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# Microcomputer Newsletter

September 1986

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### The Fine Print:

The Microcomputer Newsletter is published by the Microcomputer Systems Group, a part of the University of Minnesota's Academic Computing Services and Systems department.

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## News and Announcements

### ● MEWS Update

The Microcomputer Systems Group has developed additional support software for Macintosh TML Pascal programmers using MEWS (Menu, Event, and Window System). MEWS, public domain software developed by the Micro Group, facilitates program development; it allows you to create professional-looking applications that manage windows and pull-down menus and handles events and desk accessories. MEWS has *two new* libraries of support routines. One library controls the serial port. These library routines allow you to develop applications that can communicate with plotters, other computers, and other serial devices. The second library supports file I/O. These library routines make it much easier to read from and write to disk files. The Micro Group also added new demonstration programs to the MEWS distribution disk and updated all the software to work with version 1.2 of TML Pascal. If you want these new routines, bring *one initialized double-sided disk* to the Micro HelpLine and make a copy. (*We discourage attempting to use TML Pascal 1.2 with single-sided disks.*)

### ● Project Woksape

A call for proposals for the second half (Year 2, Phase 3) of the Woksape project was sent to college deans, computer coordinators, and department heads. If you are interested in submitting a proposal for an IBM project, contact your department head for further information.

• **PC/PILOT:** Woksape has a site license for the PC/PILOT authoring system. The terms of the license allow you to copy and use the two program disks anywhere on the Twin Cities Campuses. *Unfortunately, the license excludes coordinate campuses and use off-campus by faculty or staff.* However, courseware developed using PC/PILOT may be distributed off-campus with the CPI module (which is required to run compiled PC/PILOT programs). (See "Multiple Use License Agreement" in the *PC/PILOT Language Reference Manual*.)

Some people may not have gotten all the documentation that was on the PC/PILOT disks. You should see two files: README1 and README2. If you do not have these files, bring a formatted disk to the Micro HelpLine. To order PC/PILOT manuals, write to: Washington Computer Services, 3028 Silver Lane, Bellingham, WA 98226. Manuals are \$25 with a nice binder, \$17 with no binder.

• **KERMIT:** We now have Kermit, a public-domain (free) communications program, for the IBM PC. If you want a copy, bring a formatted DOS disk to the Micro HelpLine.

## Review: MacΣqn



MacΣqn version 1.5 from Software Recognition Technologies is a desk accessory for the Macintosh that makes it easy to create equations and formulas to be incorporated into documents. You can use

MacΣqn while using a word processing program (such as Microsoft Word or MacWrite) or a general-purpose graphics program (such as MacDraw or Cricket Graph). The equations you create with MacΣqn can be printed at the highest resolution of your LaserWriter or Imagewriter printers. Here is an example of an equation created (in less than 2 minutes) with MacΣqn:

$$V_c(Z_L) = \frac{2j_c^2(Z_L)}{\beta^4} \left[ t(Z_L) + 2 \int_0^{Z_L} \sqrt{t(Z)} dZ \right]$$

### Background

The Macintosh has become a popular computer for scientific and technical word processing. Why? Well, the Macintosh allows you to incorporate diagrams into word processing documents, and diagrams can be central to conveying concepts in technical documents. Technical writers also like the Mac because they can use many different fonts (typefaces) within one document. On many computers the fonts that are displayed on the screen are built into the hardware of the machine and, therefore, are difficult to change. All Macintosh fonts reside on disk; it is relatively easy to modify existing Mac disk fonts, add new fonts, preview those fonts on the screen before printing, and so on.

When the Macintosh was first released, the Imagewriter was *the* printer of choice because it was the only fully supported printer available. Since many technical professionals were using the Macintosh, several fonts that contained common mathematical symbols and Greek letters appeared. These fonts were designed primarily for, and worked well with, the Imagewriter printer.

