Friday, November 14, 1980

math NEWS

Volume 24, Number 9

Lecture Series

The first lecture in the Math Society Lecture Series was given Monday. Professor Lee Dickey talked about "Inversion and the Dunce's Cap," to a group of about 15 students.

Inversion is a transformation of the plane which has some rather strange properties. For example, the image of a straight line may be either a circle or a straight line, and the image of a circle may also be either one. In fact, it's easier to talk about if you give the plane one more point, that lies on every line (which you might want to call "the point at infinity"). Then your lines are really just circles of infinite radius, and the transformation maps circles to circles. Prof. Dickey proved some of these properties, and then gave some applications of inversions.

He outlined the proofs of Steiner's Porism and the Bundle Theorem, two theorems of plane geometry that are very difficult to prove by standard methods. By basing his proofs on inversions, the results came quite easily.

The dunce's cap? Well, that's just what your picture looks like when you generalize the inversion to a sphere.

The next lecture has not been scheduled yet.

Duncan Murdoch
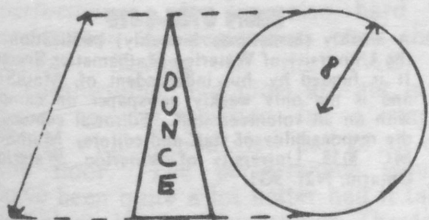
A young statistician named Lou
Had but four observations too few...
"Confound it!" he muttered,
"My mind is too cluttered —
Eight half-observations will do!"

bwlutek

Broomball Report

In which we answer the question, what would happen if they held a broomball match and nobody scored?

Seems odd that after scores of 15-1 and 14-0 (default) we suddenly ground to this kind of halt. The result of the game against Free Radicals 'A' on November 2 was a scoreless tie! Both offences were shut out. It was also observed that both defences shut out the opposing offences. Coach Ashok Patel, when asked for an opinion on the lack of offensive punch, mused, "well, I guess nobody scored."

Quote of the game: Stan 'the Man' Mikoluk, star right winger for the Mathsochists, was heard to say, "geez, time to get serious, I gotta score a goal;" nary a second later, the buzzer sounded.

The game was perilously close to a disaster all along, but the stiff goaltending and all-powerful force of luck kept us in the game.

The next game is Tuesday, November 16. We're psyching ourselves up for it.

Red
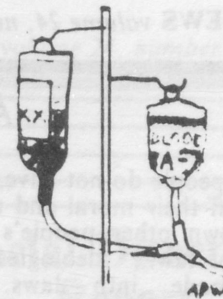
Blood Donor Clinic A Success

Being a leap year I think that it was quite appropriate that we had 366 donors at the Red Cross Blood Donor Clinic held in the Math lounge last Thursday, Oct. 30. I don't mean to say that the total number of donors was the success, for Waterloo always produces great successes for the Red Cross whenever there's a clinic held, but the fact is that again as in the past Math has proven to hold the greatest humanitarians since Archimedes (not to mention the fact that when Mathies set out to do something... they do it BIG!!).

I am amazed that there was apparently such a cowardly showing by all the other societies (especially the ENGINEERING society) even after there was a letter sent to all these societies challenging them to a Blood Bath competition. We knew that we would come out victorious, but come on now, we didn't have a run for our money, it was a mathSACRE.

And now, for those all truth telling numbers that prove Math's greatness:

I.S.	0
Rec	4
Kin	20
Arts	29
Sci	32
Eng	36
Math	104

Need I say anymore? As any mathie can see at a glance, there is a difference between the total number of donors from each society (225 for the rest of you Orcs) and the total donors as recorded by the Red Cross. We attribute this to the fact that there was a number of faculty members who donated (many thanks to all of them) and also that the list for Environmental Studies was lost during the clinic (we assume that someone from that society took the list home to frame it or something).

Well, on a serious note I would like to say thanks to all those noble people on campus who did participate in the clinic and gave of their time and blood to help others who need. We all deserve a pat on the back. Let's all try to make the next blood donor clinic an even greater success.

P.S. Dear Engies, that makes two!

MAB
MathSoc prez

ANTILOGUE

"One right people do not have, however, is to stuff their moral and religious opinions down other people's throats by means of law... ideologies should not be made into laws. Only principles that directly result in the protection of members of a society should be given this distinction."

So ended Brad Templeton's *Monologue* last week. I must agree with him totally. Blue laws such as *Thou shalt not party on Sunday*, or *Thou shalt not drive a truck on Sunday*, exist simply because the day is dedicated to some ancient pagan sun god. Such laws do not belong in the books of this or any other province. However, Mr. Templeton in his pro-abortion article has chosen to pervert this philosophy by giving himself the right to determine who is and who is not a "member of society".

Suppose we accept that there is something sacred about human life. Mr. Templeton accepts this, claiming that the human mind is sacred. Religious groups accept this using reasons ranging from an immortal soul to a holy spirit. Every religion, every individual even, has his own idea as to when one attains this sacred state. For Mr. Templeton, it is when the mind has developed, is self-conscious, and has a value to society. For Mr. Hughes (whose anti-abortion article started this two weeks ago), it is at the moment of conception. For others it is at the moment of birth; for still others at three months after conception. It should be obvious that at most one of these views can be correct. Yet it is even more obvious that Messrs. Templeton and Hughes will never be able to convince the other of the correctness of his position. How then is someone such as I, who does not have such strong religious opinions, supposed to decide which position to take? If there is nothing sacred about human life, then it hardly matters what one's opinion is. But if there is something sacred, if it is a sin to destroy human life, then it matters a great deal.

Now suppose for the moment that Templeton and Hughes are both wrong; that a fetus becomes human not sometime after birth and not at conception, but at three months after conception as is commonly accepted by hospitals. Consider the two positions: through ignorance Mr. Hughes is refraining from killing fetuses which are not yet human; Mr. Templeton, also through ignorance, is destroying sacred human life. Both are wrong, but whose mistake is worse?

Let's get back to the question of society. Mr. Templeton feels that "a human body with an undeveloped mind" should not have "the same rights as a person". He questions the values of newborns: "what are they worth, both to society and themselves?". He decides who should live and who should die: "allowing abortions a few days after birth allows children with birth defects to be terminated".

Even if it weren't a sin to destroy an undeveloped mind, what would be the consequences of accepting his outlook? If children's rights are determined by their parents, could children be disposed of by considering their gender or hair colour to be a birth defect? What about grandparents whose minds were at one time developed, but are now quite senile: can we dump them just as easily? Obviously some kind of control would have to be imposed on the individual by society, but ultimately it would still be necessary to decide who is worthy of life and who is not. If the wrong criteria are used the results could be, and have been, quite horrendous. A hundred and twenty years ago Africans in the southern States didn't meet the standards required of humans and so had no more rights than animals. They could be bought and sold, tortured and killed, all at the whim of their human owners. Forty years ago criteria closer to those so dear to Mr. Templeton were used. The feeble minded, the blind, the crippled, the burdens on society were disposed of. So were homosexuals because they corrupted society. So were Communists and Jehovah's Witnesses because they refused to accept that society. So were Jews and Gypsies because they didn't fit the criteria for being human. So would most of us be if that evil hadn't been stopped.

