Chapter 13 Other Software in the 1980's

The 1980's began with a continuation in the shift from the technical programming language enthusiast, to the increased use of application software. Business productivity programs such as databases, spreadsheets and word processors became a major segment of the software market. The release of more powerful microprocessors, less expensive memory and storage devices accelerated these changes. Ease-of-use and user friendly were the terms used to describe the new focus for software in the 1980's. Incorporation of innovative graphics helped to establish this new focus. These market demands and the introduction of the IBM Personal Computer in 1981, resulted in major changes and a rapid expansion of the software industry. However, between 1983 and 1984, a severe downturn in the personal computer industry, caused significant financial problems for a number of software companies. The operating system segment of the software market also experienced significant change.

13.1 ... Operating Systems

Seattle Computer Products

Seattle Computer Products, Inc., had developed an Intel 8086 microprocessor card for the S-100 bus in May 1979. They required a 16-bit disk operating system and proposed to use Digital Research CP/M-86 which had been promised for the end of 1979. In April 1980 CP/M-86 was not available and Seattle Computer Products decided to develop its own operating system. It was written by Tim Paterson and called QDOS (Quick and Dirty Operating System) because it was created so quickly (in two man-months). QDOS 0.1 was released in August 1980.

QDOS was similar to CP/M. Paterson obtained compatibility with CP/M by incorporating a translator that converted 8080 instructions into 8086 instructions. He then provided equivalent CP/M functions to operate on the 8086 microprocessor. Paterson also improved the data

storage capabilities and file organization of QDOS as compared to CP/M by using the Microsoft concept of a file allocation table (FAT). This concept controlled the disk format and space allocation.

Seattle Computer Products contacted Microsoft in early August regarding adapting 8086 BASIC to QDOS and a possible cross-licensing agreement. In September 1980 Microsoft purchased non-exclusive rights to the Seattle Computer Products operating system. Then in November 1980 Microsoft signed a contract with IBM to provide a variety of software including an operating system for their new PC Computer. A new version of the operating system called 86-DOS 0.3 was released in late 1980. Version 1.0 was released in April 1981 which was very similar to Microsoft MS-DOS. Then Tim Paterson left Seattle Computer Products and joined Microsoft in May 1981. Microsoft purchased all rights to the Seattle Computer Products disk operating system. in July 1981

Digital Research

In late August 1980, IBM visited Digital Research to negotiate the possible use or adaptation of CP/M for its new PC computer. However Digital Research would not sign an IBM non-disclosure agreement that resulted in a termination of the meeting. Then in September it became apparent that Digital Research would not assign the resources required to provide a 16-bit version of CP/M in the time schedule required by IBM. This resulted in IBM selecting Microsoft to provide the PC computer operating system.

The negotiations with IBM were indicative of company organizational problems. This resulted in John Rowley being hired as president in November 1981.

CP/M-86 was a 16-bit version of the CP/M operating system developed by Digital Research for the Intel 8086 microprocessor. Some early copies were available in 1981, however it was not released for use on the IBM Personal Computer until April 1982. The software was priced from $175 to $240, which was considerably higher than the $60 IBM charged for the Microsoft operating system. The price was subsequently reduced, but the late

release, higher price and a lack of support from IBM limited sales.

Concurrent CP/M-86 is a program developed by Digital Research during 1982/83 to enable multitasking. This provided the capability of running up to four processes or programs at the same time. The company also developed another operating system called Concurrent DOS for the DOS environment in 1984.

Then in May 1988, Digital Research released Version 3.3 of DR-DOS (Digital Research - Disk Operating System), an operating system compatible with MS-DOS. This first release of DR-DOS was followed by Version 3.40 in January 1989 and Version 3.41 in June 1989.

Microsoft

Microsoft entered the operating system segment of the software market when it developed XENIX in August 1980. Then with the release of the IBM PC computer in August 1981, Microsoft became a significant provider of operating system software (see Sections 12.2 and 12.3). See Appendix B for a description of the different versions and corresponding release dates of DOS.

IBM

IBM contracted with Microsoft to provide the operating system for its PC computer released in August 1981. IBM added some utilities to the Microsoft operating system and called it PC-DOS. Then in 1984 IBM entered into a joint development agreement with Microsoft to develop a new operating system that became OS/2 (see Section 9.5).

Apple Computer

Apple Computer released the Sophisticated Operating System (SOS) for the Apple III computer in May 1980. It was one of the earliest operating systems to have installable device drivers.