Life was simple until Apple released the LaserWriter. The LaserWriter prints at a much higher resolution than does the Imagewriter, and fonts designed for the Imagewriter do not look very appealing when printed on the LaserWriter. Another problem for technical writers is that, regardless of the font, it takes a considerable effort to correctly locate each element in an equation and considerable time to create a complex equation with MacPaint or MacDraw. Building equations with a general-purpose graphics editor such as MacPaint is slow work because you must manually arrange every symbol and letter in the equation.

MacΣqn addresses both the problems we have just raised. With MacΣqn, you can make equations using fonts intended for the LaserWriter and automatically place elements in an equation.

### Installation

Before you can use the MacΣqn desk accessory, you must install it into your System file with Apple's Font/DA Mover program. You also need to run a special installation program called

*insEqnRes*, which installs some additional resources into the System file. While the *insEqnRes* installation program is running, your screen will be empty, so you must take it on faith that the installation worked correctly. Once you have completed the installation, a new option, *MacEqn*, appears in the  (desk accessory) menu.

### Using MacΣqn

MacΣqn works slowly on a 128K Mac. We strongly recommend you use MacΣqn on a 512K Mac or a Mac Plus. When you build an equation with MacΣqn, you create a picture that can be pasted into your document. A picture created by MacΣqn is very similar to a picture created with MacDraw. In fact, you can paste a MacΣqn picture into MacDraw and modify it, if you so desire. The MacDraw format allows the LaserWriter to print MacΣqn pictures at its highest resolution (300 dots per inch). Pictures created with MacPaint have a different (from MacDraw) internal format and are printed at the same resolution (75 dots per inch) on both the Imagewriter and the LaserWriter. In simple terms, MacΣqn produces pictures that look good when printed on an Imagewriter and look great when printed on a LaserWriter.

MacΣqn supports these four LaserWriter fonts:

Times, Helvetica, Σμβολ (Symbol), and Courier.

You must have the Symbol font in your System file for MacΣqn to function properly; MacΣqn uses characters in the Symbol font to generate symbols such as integral and sum.

To use MacΣqn, select the *MacEqn* option from the  menu while you are using a word processing program or general-purpose graphics program. MacΣqn displays a new window on the screen named *MacEqn* and adds a new pull-down menu called *Eqn*. The *Eqn* menu has two parts: a *Functions* part that allows you to choose a special symbol or a symbol position on the screen, and a *Fonts* part that allows you to choose fonts, sizes, and styles such as italic or bold.

### Fonts

The *Fonts* part of the *Eqn* menu consists of Fonts, Sizes, and Styles. A nice feature of MacΣqn is that it automatically changes character sizes so that, for example, subscripts are one size smaller and the summation sign is two sizes larger than the regular characters. MacΣqn also supports Underline, **Bold**, *Italic*, and Outline styles.

### Functions

To build a formula, you use options in the *Functions* part of the *Eqn* menu. You select the options with the mouse or with Command-key equivalents. MacΣqn allows you to create

∫ (integral) and ∑ (summation) signs, ∏ (products),  
fractions, subscripts and super<sup>scripts</sup>,  
√ (radicals), and overbars.

You can even construct simple matrices. After playing with the *Eqn* menu for a few minutes and before reading the manual, we felt comfortable enough to create formulas. However, to use all MacΣqn's features, you'll probably have to read the manual.

## Creating Formulas

You can create equations with up to 212 characters. When you choose a symbol, MacΣqn immediately draws the symbol on the screen. If you use symbols such as an integral or summation sign, MacΣqn prompts you to enter integration or summation limits. This automates the process of equation building. You use the *Enter* key after you are finished with the lower limit of an integral and again after you are finished with the upper limit of an integral; then you can continue building an equation or choose another symbol from the menu.