I am not saying that Mr. Templeton sees such a society as desireable, but I am saying that his ideas are dangerous, that they are an invitation to another holocaust.

I am not God. If I must decide what makes a person human, if I must decide who is to live and who is to die, then let my error be in favour of life and not death.

Ray Butterwort(h)

WATSUP?

WATSFIC (University of Waterloo Science Fiction Club) is having one of its most sucessful terms since it was founded 4 years ago.

We actually had elections this term with Greg Bezoff (President), Brian Dorian (Secretary), James Nicoll (Treasurer) and Mark Kraatz (Secretary of War) emerging as the winners (losers?).

A Diplomacy Tournament was held in October with a modest turnout. Over 100 people turned out for the Dungeons and Dragons Tournament which was held November 8th and 9th. This is the first time that *WATSFIC* was able to get official recognition (and prizes) from TSR Games for the tournament.

mathNEWS has passed on to *WATSFIC* a complaint from deanorthey who wanted to know why he was barred from the tournament rooms. He felt that he should be able to watch and learn more about how to play the game. The reason for not allowing casual observers has to do with the fact that it is a tournament. The organizers try to set up the tournament such that each party of players is on an equal footing (this is a little difficult when an observer reveals details of the Dungeon which the party hasn't discovered yet). If you want to learn more about D&D come out to any *WATSFIC* meeting. There are usually are one or more campaigns running after the meeting is over.

According to a survey of club members' interests D&D only ranked fourth. Movies ranked third, so a movie night was held November 13th for members only. The movies shown were "Lord of the Rings", "Alien" and "Silent Running".

Membership topped 100 earlier this month. This was largely due to benefits that members received (discounts on tournament fees, free movies, able to borrow from the club library and being able to munch donuts at meetings).

The last meetings for the term will be held November 17th and 27th. For further meeting information check the notices outside the *WATSFIC* office (MC 3036).

djmullin

MUSIC

Beatlemania

Last Friday evening, November 7, four lads that shook the world came to give Waterloo a shake. These four men, with their show known as "Beatlemania" came in the personages of John, Paul, George and Ringo to provide an enjoyable evening of musical entertainment.

My overall impression of the show was that it was quite good. This is to say that it was not perfect, but did do quite well considering some of the problems involved. The resemblance on many songs was quite good, approaching uncanny on a few.

By far the most impressive performer was the one playing Paul. Aside from a good physical resemblance to Paul, the numbers he did with the rest of the group were among the best performances of the night. A fairly plain difference could be detected when he did his solo numbers however. His performance of "The Long and Winding Road" was probably the best of his solo numbers. The 'Paul' certainly carried a large portion of the show.

Even at the distance of my seat, I was not too impressed with the resemblance of the John Lennon. His singing was good, but was significantly different from that of the real John on too many occasions. This was unfortunate, as most of the numbers were John Lennon numbers, so he was responsible for a large part of the show.

Perhaps one of the bigger disappointments was the fact the the players of George and Ringo had almost no leading parts in the performance. 'Ringo' did sing "A Little Help From my Friends", but that was his only number. When 'George' was seen to sing, it was mostly with 'John' or 'Paul' singing stronger vocals over him. There was very little representation of the significant part George played in the history of the Beatles.

I don't want to gripe too much, but I have to complain about the place the concert was held. As most of you know, the acoustics in the PAC are atrocious. The sound from films and recordings in the background was unintelligible throughout most of the performance. It was also hard to understand the performers when they spoke. Seating in the PAC is uncomfortable, and most are not in a good viewing position for a stage. Those with a good view had to sit on the floor. The performance would have been quite a lot better had it taken place in the Humanities Theatre, but of course this has a much smaller capacity.

Rock and Roll Is Not Dead

On Thursday, October 30th, Teenage Head played at the Waterloo Motor Inn. Those who got there early were fortunate, as many people were turned away at the door; the several hundred who got in, however, were treated to one of the finest displays of high-energy rock and roll ever to hit Waterloo. Despite a temporary change in line-up (Gordie Lewis got into a car accident over the summer — David Bendeth was filling in), they put on a top-class show, playing all their old classics, plus a few other oldies such as "Slow Down" and "C'mon Everybody". If you ever get a chance to see them, don't pass it up — they're superb. A word of warning, however: a Teenage Head concert is not an intellectual experience — I expended so much energy that it took me several hours to recover!

David Till

"Beatlemania" began shortly after 8 p.m., to a fairly full PAC. Their opener, "I Want to Hold Your Hand", was well received. They progressed from the early songs to the more recent material such as "Let it Be" throughout the course of the next two hours. While they played the songs, a slide/motion picture revue of the sixties flashed on the screen behind them. At several points, the performers stepped offstage to change costumes to different types of Beatle dress, including the uniforms of Sgt. Pepper's Lonely Hearts Club Band. Other costumes, from suit and moptop to casual suspenders were used.

At the conclusion of the performance, they left the stage and were called back three times for encores by an enthusiastic audience. These encores were among the highlights of the performance in my mind. The audience received most of the numbers quite well, with honest applause and clapping to the beat. Despite pleas from the audience, the performers finally retired from the stage.

Despite the problems, I did enjoy the concert. Certainly if one were not critical of how accurate the likeness was, the performance would be highly enjoyed as a rendition of wonderful Beatles tunes. Should I see the show return to a high quality concert hall, I may just go see it again.

Brad Templeton

Social Director's Report

Well, the Math-Kin "Dress Tacky" Pub at the Waterloo Motor Inn with the band Rendezvous is now over with. The place was about 2/3 full and the ratio of mathies to kin people was about 1 to 2. Are mathies apathetic or anti-social or what??? Anyway, I think that everyone there had a grand time. I certainly did!!! There were three spot dances held and there were prizes for the most tackily dressed male and for the most tackily dressed female. I consider the event a success even though we lost money... as usual.

There are two new events on the agenda now. There is a "Design a U of W Mathie Winter '81 T-shirt Contest"!!! Create a T-shirt design and submit your design in my mailbox in the Math Society Office. If you win, you will be given a free T-shirt plus $25.00. If you are off-campus next term, we will mail the T-shirt to you.

The next and last event planned for this a term is a "Come in your Favourite Jeans" Liquidation Pub. It is to be held in the Math Faculty Lounge on Thursday, November 27th. There will be 6 prizes given out for the best jeans — 3 for females and 3 for males. There will also be 3 spot dances. Beer will be 50¢ and liquor will be $1.00. The entrance fee will be $1.00 for mathies and $2.00 for non-mathies. There will be a DJ and a few munchies. Hope to see you there. Bye now!