The Professional Disk Operating System (ProDOS) was developed for the Apple II computer and evolved from the Apple III computer SOS operating system. It also resulted from a requirement to provide an interface with peripheral devices other than the Disk II drive, a

hierarchical directory structure and peripheral device drivers. ProDOS was released in January 1984 and was subsequently renamed ProDOS 8.

The Professional Disk Operating System 16 (ProDOS 16) was a 16-bit operating system released with the Apple IIGS computer in September 1986.

The GS/OS native operating system was released for the Apple IIGS computer in September 1988. It incorporated the concept of File System Translators (FST's) to determine disk format for the selection of device drivers. Version 5 of the Apple IIGS System software was released in May 1989. It was a significant upgrade of the system software with improvements in performance, graphics and file operations.

Other Operating Systems

Douglas L. Michels founded The Santa Cruz Operation (SCO), Inc. in 1979. The company started developing UNIX-based operating systems in the early 1980's.

UCSD p-System is an operating system that included UCSD Pascal. It was provided by SofTech Microsystems for the IBM Personal Computer released in 1981. It had a price of about $450.

Mach is a UNIX based micro-kernel operating system developed by Richard (Rick) Rashid at Carnegie-Mellon University in the mid 1980's. It was designed to be portable to many types of hardware and multiprocessor computers. It formed the basis for the NeXTSTEP operating system and influenced the design of the Microsoft Windows NT operating system.

NeXTSTEP is a UNIX-based operating system released with the NeXT computer in October 1988. Avidis Tevanian who had been one of the lead designers of the UNIX Mach system at Carnegie-Mellon University, was the chief software designer at NeXT. IBM subsequently licensed NeXTSTEP with the intent of adapting the system for its new workstation.

Operating System User Interfaces

Operating system user interfaces received a lot of attention from hardware and software suppliers between 1980 and 1983. Apple Computer had developed a graphical user interface for the Lisa and Macintosh computers. VisiCorp demonstrated VisiOn in late 1982 and Microsoft had initiated an extensive development of a system that would become Windows (see Section 12.4) in 1983.

VisiOn is a multiwindow graphical environment program that was demonstrated by VisiCorp (formerly Personal Software) at the November 1982 COMDEX show in Las Vegas. VisiCorp released the program in November 1983. It had taken between two to three years to develop under the code name of Quasar. William T. Coleman was the group manager responsible for the development of VisiOn and related application programs. The software interfaced between the IBM PC operating system and user application programs. It utilized high resolution graphics, a mouse and had its own application programs. It was machine and device independent. The program cost $495 at introduction, then after poor sales the price was reduced to $95. However VisiOn could only run programs written for the interface. The only programs available at the release were VisiCalc, VisiGraph and VisiWord from VisiCorp. This limitation was detrimental to its widespread acceptance. VisiOn created financial difficulties for VisiCorp. Control Data Corporation subsequently purchased the VisiOn software.

DESQ is a windowing system developed by Quarterdeck Office Systems in May 1984. It could multitask DOS programs but did not have a graphical interface. It was not successful. Quarterdeck subsequently developed DESQview for use with IBM TopView in July 1985.

Digital Research developed GEM (Graphics Environment Manager). Lee Lorenzen was a principal in the software development. It had a graphical user interface with a "look and feel" similar to the Macintosh computer, but could not multitask DOS programs. It was demonstrated at the COMDEX show in October 1984. The company also developed a number of application programs for use with the system. During

1985 changes were made to the user interface, due to threatened litigation by Apple because of the similarities to Macintosh.

Hewlett-Packard developed NewWave PC that is an interface for use with Microsoft Windows. HP announced NewWave in November 1987. It included additional features to make Windows easier to use that had similarities to the Apple Macintosh system. This resulted in litigation by Apple Computer in March 1988.

Berkeley Softworks released GEOS (Graphic Environment Operating System) that was ProDOS-compatible in March 1988. It had a Mac-style desktop, word processor and spelling checker.

Other operating system interfaces are Microsoft Windows (see Section 12.4), IBM Presentation Manager and TopView (see Section 9.5) and a TopView clone called Mondrian. Metaphor Computer Systems is a company founded by David Liddle and Donald Massaro in 1983, that developed a windows-like graphical user interface for the PC computer.