At the bottom of its window, MacΣqn displays information about the current font, its size, the kind of special symbol you are using (such as integral, root, fraction, product, summation), and the relative position of the element in your equation (numerator or denominator for a fraction, power for a root, etc.). You can increase or decrease the size, change a font or style, and mix special symbols (creating double or triple integrals, complex fractions, nested roots, etc.). MacΣqn allows you up to 12 such nested levels. After you have created a formula, you use the *Copy* command in the *Edit* menu to copy the equation to the *Clipboard*. Once you have the equation in the *Clipboard*, you *Paste* the equation into your document.

## Problems

A few of MacΣqn's options are not included in the *Eqn* menu because there is not enough room. This problem could have been avoided if MacΣqn had the *Fonts* and *Functions* parts in separate menus; that way, MacΣqn would also be more consistent with the Macintosh standard conventions.

The MacΣqn program is somewhat self-explanatory; unfortunately, the MacΣqn manual is *not* clearly written. In many cases, you have to read the same paragraph two or three times and even then rely on trial-and-error.

MacΣqn does not support command-key equivalents in the *Edit* menu and using them may crash the program. Although *Cut* and *Paste* options appear in the *Edit* menu, they are not implemented. That means *there is no way you can paste the contents of the Clipboard back into the MacΣqn window*. So if you want to change your formula, you must build it in the MacΣqn window all over again. When working with MacΣqn, you should save your document immediately before and after each equation is pasted into it. This minimizes the loss of information if you accidentally use the *Clear* command or some other keys that inadvertently erase your formula from the screen.

The editing features of MacΣqn are very limited. You cannot insert characters or symbols. In addition, it is difficult and, in some cases, impossible, to correct an equation while you are building it. Hence, you must be very careful when you type.

## Conclusion

Using MacΣqn, you can quickly create complicated equations and formulas to be incorporated into your documents. When you print the document, you will get good quality print on the Imagewriter and excellent quality print on the LaserWriter. Although MacΣqn is not perfect, it is the only product of its

kind that we know of for technical writers. Despite the problems mentioned earlier, once you start using MacΣqn, you won't want to create equations and formulas without it. You can buy MacΣqn from the Minnesota Book Center for \$82.

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## Review: Microsoft Word

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Microsoft Word version 3.0 for the IBM PC and compatibles is a full-featured word processing package. Microsoft Word supports advanced word processing features such as multiple fonts (typefaces), multiple windows, and a mouse. The Book Center now has an educational discount for Microsoft Word (MSW) which makes the program even more attractive. Full-time University of Minnesota faculty, staff, and students can purchase MSW version 3.0 for the IBM-PC for \$82 at the Book Center.

### Basic Features

The basic features that you expect from any word processing program are included in MSW. You can insert and delete text and cut and paste text within and between documents; you can set margins, first line indents, and line spacing. MSW also automatically reformats paragraphs on the screen and has the usual text search and replace options. Tabs can be either left flush, right flush, center, or decimal (for aligning columns of numbers). Your options for character formatting include bold, italics, underline, double underline, small caps, strikethrough, superscript, and subscript.

### Advanced Features

MSW is loaded with advanced features. You can use MSW's *glossary* function to store a block of text you use repeatedly so that you have to type it only once. To retrieve the text, you type the code you assigned it and press the <F3> key. The *glossary* feature also lets you automatically enter the current date and time and edit text you've stored in the *glossary*.

You can print different *headers* and *footers* on even- and odd-numbered MSW pages. If your document contains footnotes, MSW will automatically renumber the footnotes as you enter or delete them. MSW can print extremely long footnotes on multiple pages beneath the main text of your document.

MSW has an interactive spelling checker with an 80,000 word dictionary. You can also build and edit your own specialized dictionary to hold words not contained in MSW's main dictionary. MSW's *print merge* facility lets you print mailing labels in one, two, or three columns and print form letters using conditional instructions such as *If* and *Else*.

Other MSW advanced features include: a facility that sorts lists of text and numbers in ascending or descending order, ability to print multiple column text, style sheets to define and re-use special formatting for entire documents, table of contents and index generation, a five function calculator, an outlining facility, and access to DOS commands from within MSW.