Marnie

P.S. I need volunteers to work at the door — please volunteer!!! (You will get in free!)
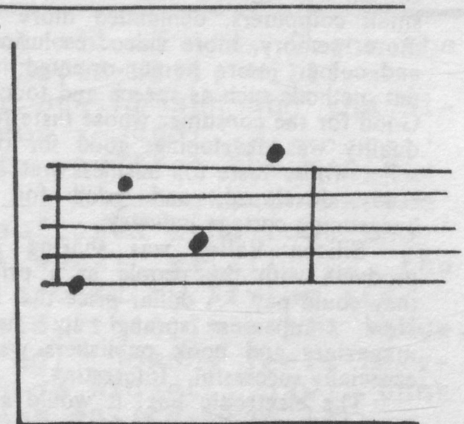
MUSICIAN

Sharing Problems: Personal Computers as Interpersonal Tools

On September 18th and 19th of this year, in Palo Alto, California, the Third Symposium on Small Systems took place, under the sponsorship of the ACM. The proceedings of that conference provide an illuminating view of the most potentially pervasive development of computer science today: **personal** *computing. We reprint the keynote address of that conference, with the ACM's kind permission, with the goal of introducing some research problems in, and the excitement of, personal computing.*

Some Recent and Familiar History

When the first inexpensive programmable systems appeared in the marketplace, and then in our homes and schools, libraries and museums, the excitement of their affordability overshadowed any consideration of their limitations. It truly did not matter if they were not as generally useful as the computer scientists wanted. The fact was that so many people, previously shut out from computer access due primarily to a different professional allegiance, could now get a taste of the fun and the power of a computational tool.

Not just any computational tool, of course, could have stirred this excitement. It required links to media that had already captured the peoples' senses — video and stereo systems. People could control the actions on their own televisions and alter the sounds emitted from their own audio speakers. Great fun.

The technology's economics placed simple programming capabilities into the hands of persevering and creative people. Industry responded with more digital wonders, slowly increasing the prices, not out of their own greed, but because the consumers, smitten with the taste of small computers, demanded more — more memory, more video resolution, and colour, more human-oriented input methods such as speech and touch. Good for the consumer whose taste for quality was developing; good for the seller whose taste for business was already developed; and good for a burgeoning cottage industry.

Silicon Valley was sharing its products with the people at a price they could pay. A dollar price that is. New companies sprang up; new magazines and book publishers were especially successful. Interesting.

The electronic box, it would appear, was not as much fun unless a variety of programs could run on it. Even more fun when the programming involved two or even more users interacting on a single system or across communication wires. Computer as referee or computer as player. Entertaining. Challenging.

The consumer was new and not too picky about programming languages or program development aids. BASIC would do just fine — until the consumer moved from games and school drills to house management, appliance control, and to small business applications, of course. The hobbyists shared application programs, and shared the woes of converting among language dialects and hardware input/output differences. But that was fun too.

And two-to-three person software houses shared applications for inventory control, financial ledgers, even video calculators. Never mind the price tag. The box was already bought and had to be fed. Prices for software packages, often higher than the computers themselves, were calmly paid. It seemed OK — the consumer was smitten. Computing fairs were well-attended, so everyone could share ideas, new products, and, yes, concerns.

One of the biggest concerns focussed on schools and on the problems of educating our children for a society in which computers would be commonplace. Remembering the disappointments of the sixties, interest turned mostly away from using the 'affordable' new systems as deliverers of instructional material. At least until the videodisc craze re-introduced the aspirations of the sixties.

The educational hope was to stimulate mathematics, physical sciences, and even social sciences curriculums with problem-solving activities carried out on the affordable small computer systems. We were once again confronted with the challenge of developing computer curriculums, to teach programming or other forms of problem solution, but this time without the distribution force of a centralized time-shared facility to handle the potentially massive materials' dissemination required. So what?

Time sharing hadn't helped to disseminate materials better anyways. Telephone lines connecting users, separate pricing for terminals and access, separate non-communicating systems, all entered into a high price tag for schools. Diskettes are easy to mail, cheap to buy, and cheaper to copy. And the magazines and books were full of programs to re-implement. The kids would have computers at home so, this time, the schools would have to accept their use and do something about teacher (re-)training. Right?

And for the kids without a personally-owned system, public access would be available in the libraries and museums. Right?

One more piece of history is recalled. Back in the sixties, some people, thinking hard about how computers would be more than electronic pencils and paper, wanted to use them to enhance the distribution of newsworthy and not-so-newsworthy events. They started community electronic bulletin boards. Centralized database systems would accumulate and disseminate want-ads, for-sale signs, social events, and community-crisis notices. Strangers could meet to solve common problems. The idea was nice. But the services closed down. Not used enough? Public funds insufficient? Not sufficiently accessible?

The teletypewriter terminals of those early systems were not commonly available. Typically, they were not at home. The information access methods were not sufficiently resourceful. But home systems and the telephone lines are combining. And industry is expanding the development of local networking facilities. Community links are physically broadening. New ways to share information are appearing and newer opportunities to form allegiances seem possible. Politically interesting.

So what is the problem?

It would seem in this brief and biased look at history that the small, affordable computer has generated excitement for at least three reasons: Entertainment, Education, and Enlightenment.

And in each instance the key to the excitement is the potential for increased interaction among people, primarily in the form of increased ability to share information. The problem of sharing information is a problem of setting up a commonly understood language over identified communication pathways. It is also a problem in designing interfaces between different languages so that each person, or system, can process information in a local language, while gathering from or adding to shared information sources. Not the least of these interfaces is the one that couples the human user to the computer system itself.

Let's just suppose that the momentum continues — more people, more schools, more small businesses gain access to some minimal computer resources. And let's just suppose that the numbers make it both economically and politically feasible to move the vast knowledge we are accumulating into electronic form.

What form will this information take? Will we, the users, have to know or care? How will we describe our information interests? Once we have gathered the information we want, perhaps a game to play, a problem to solve or the information needed to solve a problem, how will we process it?

We search for information, we use it, and then we edit it. We come up with solutions to problems, states of a game, or strategies of play, inferences drawn from organizing and re-organizing facts and relations. Then we choose to retain the (partial) solutions and to share them, to challenge other problem solvers, or simply to communicate a new result.

And we do so in different forms. Some of us are more analytic, preferring to deal with information in verbal/logical forms. Others are geometric, using visual/pictorial methods. And others combine both approaches.

So the interface for our users requires different forms of access. And different methods for viewing the same retrieved information are needed. Since our users are presumably of different ages and different levels of intellect, the interface must 'grow' with the user's growing experiences. With all the excitement witnessed in the years since computers became affordable, even the commonplace uses still seem too inaccessible to the new user. Help systems, at least a simple way in which the user can ask, "what is expected of me next?" (in the sense of the possible next mechanical things to do such as to type a letter or to point at a command) appear in no marketed system. And like the 'help' key, a 'library' request key is not yet available.

Among many problems, we have two technical one to solve so that the communication pathways can be well-marked and well-trodden. One deals with the interfaces for accessing shared information as though the system addresses only a single user and all information sources are identically formatted. The other deals with interfaces to help the user browse and make requests for information, getting back executable programs, not just static data. The users, pleased with the easy entrance into programming they experienced, do not want to learn much more in order to access possibly dozens of different information sources. Electronic mail, electronic libraries, electronic textbooks, all need share a (theoretically) common user interface when accessed on a single personal computer.

Murphy's Law: A Contradiction Resolved?

As everyone knows, no matter how hard you try to do something, it always gets screwed up. This comes as no surprise to a person familiar with Murphy's Law ("whatever can go wrong, will go wrong") and its variations. A 'Murphologist', or student of Murphian dynamics, believes that out there somewhere lurks a malevolent force that delights in causing anguish to mortal beings. This seems to make sense; however, there is a serious error in logic being made here: for Murphy's Law to be consistent, only one person can exist in the universe!