The Massachusetts Institute of Technology (MIT) developed the X Window System for the UNIX operating system. The X Window System is a graphical communications interface that provides a standard way of controlling graphic displays from one X Window System to another. Graphical user interfaces that have been developed for the X Window System are DECwindows, Open Look by UNIX International and OSF/Motif by the Open Software Foundation.

13.2 ... Programming Languages

BASIC

As a result of demands for structured programming concepts, Dartmouth College developed a powerful BASIC compiler in 1983, called Dartmouth Structured BASIC, also known as SBASIC. After many conflicting requirements and technological changes since the formation of a standards committee in 1974, the American National Standards Institute (ANSI) completed a draft for a "full" BASIC standard in 1983. This led Dartmouth College to develop a compiler based on the new standard that would be portable to most personal computers. Dartmouth released this new compiler named True BASIC in 1984.

During the 1980's, the availability of more powerful computers and increased memory, resulted in a move from interpreters to compilers for new BASIC programming languages. Examples of these are the Digital Research CBASIC-86 compiler, Microsoft QuickBASIC and the Tandy Radio Shack RSBASIC compiler

Borland announced Turbo BASIC at the fall COMDEX show in November 1986.

C

Borland released Turbo C at a price of $99.95 in the late 1980's.

C++

Bjarne Stroustrup developed the C++ programming language at Bell Telephone Laboratories. C++ is an object-oriented extension of the C language. C++ became available in 1986.

Logo

In the summer of 1982 Logo became available for the Apple II and TI-99/4A computers.

Modula-2

Modula-2 is a general purpose systems implementation language based on the use of modules. It was developed by Niklaus Wirth after a number of years research on the capabilities of Pascal. The initial Modula language was described by Wirth in 1977 and an improved version Modula-2 was available in 1982.

The first commercial implementation of Modula-2 was announced by Volition Systems in December 1982. It was released for a number of computers including the Apple II, Apple III and 8080/Z80 based systems.

Oberon

Oberon is an object-oriented systems programming language developed by professors Niklaus Wirth and Jurg Gutknecht at the ETH (Eidgenossische Technische Hochschule) in Zurich, Switzerland. The language is a distillation of the best features from Pascal and Modula-2. Oberon is smaller and simpler than its predecessors. The software was developed in conjunction with CERES, which was a single-board graphics workstation. Work on the language began in 1985. Wirth named the language in tribute to the precision of the Voyager spacecraft as it flew past Uranus's moon of the same name (Oberon) in 1988. Implementations are available for Apple Mac II's, DEC DECstations, IBM RISC System/6000 workstations, Intel based PC's and Sun SPARCstations.

Pascal

Microsoft developed a Pascal compiler for the IBM PC in April 1983 that had a price of $300. Then in March 1989 Microsoft released Quick Pascal.

UCSD Pascal was originally developed at the University of California, San Diego (UCSD). The UCSD system included the programming language and the UCSD operating system and was supplied by SofTech Microsystems, Inc.

Philippe Kahn moved from France to the USA and founded Borland International, Inc. in 1983. Turbo Pascal was the first product developed by Kahn. The compiler was introduced by an advertisement in the

November 1983 issue of *Byte* magazine at a price of only $49.95. It was an innovative program with an integrated programming environment. It facilitated program development by having a built-in text editor from which one could compile, correct errors and run the program. The program was an immediate success. Some other programs released by Borland are the Paradox database, Quattro Pro spreadsheet and Sidekick.

PL/I

Digital Research developed a three-pass compiler for PL/I in 1980. The compiler was written in PL/M and was based on the G Subset of PL/I which was an adaptation for minicomputers. The first two passes produced symbol tables and intermediate language suitable for various hardware systems. The third pass, optimized the code and developed the final machine code for a specific system.

13.3 ... Word Processors

The 1980's was a period of transition for word processing. The market changed from companies such as IBM, Lanier and Wang Laboratories supplying dedicated word processors, to the use of general purpose personal computers and word processing software from other independent companies. The dominant companies changed in 1983 from Wang to MicroPro providing Word-Star, then to the WordPerfect Corporation in 1986. However by 1989, Microsoft Word and WordPerfect had close to equal shares of the market.