## Getting Started

When you open the Microsoft Word package you'll find five disks: the Program, Utilities, Spelling program, Printer, and Tutorial disks. You'll also find three manuals: *Using Microsoft Word*, *Reference to Microsoft Word*, and *Printer Information*, as well as an *Ideas for Outlining* booklet with sample outlines, a *Quick Reference Card* for all keyboard and mouse commands, and a template to lay over the function keys on the unenhanced IBM keyboard.

Your first step is to install MSW on your hard disk or make a working copy on floppy disks. You use the *Setup* program to install MSW for your specific hardware configuration. The Setup program is very easy to use; all you do is follow prompts.

Once you have installed MSW, you will probably want to explore the program before you start writing your masterpiece; the Tutorial software serves this purpose admirably. You can follow the Tutorial from beginning to end, or you can select only those features of MSW you want to review. If you have a hard disk, you can install the Tutorial and refer to it from the Help menu within MSW.

If you want more detailed information than you find in the Tutorial program, you will need to refer to MSW's manuals. Fortunately the manuals are well written and well organized. *Using MSW* leads you through all of the features of the program. The reference manual contains a glossary, a complete listing and description of all the commands, keyboard moves, and messages as well as additional information on setup and file conversion. *Printer Information* contains a listing of all the printers and printer features MSW supports. In addition to the manuals, Microsoft provides excellent phone-in customer service Monday through Friday from 8 a.m. to 8 p.m. The customer service telephone number is (206) 882-8089.

## Using Word

When you start Microsoft Word, the program displays a text window on the screen. Your document is displayed inside of this window. Only short documents will fit entirely in this window, but you can scroll vertically and horizontally to move to parts of the document that aren't visible. Documents can be up to 22" wide. The text windows in MSW are similar to the windows with which Macintosh users are familiar: text windows have scroll bars that you can manipulate with a mouse.

You can edit more than one document at a time with MSW. If you have multiple documents open, each document is displayed in its own window. Unlike the windows on the Macintosh, MSW IBM windows do not overlap; the more windows you open, the smaller each window becomes. Since MSW IBM windows do not overlap, you will never have a hard time finding a window, because it cannot become covered or buried underneath other windows. The drawback to the MSW IBM window scheme is that you cannot see much of the contents of a window once you have several windows on the screen. In any case, multiple windows make it easier to cut and paste text from one document to another. You can have up to eight windows on the screen simultaneously.

At the bottom of the screen (beneath the windows) is MSW's command menu and the message and status lines. The command menu includes commands to format the document, search and replace text, print, manipulate windows, and so on. To invoke a command you either type the first letter of the command or point to the command with your mouse and click. MSW uses the message line to display prompts. The status line displays information such as the name of the document and page number.

## Word Menus

MSW has a menu driven structure similar to Lotus 1-2-3. You press the <Escape> key to go from the text window to the command menu; then your cursor moves from the text window to the first command on the menu. Once the cursor is in the command area, you select a command by typing its first letter. Selecting a command often leads you to a second and third level of commands (e.g., to set the position of a tab you run through this sequence of commands: *Format—Tabs—Set—position*). After you have executed a command, the cursor automatically moves back to the text window. This scheme for invoking commands is OK once you know where the commands are. Learning MSW takes some time because it has so many commands, and it is not always obvious which command menu has the option you want to use. Because this scheme often requires many key strokes to execute a command, it is slow.

Fortunately, for many of the frequently used formatting and editing commands MSW has keyboard shortcuts, so you don't have to go through multiple menus to access these commands. Suppose you want to set a first line indent. All you have to do is hold down the <Alt> key and press the letter <F> key; this automatically indents the first line five spaces from the left margin. If you used the Command menu, this operation would take longer. You would have to select *Format*, then *Paragraph*, then tab to the *first line* option, type in the number <.5>, and press the <Enter> key.