An example: suppose I toss a coin and want it to land 'heads'. According to Murphy's Law, the coin would therefore have to land 'tails'. So far, so good — it's just me against Fate, so to speak. But now let's throw a spanner into the works: suppose that we introduce another person who calls 'tails' at the same time that I call 'heads'. The other person is also affected by Murphy's Law; therefore, if he calls 'tails', the coin would have to land 'heads'. We are now in a dilemma; the coin cannot land either 'tails' or 'heads'! What to do?

This is where a theory put forward in a short story by Larry Niven comes in. The proposition: every decision that a person makes causes a pair of parallel universes to be created, one for each possible outcome. This means that if I flip a coin and I call 'heads', there will exist another universe, identical in every respect to ours except that the 'me' over there calls 'tails'.

Now we apparently have a solution to our problem — namely, that my opponent and I are now in different universes and therefore, both of us can now lose the toss. Unfortunately, we have not actually solved the problem — we have multiplied it! There now exist two of me and two of my opponent, half of whom win and half of whom don't. We still have this inconsistency — for Murphy's Law to be true, all four of us would have to lose!

Now we must enter the realm of metaphysics. The universe can be thought of as being divided into two parts: the 'inner world', which is what you are, and the 'outer world', which is what you perceive. Though we have four 'people' accounted for so far, we have only two inner worlds: mine and my opponent's. (I am assuming that the 'spirit' of a human being can exist in only one place at a time.) We can establish, therefore, a one-to-one correspondence between the number of inner worlds and the number of losers of coin tosses. Murphy's Law can now apply to me in this universe and my opponent in the other universe; the 'me' that wins in the other universe and the 'opponent' that beats me in this one are mere shadows.

We have now removed the inconsistency from Murphy's Law. But now we have a worse problem: logically, we can now prove that a person that wins a coin toss does not really exist — a statement which has interesting philosophical implications.

I am therefore at a loss to proceed; either Murphy's Law is untrue, or no one who succeeds in life actually exists — truly a Catch-22. I retire, defeated.

David Till

CSC Flash!

On Thursday, September 30th, the CSC held a discussion of the Computer Science curriculum. Many voices were heard, and for a long time, on the various strengths and weaknesses of the computer science core. In fact, it was one of the longer CSC meetings held, lasting from 8:00 p.m. to past 10:30 p.m. The duration indicates the magnitude of the topic: there are *many* oft-conflicting views on the best way to educate a computer science student, and *many* sub-topics to discuss. The substance of the meeting is covered in a separate article elsewhere in this issue; please have a look at it.

What effect will the meeting have on the CSC itself? Because of the relatively large interest shown (approximately thirty students attended, as did one Pure Math professor), and because people expressed interest in having an on-going curriculum review, the CSC may set up committees to handle this interest. Certainly, we will work for changes requested by the meeting. The first step? Writing a report that makes specific suggestions. That will be done in the next few weeks; watch mathNEWS for further notice of it.

On Thursday, November 13th, the CSC (in the *second* of its Relevant Meetings) sponsored a panel discussion of the future of computing facilities at the university. As I'm writing this on Tuesday, the 11th, I can't tell you what went on, but I'm sure it was fascinating, judging by the list of panelists: Professor Morven Gentleman (University Computing Czar —uh— Officer and past director of the MFCF), Professor Paul Dirksen (Director of the Department of Computing Services), and Professor J. Wesley Graham (Computer Systems Group).

Finally (inasmuch as it will be the last meeting of the term), next Thursday (the 20th) will see the arrival of John Sutherland from Control Data Corp. in Mississauga to talk about the Cyber 205, currently the world's fastest computer. Watch for posters announcing the room.

Finally (inasmuch as this is the last paragraph in the column), please have a look at the CSC Office Door, plastered with items of interest to many. We are, in fact, considering asking for an additional office just so that we will have another door on which to place notices. Of specific interest are announcements regarding the NSERC Summer Assistantship Programme (whereby the federal government will pay $600/month of your salary to work on research in industry or at a university) and the new microprocessor lab that the department will be testing next term.

peter rowley (plrowley)

New! B.Sc. Course in Gastrophysics

The staff of mathNEWS, in conjunction with the Faculty of Mathematics and Food Services, after lengthy experimentation and a fortune in Pepto-Abysmal, is relieved to announce the establishment of the world's first in-depth study program in gastrophysics.

This growingly important field of academe has been broadly defined, analyzed, diagrammed in overview, conceptualized, prototyped, and syntaxed by a team of generally vague and meandering mathNEWS researchers. Their conclusions will be of great interest to the average mathematics student, because of the immediate importance of food quality on this campus.

The basic B.Sc. program consists of two two-year terms of fine dining in the best restaurants and bistros of the Left Bank*, all expenses paid thanks to overpricing at the Laurel Room. The following year is spent slinging hash in the Blue Room at V1, with mandatory spaghetti every week. Fourth year is reserved for specialization in the nature of gastronomy, involving a multi-credit seminar course and a research paper describing the worst food you can think of.

As a guideline, we present some possible topics for in-depth research in fourth year: *1. Subatomic food analysis.* If you thought campus food was bad at gustatory level, you have another thing coming. The strong-stomached student will gain much from a quark-level analysis of mystery meat, pasta disasta and Lepton® chicken noodle soup. We are also planning to offer discussions about beri-beri, salmonella and various types of malnutritive disorders. *2. Food spoilage.* Students will be encouraged to spend as much time as possible watching food spoiling. We recommend in particular Canteen of Canada vending machines. *3. SCH desserts.* There has been enthusiastic response within the global gastrophysics community to the idea of analyzing the great SCH spice-cake story. A team of expert chemists, eminent police detectives and CIA agents will aid in the attempt to break the secret code and find what may be the missing link in the deceptive world of gastronomy.

These are but a few of the projects you may undertake. So remember, next time you encounter an inedible victual for sale (rent, rather, considering how long it is likely to stay in one's stomach), you are on the verge of becoming a sentinel in the expanding and exciting field of gastronomy!

In the gravy, you can see things swim around
In the gravy, germs and viruses abound
In the gravy, come and see just what we've found
In the gravy, in the gravy...
They got stew! They got stew!
They got stew down at Village 2!

- Fass 1980

How to live with a calculating cat and a computer scientist — or — Is It All Worth It?

The title of this article may lead you to believe that cats and computer scientists are one and the same. In the majority of cases, this is not true, however there are days when the two are indistinguishable. Most of you would recognize the name of the computer scientist if I told you, but I won't, however none of you know my cat.

His name is Chorē (pronounced 'Corey') and he is of unknown and probably questionable parentage. He is snow white with an artistically placed grey patch, resembling a mark such as would be left by an ashtray dropped on his head. He submits to all pokes and prods and allows me to tickle the pads of his feet, unlike most felines. Chorē is the ideal cat and is cute as a button. This description makes it appear that Chorē would easily fit into anyone's life but, like everything else that looks too good to be true, there is one drawback. Chorē is *demanding.* (For those of you who think I have forgotten the computer scientist, this is where he comes in.)