EasyWriter

In 1981, IBM negotiated with Bill Baker of Information Unlimited Software (IUS) to adapt the Apple II EasyWriter word processor for their new personal computer. An agreement was reached and John Draper with assistance from Larry Weiss of IUS developed the program for the IBM PC. It had a price of $175 and was released with the support of IBM in August 1981. The program did not receive good reviews. However, it had good initial

sales, because it was the only word processor available for the IBM PC at its introduction. Improvements were made to the program, but it did not compete successfully with later word processors. In 1983, Computer Associates International purchased IUS from Bill Baker for over $10 million.

Word-Star

For the founding of MicroPro International and the introduction of Word-Star in 1979, see Section 7.3. MicroPro adapted Word-Star to the IBM PC in mid 1982 and it quickly gained a dominant share of the market. Other company products were CalcStar, DataStar and InfoStar, MailMerge and SpellStar. The company became a public corporation in March 1984. A new version of the word processor named Word-Star 2000 with a new interface was introduced at the fall COMDEX show in 1984. However it functioned slower and received a poor reception. This was a turning point in the dominance of MicroPro as the leading supplier of word processors. The company changed its name to WordStar International in 1989.

WordPerfect

Alan Ashton who was a Ph.D. graduate in computer science from the University of Utah, started developing the specification for a word processing program in the summer of 1977. The specification defined innovative features for word processors at that time. It included text scrolling, use of function keys and automatic on-screen editing. In 1978, Bruce Bastian started working with Ashton to develop the software for the word processor.

A simplified version of the software called P-Edit for program editing was released and sold by an associate Don Owens. Ashton, Bastian and Owens then formed a company called Satellite Software International (SSI) in September 1979 to market P-Edit and the new word processor. The word processor was completed in March 1980 and called SSI*WP. The software only worked on a Data General computer system and the retail price of the program was $5,500. However the program was easy to use and fast.

In October 1980, W. E. Pete Peterson who was a brother-in-law of Bastian joined the company. At the end of 1981 Owens was removed as an officer of the company and Peterson became manager of sales and marketing and subsequently an executive vice president.

In early 1982 the company started adapting P-Edit for the IBM Personal Computer and completed the conversion in August. Work on the conversion of SSI*WP to the IBM PC was completed in the fall of 1982. The name WordPerfect was selected for the program, then it was announced to the press in October. WordPerfect was released as version 2.20 and shipped in November. The program had innovative features and the company provided excellent customer support.

In early 1983, SSI purchased Don Owens share of the company for $139,000. Ashton and Bastian now owned 50 percent each of the SSI stock. Peterson subsequently received a small percentage of the shares. Versions 3.0 and 4.0 were released at the 1983 and 1984 fall COMDEX shows respectively. Also in 1984, the company name was changed to SSI Software. With the release of version 4.0, reviews were very favorable and sales set new records in 1985.

Other company products were MathPlan (later named PlanPerfect), SSI*Data (later named DataPerfect), a legal-time-and-billing system named SSI*Legal and a version of the Forth programming language named SSI*Forth. In 1986, the company name was changed to WordPerfect Corporation and WordPerfect became the leading word processing program. Executive WordPerfect, a "junior" version of WordPerfect was released for portable computers in May 1987. In 1988 the company released WordPerfect Office incorporating electronic mail for networks, a version of WordPerfect for the Apple Macintosh in April and version 5.0 of WordPerfect for the IBM PC in May

In 1989, the tenth anniversary of the company founding, WordPerfect had achieved significant success. However with the release of graphical user interfaces by IBM in OS/2 and by Microsoft with Windows, increasing demands were occurring in the marketplace for WordPerfect to provide a graphical version of its word

processor. Due to competitive concerns with Microsoft Word and higher expectations for the success of the IBM OS/2 operating system, the company decided to emphasize the development of a version of WordPerfect for OS/2 first.

Other Word Processors

Paul Lutus developed a new word processor for the Apple II computer in 1980, with a number of improvements as compared to his previous Apple Writer program. Lutus negotiated a royalty agreement for the program with Apple Computer instead of the flat fee received previously. The program called Apple Writer II was released by Apple Computer in 1981. It became a very popular word processor for the Apple II computer and made Lutus quite wealthy.

Timothy E. Gill founded Quark, Inc., in 1981. Gill developed an early word processor called Word Juggler for the Apple III computer. Farhad Fred Ebrahimi purchased half of the company in 1986.

MultiMate is the name of a series of word processing programs initially developed by MultiMate International Corporation. The company was established in 1982 and was acquired by Ashton-Tate, in December 1985. The first program developed was MultiMate Professional Word Processor. An improved version with additional advanced features was called MultiMate Advantage Professional Word Processor. An easy-to-use version of the program called MultiMate Executive Word Processor is also available.