## Using Word with a Mouse

If you have a mouse installed on your system, you can take advantage of some speedy shortcuts that the keyboard commands cannot match. For example, you can split a window much faster using a mouse; all you need to do is point and click. With the keyboard you must go to the Command menu, make selections, and type numbers.

The mouse really shines when you select and move blocks of text from one section of your document to another. A mouse speeds these operations because it is much faster to select a block of text by pointing and dragging with a mouse; and only a mouse lets you move a block of text directly to a new location. If you use only MSW keyboard commands, you must transfer the text to a temporary storage space before pasting it into a new location.

The mouse also lets you instantly copy character or paragraph formatting from one block of text to another. This feature is very useful with a document where you are constantly changing between two or more paragraph formats or in the case where you want to change only certain paragraphs.

## Printing

One of MSW's best features is that it supports proportional fonts on most of the major printers. Although MSW cannot display proportional fonts on the screen, it makes all the proper margin adjustments and gives you the proper line breaks. MSW supports over 80 printers. Setup lets you install as many printers as you like. Both installation and changing printers within the program is very easy.

MSW can automatically download fonts to the Apple LaserWriter and Hewlett-Packard LaserJet Plus. On the Hewlett-Packard LaserJet Plus you can print in Courier font at point size 12, and in Helvetica and Times-Roman fonts at point sizes 8, 10, 12, 18, and 24 (assuming you have purchased the proper font cartridges). On the Apple LaserWriter you can print the Courier, Helvetica, Times-Roman, and Symbol fonts in point sizes 8, 10, 12, 14, 18, and 24.

MSW supports all of the dot matrix printers available through the Book Center. On the Epson FX-85 you can print pitch sizes 8, 10 (pica), 12 (elite), 14, 15, and 16; you can also print using proportional spacing, in near-letter-quality mode, and with italics. If you are clever, you can modify MSW's printer description files and add support for a printer's special capabilities to the printer description file.

## Hardware Requirements and Compatibility

Microsoft Word runs on the IBM-PC and compatibles with a minimum of 256K of memory, two floppy disk drives (or a hard disk drive), and DOS version 2.0 or later. MSW version 3.0 is not copy-protected, and you can easily install the program on a floppy disk or on a hard disk.

MSW works with a variety of displays and display adapters. If you have an IBM monochrome (TTL) monitor and the IBM monochrome display adapter, MSW will be able to display only the bold and underline special effects on the screen. A system equipped with an IBM monochrome monitor and a Hercules (or Paradise Hi-Res) display adapter allows you to display bold, underline, double underline, italics, strikethrough, small caps, and superscript, and subscript characters on the screen. This is because MSW uses the Hercules card's graphics mode to draw the characters to the screen. Other display adapters that allow you to view the complete set of special effects include the IBM Color/Graphics Adapter (or Paradise Modular Graphics Adapter) and the IBM Enhanced Graphics Adapter (EGA). Unfortunately, MSW cannot display different fonts, different sizes of fonts, or proportional fonts on the screen.

As far as compatibility with other IBM software is concerned, MSW can import WordStar and ASCII text files. MSW can also convert Microsoft Word documents to columnar, DIF, dBASE II, and SYLK file formats and can convert any of these file formats created in other programs into ASCII text files.

## Limitations

MSW is not quite a what-you-see-is-what-you-get package. You can see page breaks on the screen, but they are not automatically updated after you insert or delete text. You must use the

*Repaginate* command each time you want to see the new page breaks on the screen. Although MSW prints headers and footers, you cannot see them on the screen. You can print two columns of text with MSW, but on the screen the text is displayed as one long narrow column.

MSW is loaded with features, and at first it is not easy to remember in which menu you'll find a particular command. In addition, MSW is not particularly intuitive. For example, suppose you want to change the right margin. There is no function key assigned to margin and no command for margin. MSW's on-line help has no entry for margin. Eventually you figure out that the Margin command is buried at the third level of commands under *Format* and *Division* commands.