This computer scientist rises at unearthly hours, all in the name of the MFCF, two or three times a week. Not being a computer scientist, I fail to understand why a person would rise before the sun just to find out that his problem can not be solved. Those pre-dawn jaunts to the University are *very* demanding. About the same time he leaves the house, Chorē usually decides that he has had enough sleep and will begin to prowl, letting it be known that he wants out. So begins Chorē's day, and the beginning of his long list of demands. After I get Chorē settled away I try to steal a few more winks before my own day begins. Chorē, I am sure, would enjoy life more if I allowed him to prowl all night and sleep all day. *(And cut down trees, and wear high heels, suspenders and... -ed)* Our friendly computer scientist attempts this type of life only once a week when he dedicates Tuesday night to mathNEWS, often following this by a light fun-filled hour or two of testing and, if I'm lucky, I'll see him for ten or fifteen minutes before he is fast asleep until late Wednesday afternoon or early evening.

Hm, here he comes now. All must be forgiven, all transgressions... C'est la vie!
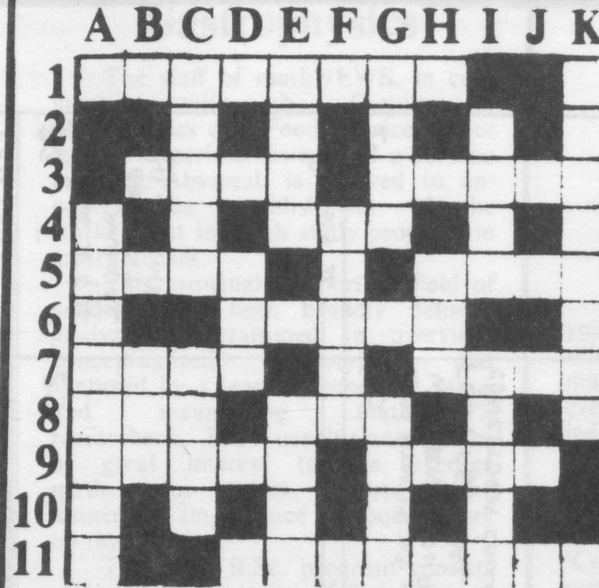
← printed without permission SORRY!

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday
15 ELECTRA and EUMENIDES - HUMANITIES THEATRE	16 THE NEW SINGLE SWINGERS - HUMANITIES -	17 CRAFTS FAIR C.C. - 1 week - • Co-ED TILL Pinball 20TH Tournament C.C.	18 Math News Production Night	19	20 TOM WAITS - HUMANITIES -	21 FED FLICKS:
22 VILLAGE I & II FIRST ANNUAL BENEFIT SEMI-FORMAL	23 —— Wizards ——> / —— Rocky II ——>	24 CONFIRMATION OF EMPLOYMENT	25 "THE GLASS MENAGERIE" -THEATRE OF THE ARTS -	26 THE MAN WHO LOVED WOMEN - HUMANITIES - • Animal Crackers Cinema Gratis C.C.	27 FED FLICKS:	28 LATE PRE-REGISTRATION
29	30 K-W STATUS OF WOMEN GROUP: FILM FESTIVAL CONESTOGA COLLEGE	1	2 MathNews Production Night	3 LAST DAY OF LECTURES; B.B GABOR & THE DENICS -WATERLOO MOTOR INN -	4 PAT GERRAT AND BILLY THE KID Cinema Gratis C.C.	5 FINAL EXAMS START
6 —— STAR TREK ——>	7	8	9 THE HUGGET FAMILY - HUMANITIES -	10 LAST DETAIL Cinema Gratis C.C.	11	12 NO FED FLICK!

Those faculty interested in theory expect to be able to teach theory occasionally, but they do so to relatively small numbers of students, thus artificially bringing the class averages down. As you can see, the issue is a complicated one, and I don't pretend to have done it full justice in this short space. More will be forthcoming in future columns.

Thus, a concerted review of the computer science curriculum has begun. There was a strong opinion expressed at the meeting that the review should continue indefinitely. As indicated in the CSC Flash article, the CSC will attempt to provide outlets for that interest. Your comments on the above, and on the curriculum in general, are most welcome. They may be sent via TSS mail to userid csc or via regular mail to Peter Rowley, c/o Department of Computer Science. This article is clearly not the end of the curriculum review; watch mathNEWS for further coverage of the core, and of other areas mentioned above.

peter rowley

Down

a4 Someone not in the group... nor in the house? (8)
c1 A bird that destroys buildings? (5)
c7 Good festival. (4)
d5 A tiny speck of the antidote. (3)
e1 Destroy pear harvest. (4)
e8 Some had no kayaks? Fine! (4)
f4 Pale as the rooster's mate. (5)
g1 Tide flows back to take things away. (4)
g8 Strange ache in every one. (4)
h5 Paintings are old. (3)
i2 He lives in pride. (4)
i7 Provide no dew, strangely. (5)
k1 The people in the doctor's office have to have it, we hear. (8)

Across

1a A musical instrument that remembers what it plays? (8)
3b A gal goes ahead for a festive affair. (4)
3g Being a stupid person, I do it differently. (5)
4e Back-tap! (3)
5a Employed, and finally abused. (4)
5h Worker to note the starting stake. (4)
6d Someone else beheaded mother. (5)
7a It couldn't be made with hard water! [Part 1] (4)
7h Somewhat content with the lodging. (4)
8e A dollar bill in real money. (3)
9a It couldn't be made with hard water! [Part 2] (5)
9g They help, it's said, strangely enough. (4)
11d Incidentally, it's where the Good Samaritan found the robbers' victim. (2,3,3)

BY P7

GRIDWORD
R I D W O R D
R   D   D W
WORD   D   W
WOR G   GR
O R

Last Week's Gridword Answers

	Across		Down
1a	PETAL	a1	PIN IT
1g	TOQUE	a7	MAPLE
3a	NEEDLES HALL	c1	TRESPASSERS
5a	TOPIC	e1	LILAC
5g	SIREN	e7	SPELL
7a	MASKS	g1	TESTS
7g	ATLAS	g7	ACT AS
9a	PREVENTIONS	i1	QUARRELSOME
11a	EASEL	k1	ELLEN
11g	SEEDY	k7	SASSY

