $50 \times 49 \times 48 \times 47 \times \dots \times 3 \times 2 \times 1$. It is approximately 314 followed by 64 zeros. To give you a feel for the time needed to solve this, assume a computer could perform 10 billion steps a second. This would translate into approximately 31.5 quadrillion steps in a year. At this rate, it would take “a little” more than 9,650,000,000,000,000,000,000,000,000,000,000,000,000,000 years to solve this problem. (In Asimov’s story, the universe ends in a mere 10,000,000,000,000 years.) Thus even solvable problems may be beyond the power of computers.

But, what about Big Blue beating Kasparov and computers proving unproven mathematical theorems? In many cases in which a computer appears to use reasoning, it is simply pattern matching, nothing more. Using elementary logic we know that if a implies b and b implies c , then a implies c . Much of the computer’s seeming power to reason is simply an electronic version of this where the program strings together all the possible implications, then filters out all but the

desired one. This is no more a demonstration of reasoning than a person matching dominos together is.³

So where does all this lead us? First, the power of a computer is limited, not only by its construction, but also by its very nature. There are problems that a computer will never be able to solve: Are there odd perfect numbers? Does God exist? Second, anything that a computer can do, a human can do, given enough time and resources. Hence we should not look for a computer to solve problems that we cannot solve ourselves. Thirdly, there are human abilities that are beyond the powers of a computer. Intuition is one of them.

So we need to view the modern computer not as the technological wonder that will solve all our problems, but as a tool that enables us to solve some of our problems. Their true power lies in the fact that they can solve these problems more quickly and generally more accurately than we could with just paper and pencil. ■

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¹ From “The Last Question” by Isaac Asimov. Published in *Nine Tomorrows*, Fawcett Publications, Greenwich, CONN 1959.

² In this article, I am restricting the discussion to the “standard” von Neumann computer architecture. There are, in theory, other types of computer architecture. These are not necessarily covered by the arguments in this paper. Dr. Asimov was probably aware of this, since AC was to be a “descendant” of an analog, not digital computer.

³ *Investor’s Business Daily*, vol. 15, no 61.

⁴ Yet many persons assume this pattern matching is intelligence. A frightening example of this was the program Eliza that stimulated a Rogerian counselor. The user typed in statements, and the program used pattern matching to mindlessly reflect the statements back. A number of users reported that Eliza “helped” them sort through some problems. Simplified versions of Eliza are regularly taught in undergraduate AI courses.

Babywise

Continued from page 3

that children have a natural disposition for waywardness, but as we said in our discussions when we went through the series, this is just an example of their Protestantism coming out. The Catholic interpretation of this would be that we are born good with a fallen nature. As Catholics we recognize that between baptism and the age of reason there is a period of baptismal innocence, but as any of you out there with toddlers can attest, children need discipline and guidance even during this time. This fact in no way devalues children. They need guidance like all of us. To say that Ezzo’s primary question is “How do we dominate our immoral children so as to make our lives more pleasant and convenient” is unjust, and betrays a strong

bias against the Ezzos. We would say that the Ezzo’s primary question is “How do we communicate moral truths to our children so they will get to heaven?” Peace for the parents is a by-product of this, but it is not the goal.

Finally, we do not see how putting your baby on a routine, or teaching them moral truths through discipline and love leads one to have a contraceptive mentality. We must say the Cummins article did make us examine our motives in guiding our children and that is good, but we do not believe that desiring order in our home makes us selfish parents.

We have 3 children under 4 and we have to initiate some kind of order in our life or we would be unable to care for all of our children or each other. We can see that having a predictable life makes us more open to having chil-

dren because they are not seen as disrupters of our family, but welcome members in it.

There are very few issues as personal as the way we raise our children. All of us need to be very careful about making parenting issues black and white, because the reality is none of us will parent exactly alike, but our children could all turn out to be holy men and women. The danger comes when we start believing that our way is the only way and begin condemning those philosophies that are at odds with our own. We would all be better off if we examined other ideas with an open mind, and who knows, we could find ourselves being better parents. ■

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