MSW's on-line help has a limited index; this makes it difficult to quickly find the information you need. You can't access a topic directly and must spend time paging through a main subject until you find what you are looking for.

## Conclusions

MSW is a powerful word processor and has a number of features that make it especially attractive: MSW is not copy protected, supports a mouse, allows you to edit multiple documents in multiple windows, has style sheets to save and re-use document formats, and has excellent printer support. If you plan to do serious writing, create complex documents, or use a word processor on a regular basis, MSW is a package worth considering. If you want to see MSW, we have a copy of version 3.0 at the Micro HelpLine that you can try.

## Fall 1986 Short Courses

Fall Quarter the Micro Systems Groups will teach over two weeks' worth of courses. Registration information is below; course descriptions are on page 6; the fall schedule is on page 7.

### Fees

You can pay fees by cash, check, or with a signed University Journal Voucher. *No refunds will be made after the class has begun.* Fees are printed in order for the following groups: 1) University students, 2) University faculty and staff, and 3) non-University of Minnesota persons. Currently there are four fee levels:

A = \$15, \$25, \$40	C = \$40, \$50, \$80
B = \$25, \$35, \$60	D = \$45, \$60, \$90

### Registration

All classes have limited enrollment. Classes are filled in the order registration is received. Fees must accompany your registration. Register in person at the ACSS Reference Room in 128A Lind Hall, Monday-Friday, 8 am-4:30 pm, or register by mail. The deadline for registration is 4:15 pm on the last working day *before* the class begins.

### More Information

If you need more information on short courses, call 625-7397.

## Fall Quarter 1986: Microcomputer Short Courses



### IBM and Compatibles Hands-On: Limited to 10 Per Class

**Introduction to Microcomputers - DOS.** *Fee Level B.* This 5-hour introduction to microcomputers for new users is taught over two days. This course includes background information on hardware and software for microcomputers as well as a practical (hands-on) introduction to the MS-DOS and PC-DOS operating systems.

*Intro to Micros course or equivalent knowledge is required for the courses listed below.*

*New* — **Managing Your Hard Disk.** *Fee Level B.* This 2.5 hour course will cover the PC-DOS commands necessary to organize a hard disk.

*Changed* — **Introduction to dBASE III.** *Fee Level D.* This 6-hour course will cover basic concepts of database management. The course is taught over three days and covers only interactive commands. You will create several databases and learn how to enter data, modify it, and retrieve it.

*New* — **Programming with dBASE III.** *Fee Level C.* In this 5-hour course, taught over two days, you will write and run several simple dBASE III programs while learning some basic programming concepts. *Working knowledge of dBASE III is required.*

**Beginning Lotus 1-2-3.** *Fee Level B.* This 2.5-hour course will familiarize users with basic Lotus spreadsheet concepts. You will be introduced to beginning-level commands by entering a sample spreadsheet. You will set-up your own spreadsheet, enter data, formulas, use spreadsheet commands, functions, formats, and create several charts.

**Intermediate Lotus 1-2-3.** *Fee Level B.* This 2.5-hour course covers three of Lotus 1-2-3's more advanced features: database queries, look-up tables, and macros. *Working knowledge of Lotus assumed; the Beginning Lotus 1-2-3 class alone is insufficient.*

*New* — **Introduction to (Microsoft) Word.** *Fee Level C.* This 5-hour course for new MS Word users is taught over two days. You will learn to use keyboard commands to format characters and paragraphs, move text, use search and replace, multiple windows, and a glossary, and create headers and footers. You will install a printer and change printer fonts. We will give a short demonstration on how to use a mouse with MS Word.

**Introduction to WordPerfect.** *Fee Level B.* This 2.5-hour course is for new WordPerfect users. You will learn to use simple line and page formatting commands (such as set margins and headers), how to manipulate blocks of text, use search and replace, change initial (default) values, and how to install a printer.