HÖNEYFÜNNY

NEW OPERATING SYSTEM?   YUP

WILL IT WORK?   YUP

I DON'T LIKE IT   UH-HUH

WELL?   CRASH
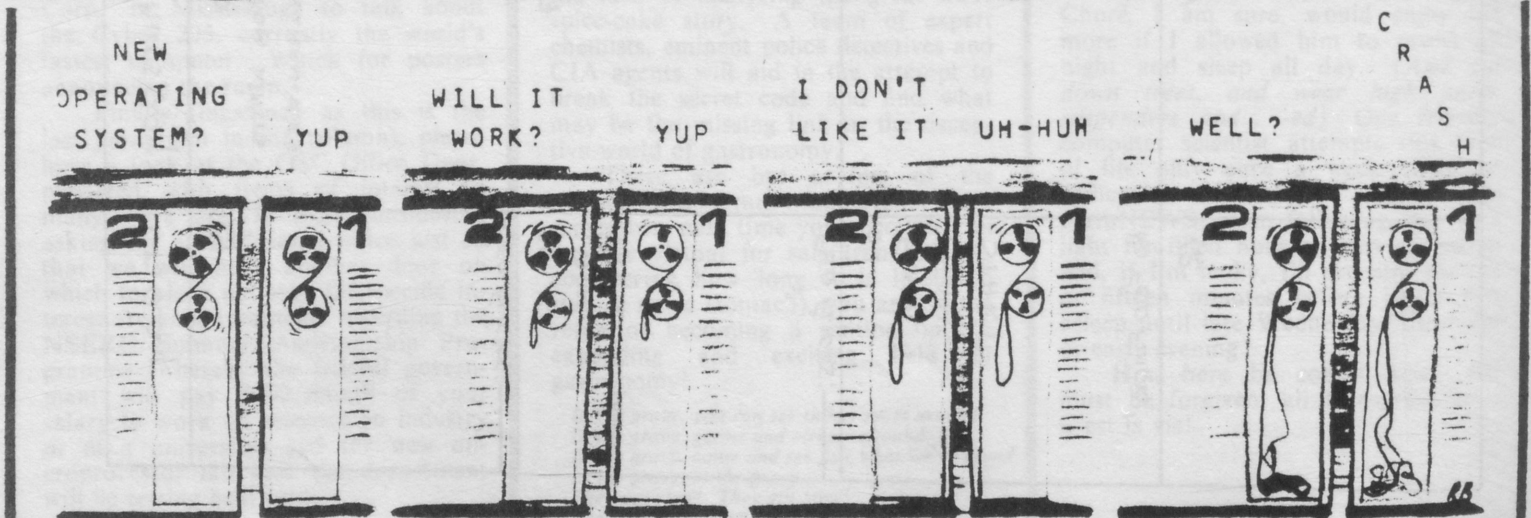
DEAD RINGER REPORT

The regular season ended on a losing note as Math's floor hockey team dropped two of three games.

The ringers lost the first match, 5-1, to the Rebels, a team expected to capture the Engineering Title. Mike McCleave was the lone scorer for the Ringers. The goal was only the second this season against the Rebels. Bob Thorn kept the team in the game, stopping numerous drives as the Ringer defence failed to clear rebounds. Dave Pauli played an outstanding game on the backline, handing out numerous hits and grabbing the second star designation. Bob Thorn grabbed the first star ranking while Mike took the third position.

The team rebounded for a 4-2 win over Unknown Quantity four nights later as Chuck Ormrod, Mike McCleave and Pierre Lapalme (2) put shots into the net. The opposition was severely undermanned but put up a determined effort. The three stars were Pierre, Bob Thorn and Chuck.

The season finale was played against Design Force and ended in a 4-2 loss. While the Ringers had a commanding edge in scoring chances, they were stymied by an outstanding display of goaltending. Pierre Lapalme tallied late in the second half and Mike McCleave drilled a disputed screen-shot minutes later, past a startled opposition goaler. John Mooney returned to scrimmage with the team but re-injured his knee. Dave Pauli played another outstanding game on defence and was chosen the first star. The goal scorers followed in order.

The team now enters post-season play for the non-Engineering championship. Dates and times will be posted.

CC

"B FUNCTIONS" Word Search

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R T P I R T S T E G H S I C S W P E E L S
E O E R E T I R W . D L Y O T E S B A T S
A E E M N T R O B A . A N N A R H U C N H
D S G N I R T S L L U N A C G I Q W C I T
F O E F M T E L O W E R C A S E R R O R P
O L T S A T O L D N T E S T S I T M A P M
I C L B X C N E D A R T I S T C I C : E O
T A I A A B S H I A T X H E E R B N H T R
Y L N T C C A S P M E E G E T U M C E A P
C L E . Y S E M N O B R K S O S U S D D R
E F P P F T O V R B B A . H T G N E L T I
V F O P A C E E T L I H B R A R I T R E N
E C Y D A R Z S O E U C T I E A L E N G T
S E N S I D A T E S G T F A R N O X M A A
L A P P E N D I X R D U D O F T H I E B L
R A N G U A G E M A N P U A L M E T S Y S
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Search List:

Note: Words within another cannot be used. For example, the 'READ' in '.READ' and 'READF' cannot be used.
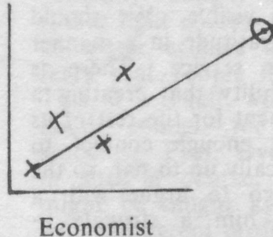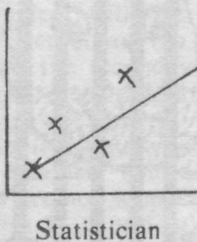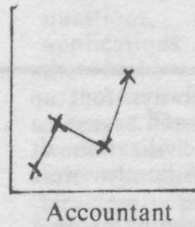
ABS, ALLOCATE, ANY, APPLY, ASCBCD, CALLF, CALLFF, CLOSE, COMPARE, CONCAT, COPY, DATE, DATESI, EOF, EQUAL, ERROR, EXIT, EXTERNALS, GETCHAR, GETDATE, GETLINE, GETSTR, GETUMC, GETVEC, HIST, LENGTH, LINUMB, LOWERCASE, MAX, MIN, NARGS, NOBRKS, NULLSTRING, OPEN, PRINT, PRINTF, PROMPT, PUTCHAR, RAND, READ, READF, RESET, RLSEVEC, SCAF, SCAN, SETEXIT, SHELLSORT, SIDATE, SLEEP, STRIP, SYSTEM, TABSET, TIME, TRIM, WRITE, ZERO.

Leftover:

Where this list came from (90 letters).

/randall

Variations on a Theme *or* Lines of Reasoning

Engineer

Accountant

Statistician

Economist

bwlutek

Due to the mathNEWS policy of providing equal time for opposing views, the following column is printed.

P.S. NDP has no policies.

UW NEW DEMOCRATS

Yes, finally the voice of reason has descended on the University of Waterloo; the UW-NDP is organizing. New Democrats and potential NDPer's are crawling out of the woodwork to discuss and debate political issues. We are looking for people who are interested in the ideas of the NDP and want a chance to participate in spreading the ideas of democratic socialism. Through the UW-NDP, members will have a chance to participate in the future of the province and the country. Math students with their superior intelligence are a necessary part of any campus group. If you're interested call Sean Mullarkey at 885-0237 or drop in at Political Science Union (HH 316).

Sean Mullarkey

The Noble Bureaucrat

It is a deplorable custom today to criticize the Canadian Civil Service for failing to provide efficiently the services we think we need. This disappointment in our bureaucrats results from a misunderstanding. The purpose of a bureaucracy is not to provide the necessities of life to citizens, but rather to prevent such supplies from reaching the public through the government, and thus protect us from the misguided policies of the politicians and save our precious genetic heritage.

The difficulty with our government's policies lies in an accepted portion of the theory of evolution. Evolutionary theory states that any organ not used eventually atrophies, and the organism gradually loses the ability that that organ supplied. This idea is supported by evidence. There are species of fish who live in lightless caves and have no eyes. Their ancestors had eyes, and so we must conclude that, over the generations, random mutations and natural selection have robbed the fish of their eyes. Humans are animals too, and bound by the same physical laws and processes.

