HI DAVE,

In this letter I am going to tell you about all the nifty toys they have here. Two of my favorite toys are the *typesetter* and XGP. An XGP is a Xerox Graphics Printer. It will print anything. It is the standard output device and is used for just about all output. I have yet to see normal lineprinter output. I'm not kidding.

There are 4 or 5 document compilers here. The one I'm using is the fanciest in terms of output. It is Don Knuth's typesetter called TEX. He created and designed it so he could keep writing his books. It is amazing. It is extremely simple to create mathematical papers that look beautiful. This typesetter makes EQN look sick. With this letter are two enclosures showing some of the power of TEX. The enclosures are drafts of stuff I turned in, so if don't worry about content. Be sure to show Professor Freidman the math one. I now view RUNOFF and the DTC as childish. As soon as I get the floppy I need (the one you're sending me) I'm going to rewrite the manual for TOPS.

The examples of math I enclosed represent just a burp for TEX. For example:

$$\sqrt{\sum_{1\leq k\leq n} A_k}$$

is just another burp. TEX knows tons of symbols. My favorite one is ©. How about $\int_0^\infty e^x dx$? Here's a fun figure

$$\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{1+x}}}}}}}$$

TEX can also build tables and matrices very easily.

$$A=\begin{pmatrix} x-\lambda & 1 & 0 \\ 0 & x-\lambda & 1 \\ 0 & 0 & x-\lambda \end{pmatrix}$$

It doesn't yet know much about fancy english fonts other than different type sizes, *slanting*, **boldfacing**, and *italics*. However, tons of fancy english fonts exist at MIT and it is only a matter of time before TEX is told about them.

Another set of toys is (are?) the editors. There are a couple of editors laying around (including teco). One, however, seems to be becoming the standard. It is a full screen editor that easily outclasses the rand editor (except for multiples windows. Actually, I haven't tried windowing yet, so maybe its superior there, too). It has roughly 3 times as many commands as the rand editor. The cursor moving commands include moving by the character, word, or paragraph. Searching and replacing is easier. Deletions can also occur on a word level. Repeat factors have been carefully worked out.

But most importantly, the commands can be rearranged so that they are best for what one is editing. There are different modes for editing LISP, English text, assembler, *etc.*, *etc.* Also, the editor is invokable from anywhere one creates text. If one is mailing a letter, one can invoke the

editor one the letter to be sent (or one received for that matter.) Lisp and the editor cooperate very harmoniously. The editor is now used to read mail. When one wishes to read his mail the editor is invoked in a special mode which knows about letters and the format of the mailbox.

Another toy is Lisp. The Lisp support system is absolutely comprehensive, but then AI and Lisp are isomorphisms of each other. Since you aren't a Lisp programmer (yet) I won't bore you with the details. I don't know what the support for other languages is like. One machine does run UNIX and C. I assume it has all the standard software.

We also have a very nice spelling corrector with all the bells and whistles like private dictionaries and suggested corrections for misspelled words.

Another nice toy is food. I told already told steve about it. Having a xerox key whenever you need one is also very useful! Another amenity they give us is a office phone which *makes outside calls*. I can make any non-toll call from my office without any hassles, it is a real pleasure! (Especially after 6603 and UMSA for the last two years). And to avoid any misunderstanding let me state directly that there is no charge for the phone.

MIT also shows plenty of great movies for 75 cents a throw. Superman is lot better at that price, and it's still 70mm Dolby. (I hope you noticed the mm in 70mm.) This term they're also showing Network; Cousin, Cousine; An unmarried women; murder on the orient express, day of the jackel, lord of the rings, midnight express, silent movie, lolita, dr strangelove, interiors, *etc, etc, etc.*

Oh well, enough complaining for now. I have to send this through the spelling corrector and then send it off to you. As usual, I'm not going to proof-read it, so certain areas may need imagination to figure out what I meant to say.

Be Seeing you,

Daniel

P.S.
A better mailing address for me is
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Please pass this address around. The "Laboratory for Computer Science" part looks real fancy. Some people in Computer Club may also be interested in this letter. Maybe someday I will write them one.

P.P.S The XGP usually produces better output than this. The enclosures were created when the XGP was feeling fine.

Let's see the DTC do this!!!

6.840J Homework Assignment 1

*Daniel Weise*

Sept 20, 1979

*Problem 3.2.4*

(a) Let

$$\theta(x,y) = [\phi_{univ}(x,x) \doteq \phi_{univ}(x,x)] + 1$$

This function is obviously a prf. It corresponds to

$$\theta(x,y) = \begin{cases} 1 & \text{if } x \in K \\ \uparrow & \text{if } x \notin K \end{cases}$$

Following the usual method of the book we now construct a function (program) $f(x)$ such that

$$\phi_{f(x)}(y) = \phi_{s(i,1,x)}(y) = \phi_i(x,y) = \theta(x,y)$$

If an algorithm existed which took a program as input and decided whether the program computed the totally undefined function, then we could use the algorithm to decide $K$ by applying it to the program $f(x)$. (since) By construction, $f(x)$ computes the totally undefined function *iff* $x \notin K$. Therefore such an algoritm does not exist *Q.E.D.*