**Intermediate WordPerfect (Version 4.1) for Authors.** *Fee Level B.* In this 2.5-hour course for writers you will create a simple outline, table of contents, and index. We will also introduce macro use, split screens, bibliographic entries, and other features.\*

**Intermediate WordPerfect (Version 4.1) for Office Applications.** *Fee Level B.* This 2.5-hour course will introduce features such as form letter generation (merge/sort), simple macros and outlines, and split screens.\*

*\*(Mastery of the beginning level commands in the Intro to WPerfect course is assumed.)*

### IBM Overview: Limited to 15 Per Class

*New* — **Programming IBM Graphics.** *Fee Level A.* This 2.5-hour overview discusses how to program the IBM Enhanced and Professional graphics adapters and what programming tools are available for each adapter. Discussion will be limited to Pascal and FORTRAN; *you must already know how to program in one of these languages.*

*Working knowledge of the Macintosh is assumed for all these classes.*

### Macintosh Overviews: Limited to 15 Per Class

**Excel.** *Fee Level A.* This 2.5-hour overview consists of discussion and demonstration of Microsoft's Excel. We will demonstrate designing and manipulating simple spreadsheets and databases, graphing data, and designing and using function and command macros.

**(Microsoft) Word.** *Fee Level A.* This 2.5-hour overview includes discussion and demonstration of the basic features of Word and how they work together.

**Desktop Publishing.** *Fee Level A.* This 2.5-hour overview consists of demonstration and comparison of page make-up software such as Aldus PageMaker, ReadySetGo, and MacPublisher II. *Working knowledge of MacWrite and MacPaint is assumed.*

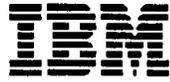
**Preparing a Dissertation on the Mac.** *Fee Level A.* In this 2.5-hour overview we demonstrate and discuss the advantages and disadvantages of several Mac word-processing and graphics programs. These programs include: MacWrite, MS Word, MacDraw, MacDraft, MS Chart, and others. We discuss organizing bibliographies, graphing and organizing data, placing graphs and illustrations into your document, and using the Apple LaserWriter printer.

**Omnis 3.** *Fee Level A.* This 2.5-hour overview introduces Omnis 3, a relational and hierarchical database management program designed for very large databases which require custom-designed data entry forms. *Familiarity with a programming language, including loops and IF statements, is required.*

**Developing Software in TML Pascal.** *Fee Level B.* This 6-hour overview covers the fundamentals of writing Mac programs with TML Pascal; it's taught over three days and discusses writing multi-window Mac applications, using MEWS (a set of Window and Event Management tools developed by the Micro Group) in detail, and discusses strategies for writing (and debugging) Mac programs. It is a course for those who *already* understand Pascal and want to write Mac applications not a course in how to program in Pascal. You must bring *Inside Macintosh* to class.

### Macintosh Hands-On: Limited to 15 Per Class

*New* — **Intermediate Excel.** *Fee Level C.* This 5-hour workshop is taught over two days. In it you will use Excel's graphics, macros, spreadsheet, and database features. *Prior experience with Excel or attendance in the introductory Excel course is assumed.*



Fall 1986	Introductory					Intermediate					view	Overview						H-on	Fall 1986
	Micros & DOS	dBASE III	Word-Perfect	MS Word	Lotus 1-2-3	WPerf. Authors	WPerf. Office	Hard Disk	Lotus 1-2-3	dBASE Prog.	Graph Prog.	MS Word	Begin Excel	TML Pascal	Omnis 3	Disser-tation	Desktop Publish.	Interm. Excel	
<b>October</b>																			<b>Oct</b>
06	1:30-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	M
07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T
08	1:30-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	W
09	-	-	1:30-4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	F
13	-	-	-	-	1:30-4	-	-	-	-	-	-	-	-	-	-	-	-	-	M
14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	T
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27 and 28: Thanksgiving Holiday																			-
<b>December</b>																			<b>Dec</b>
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