Present Liberal policy does not take this into account. If you supply people with every necessity of life without any sort of struggle, then the ability to struggle for those necessities, not being needed in the context of the State, will eventually wither away. This would be fine, if humans always remained within the confines of an all-caring state. Alas, states, unlike diamonds, are not forever. The danger lies in the possibility that a state might last long enough for the evolutionary process to rob humans of their ability to get food, clothing, mates, and the like on their own, and then collapse through some oversight. This would cause a very bloody period of readjustment as those unfit to survive in this new, harsher environment would perish. If the adaption to the State has gone too far, and is too wide-spread, humanity could conceivably perish.

Luckily, this will never come to pass, thanks to bureaucrats. If they must, they will provide the struggle needed to keep humans up to par. Perhaps the government supplies the food free, but if someone must fill out tens of forms in triplicate, and argue with uncooperative civil servants, then the effect is as if he had had to struggle for his necessities. Even if the citizen manages to side-step the civil service somehow, the ingenuity required to do so would keep the citizen alive outside of the State. The bureaucracies have a final line of defence, if the State seems to be too

successful. They can always foul up international relations and cause a preventative collapse of civilization. It was for this reason A-bombs were invented.

Bureaucrats are defending us on a front not always visible. We should show them our gratitude in a manner suitable to their service. There is always the possibility that creating a suitable environment for the rest of us is not providing enough conflict to keep them genetically up to par, so the next time you go to argue with a bureaucrat, give him a struggle — bring a gun.

jdnicoll

Young Frank Einstein

You might recall from the last column the business about Sunday and Tuesday. The devil in that article was hypothetical, of course, but the problem about Sunday and Tuesday was real. Can you think of an instance where the situation depicted in that article might arise? Think carefully and I think you'll see it's quite easy to figure out.

Yowsa yowsa! (That's Egyptian for "howdy howdy".) This is Frank Einstein reporting to you from Aswan, Egypt! You may notice the print is a bit blurry; this is because I'm writing with a Bic Banana on low-grade toilet paper. I don't have the change to pay my dear Egyptian friend standing at the washroom door, so I guess I'm stuck here till the Nile floods.

This week, I visited the Great Pyramids of ancient Egypt. Actually they're still here. With my tape measure in hand, I set out to test for myself if there was any mathematical reason to the dimensioning of the pyramids. I seem to recall my old high school math teacher telling me about some mysterious relationships between the length, height and slant height of the pyramids. Some scholars have suspected that numbers such as π and e may have been worked into the architecture.

Actually, I didn't get all that far on my measuring work before I was overwhelmed with the awesome power and majesty of the monuments. It wasn't long before Abdul from Century −21 Ancient Realty was selling me on the virtues of a renovated pyramid as a home. At first I was a bit shocked, but upon realizing how warm and cozy Tut & friends have been for the last few millenia, I thought a bit more seriously about the subject. Not only would they provide a great R-value, making them economical to heat, but, heck, my uncle Albert had been considering moving to a sunnier clime.

And so we went back to his tent and talked turkey. It just so happened that he had this handyman's special on his listing sheet, and he offered to take me there for a tour in the morning. When we arrived, I was astonished to find that it was inverted. Evidently there are vandals in Egypt, too, I thought. Abdul, noticing my shock, reassured me that this is how it was built, and, no, it wasn't a copy of an Expo 67 pavilion. Some forgotten Egyptian pyramidsmith, bored with the continental style, decided to go California and create a new concept in mummy comfort.

Entering through the roof, we proceeded to ride the dumbwaiter down to the breakfast nook. There I was surprised to find a super-modern, high-tech interior. Abdul and I spent a fair while touring the house, while all the while he spoke of inversions and transformations. How odd, I thought, for a real-estate agent. Finally I voiced my hunger and we decided to leave.

Once outside I was amazed to see that we had emerged into a closed space! What was formerly outside was now inside, and there was no escape! And so, after collecting my thoughts awhile, I sat and considered how one gets out of places like this. "Plugh!" I said. Nothing. "XYZZY!!" "mathNEWS!"

pif!

And so, that's how I came to be in this men's room, you see... Anyone got a quarter?

Young Frank Einstein

CS Curriculum Review
Changing With The Times

As described in the CSC Flash in this issue, the CSC held a discussion of the CS curriculum some time ago. The conclusion, as indicated by one of the attendees, is: there's a lot of work to be done.

We had hoped to cover several areas of the curriculum: introductory courses, the core, the math core, CS electives, and non-CS electives. It seems that each one of these areas could occupy an evening by itself. We covered the CS core quite well and touched on the other areas, however.

I discussed the results of the meeting with Professor Arnie Dyck, the undergraduate advisor for Computer Science. He explained the reasons for some conditions, some factors that students may not be aware of, and, most importantly, he indicated that change is possible. His comments will be intermingled with the opinions of the meeting below.

Introductory courses were discussed at length, as most people in the room had taken one and many were in the process of taking one. Focus centered on CS 140. People complained that not enough attention was given to debugging techniques. To this, Prof. Dyck replied that in some terms tutorials on debugging were given but were not well attended. Nevertheless, he indicated that they might be given again. People were most upset with the requirement that pseudo-code follow a strict syntax, claiming that this is entirely against the spirit of pseudo-code which, according to one student, "is *supposed* to be a mess". But the major complaints dealt with the level of the course and the effort expended for the amount of computer science learnt. Students arrive in CS 140 with a wide variety of backgrounds; some find the course difficult, others find it very easy. Indeed, this is reflected by the marks for the course: usually, a bimodal mark distribution (one with two humps) is found. The 'M0' and 'M1' distinctions try to cope with the differences in background, but not successfully, it seems. The possibility of an 'Advanced' version of CS 140, much like 'Advanced' versions of Math 130 and Math 134, was raised by Prof. Dyck, though he indicated that one problem with the scheme is that it would perpetuate the differences in level on to the second year. *(This raises a higher-level question: Should the university attempt to reduce the differences in levels between students' abilities?)* Another consideration is that students are not supposed to commit themselves to a particular department until third year; hence there is no such thing as a 'second year CS major'.

The other major complaint was that there was too much effort required to implement what the students thought were fairly simple algorithms. The anger seemed to be directed against both the language used (WATFIV-S) and the system it was used on (WIDJET). It is undeniable that WIDJET is too slow, but frustration with the language has not been particularly noticed in the past. The amount of pseudo-code required of the students is also a source of annoyance. No-one had any solid solutions to the problems raised, though a few people pointed to very positive experiences that Yale University has had using APL to teach introductory programming classes.

People had less to say about other introductory courses. Some commented that they didn't learn enough in CS 240 and that it could be taught much more efficiently with APL, to which Prof. Dyck replies that they're missing the point of the course: not only does CS 240 teach recursion and basic data structures, but it teaches style, data types, large program structuring, and the comparison of languages by comparing features, topics not easily taught using APL. CS 250 has about the right amount of material, it was said, and WATIAC isn't too bad as it has a regular architecture. In fact, some didn't want a microprocessor-based CS 250, as micro-architectures are generally rather primitive. Everyone agreed, however, that an interactive system was essential for CS 250. *(Aside: It is planned to teach CS 250 using PET microcomputers outfitted with 6502 or 6809 microprocessors. The latter, it was conceded, has a good architecture. The department is currently waiting for money to buy the necessary PET's and the new version of the course will not be taught until the spring of next year, at the earliest.)*

Finally, a strong call for a new introductory course was heard. People wanted a stronger knowledge of the role of computer science in society. They want a course that raises ethical questions, that discusses typical applications of computer science, and that looks toward the future. Many suggestions were given regarding such a course. Some said it should include a week of playing games on microcomputers, to get a feel for interactive programming. It was generally thought that it should be a rather light course, to attract people to computer science and to dispel any fears that people have of computers. This, it was felt, would also make it a good course for non-mathematics students. Prof. Dyck showed interest in such a course, indicating that it might be taught as a seminar series, with a different professor each week.

As the evening ran on, discussion became quicker, so less was said about third year courses. CS 340, CS 350, and CS 360 were generally thought to be all right, with one student enthusiastically declaring CS 350 to be a very good course. However, people were less enthusiastic about CS 369 and particularly CS 370/371.

CS 369, it was claimed, has no practical value. People felt cheated by being given the problem of gate minimization wrapped up in a heavily mathematical treatment when gate minimization is no longer a pressing concern, due to the advent of MSI and LSI integrated circuits. Some conceded that the course might have some value, but that it was not put into perspective by the professors. Prof. Dyck said that a professor is currently working on revising CS 369 with a view to making it more hardware-oriented.

It was unanimously agreed that there should only be one numerical analysis course in the core, and that it should give a broader view of the topic than taught in CS 370/371. This coincides with the computer science education literature which, while noting the historic role of numerical analysis in the establishment of computer science as a discipline, generally regards numerical analysis as outside of the CS core.

The attendees suggested two new topics for the core: software engineering and the design of human interfaces. People felt particularly strongly about the latter, wanting to know how to design programs so that naive users could use them easily. Prof. Dyck suggested that a revised version of CS 446 could handle both of these topics and, indeed, people at the meeting who had taken CS 446 wished that they could have taken it earlier, in second or third year.

The meeting concluded with a general discussion of teaching practices and facilities. The biggest concerns were with overloaded facilities (essentially all computer facilities are overloaded) and large class sizes. People felt particularly strongly that fourth year computer science courses should have much less than forty students per class, which is often the number found. Some thought it unfair that classes should be consistently smaller in fourth year statistics than in fourth year computer science.

Professor Dyck related a variety of reasons for the apparent crowding of CS courses. There is a shortage of both manpower and money, though the two are related. It is hard to keep good computer scientists, as there are many opportunities for people in industry. Thus, there aren't as many CS faculty as are necessary. In addition, it is even harder to retain computer scientists skilled in software, and the software courses are the most popular.

Professays

This week I talked to Professor Adamson of the Department of Pure Mathematics, who teaches first year algebra and calculus.

Alan Adamson was born in Ottawa (that exotic capital on the Rideau Canal) in 1949. He grew up in the town of Manotick ("half farming, half civil service") which is about 15 miles south of Ottawa. Except for a bit of Little League baseball, Adamson spent much of his time studying Mathematics ("I've wanted to be a mathematician for as long as I can remember").

When he arrived as an undergraduate at the University of Waterloo in 1966, he knew exactly what he wanted to take: pure mathematics with a bit of philosophy. He also took an English survey course, awakening an interest in literature. In his fourth year, Adamson edited an issue of a disorganized and sporadically published newspaper called mathNEWS.

He left Waterloo in 1970 for the University of California at Berkeley, a large university with "an extremely pleasant environment". Berkeley is a world centre for the study of logic, Adamson's specialty, so he was able to learn from many experts. He studied there for six years befors receiving his Ph.D. In his thesis he found an unexpected connection between two branches of logic — the subject was too technical for Professor Adamson to explain further.

In 1976, Adamson became a post-doctoral fellow in infinite-valued logic at Queen's. Here he taught a fourth year logic course and attempted to tame a first year algebra class for engineers. (In a previous year, the inventive Queen's engineers had welded a Volkswagen around a tree.) After a year of dodging the usual paper airplanes, Adamson followed his fellowship sponsor on a sabbatical to Oxford ("a small quiet place... scattered around in individual colleges. I was at Wolfson College — sort of the American college.") Here he did more research and gave an informal lecture series.

Although he officially had one year left in his fellowship grant, in 1978 Adamson applied to a large number of universities and was given an assistant professorship at Waterloo.

Professor Adamson coaches both the women's cross country team and (during the winter) indoor track. He reads a variety of authors from James Joyce (especially *Ulysses* and *Dubliners*, a collection of short stories) to Margaret Draper ("personal stories about messed up lives"). However, he cannot tolerate science fiction. He was cajoled by students into reading *Dune* last summer and "it was one of the most unpleasant experiences of my life", Adamson claims. At the moment, Adamson is doing work on connections between model theory and intuitionist logic.

CURRENT WORK
Intuition and Model Theory

Over the last two centuries, mathematicians have been attempting to find a solid, irrefutable foundation for all mathematics. One major obstacle was a definition for mathematics: what does mathematics study anyway? The problem has still not been settled, but three main schools of thought have developed.

Realism, as espoused by Cantor and others, views the mathematician as a scientist investigating an abstract, but real, universe of mathematical objects. Circles, for example, actually exist and theorems about them express real truths about real objects.

Formalism, as espoused by Hilbert and others, views the mathematician as an artist creating patterns from arbitrary symbols by stated, but arbitrarily chosen, rules. Circles, for example, only exist because mathematicians say they do and theorems about them are derived using arbitrarily chosen rules and so express no real truth.

Intuitionism, as espoused by Brouwer and others, is less definite, but seems to view the mathematician as a kind of psychologist, studying mental constructions using well defined rules of thought. Circles, for example, exist only in the human mind and theorems about them are true because they are derived using the rules of thought.

Professor Adamson is not studying the philosophy of intuitionism ("I don't even understand it") but rather its effect upon the rules of logic. Each of the three schools suggests a different mode of logical reasoning. The realist logic is the logic generally used in the classroom. Formalist logic, in its more radical modes, is any set of rules you like. Intuitionist logic puts severe restrictions on realist logic, since some realist rules seem counter-intuitive (to intuitionists at any rate). For example, intuitionism outlaws all proofs by contradiction, since in such proofs we always assume something to be true which is *not* true. Perhaps the most interesting consequence of intuitionism is its rejection of the law of double negation, and so something that is not untrue is not necessarily true. This may seem absurd to the unwary, but consider Euclid's fifth postulate: on the one hand it is used in Euclidean geometry so it is not untrue, on the other hand, it is rejected in non-Euclidean geometries (including Einstein's theory of relativity) so we cannot conclude that it is true.

Professor Adamson is presently investigating what effects the restrictions to intuitionist reasoning have on another branch of logic called model theory.

Kevin Jardine

EXAMS

How to Study

and Relax for Them

SEMINAR

WHEN: Monday, November 17, 1980
TIME: 4:30 to 5:30 P.M.
PLACE: MC2065

This How-To-Do-It session is for any math student who may become tense or "uptight" before or during exams, or for those who want to improve their study methods or are just curious.

Practical techniques and suggestions will be given by Laurel Thom, Study Skills Advisor, and Ron Walsh, Relaxation Training Counsellor.

Sponsored by Math Soc., Faculty of Mathematics, and the Department of Counselling Services.

ADDENDUM: Also PF7 for gridword! —co-ed