Camila Wilson developed Volkswriter and founded Lifetree Software Inc., in 1982. Volkswriter was introduced at the West Coast Computer Faire in March 1982. The program was written in Microsoft Pascal. It was one of the earliest effective word processors for the IBM PC computer. It was priced at $195 and a deluxe version at $295.

Bank Street Writer is a word processing program that was developed by a group of Boston programmers for Apple II computers. Brøderbund Software obtained the publication rights and released it in December 1982. Brøderbund subsequently released it for Atari computers.

pfs:Write was developed by Software Publishing Corporation in the early 1980's. It became a popular word processing program with significant market penetration. See Section 13.5 for initial developments at Software Publishing Corporation.

Other word processing programs such as the Apple Computer MacWrite, IBM Displaywrite, Lotus Ami Pro (developed by the Samna company and subsequently became WordPro), Microsoft Word and Sierra On-Line Homeword shared the market. See Section 12.6 for details of Microsoft Multi-Tool Word, Word and Word for Windows word processing programs.

13.4 ... Spreadsheets

Lotus 1-2-3

Lotus 1-2-3 was co-developed by Mitchell D. Kapor and Jonathan M. Sachs in 1981. Sachs was a graduate in mathematics from MIT and spent fourteen years studying and working at various positions at MIT. In the mid seventies Sachs left MIT and supervised the development of an operating system at Data General. Following this he co-founded Concentric Data Systems where he designed a spreadsheet to run on Data General hardware. Kapor is a graduate in psychology from Yale University and partially completed a masters degree at MIT. In 1978/79 Kapor co-developed a program called Tiny Troll and in 1981 two programs called VisiPlot and VisiTrend.

In 1981 Sachs and Kapor reached an agreement to adapt Sachs spreadsheet program for the new IBM Personal Computer. Sachs had strong technical experience, especially in assembly language and Kapor had successful commercial experience in program development, with special skills in the design of the user interface. Kapor and Sachs assigned the code name of TR10 to the software development project.

To finance the initial development and company startup they contacted Sevin-Rosen Partners. Benjamin M. Rosen was a venture capitalist who had purchased Tiny Troll from Kapor. Rosen and his partner L. J. Sevin and other investors entered into an agreement to help

finance with the development and introduction of the spreadsheet software. Lotus Development Corporation was founded in April 1982. The name Lotus was selected by Kapor, and comes from India where it is associated with the concept of perfect enlightenment.

The program featured natural-order recalculation, integrated graphics capability for charting, had a limited database capability and provided a computer based user tutorial. However the program required 128K bytes of memory. The software was optimized for a PC computer with the increased memory capacity and took advantage of the more powerful capabilities of the Intel 8088 microprocessor. The software was very fast in operation and achieved extra speed by going around DOS.

Lotus 1-2-3, was announced in October 1982, demonstrated at the November 1982 COMDEX show in Las Vegas and shipped in January 1983. It was an immediate success and soon replaced VisiCalc as the dominant spreadsheet program.

The company became a public corporation in October 1983. An improved version 2.0 of Lotus 1-2-3 was released in November 1985. Jim P. Manzi became president of Lotus in 1984 and chairman after the departure of Mitchell Kapor in July 1986. Lotus 1-2-3/3 was a new improved version of Lotus 1-2-3 that was announced in April 1987 for IBM OS/2 systems. In September 1987 Lotus announced it would be delayed, it was finally released in June 1989.

VisiCalc

Reference Section 7.4 for the founding of Software Arts and the initial development of VisiCalc in 1979.

In February 1980, Robert Frankston of Software Arts developed the DIF format for VisiCalc to facilitate data transfer. During 1980/81 Software Arts adapted VisiCalc to other computers such as the Atari, Commodore Pet, IBM PC and Radio Shack TRS-80. VisiCalc Advanced Version was released with additional features at the National Computer Conference in 1982. In early 1982, Personal Software, Inc. changed the name of the company to VisiCorp. Subsequently Software Arts and VisiCorp had disputes regarding the development and marketing of

VisiCalc. In September 1983 it resulted in litigation, and in early 1984 Software Arts terminated its marketing agreement with VisiCorp. The litigation was settled out-of-court in September 1984 in favor of Software Arts.

Lotus 1-2-3 had significantly impacted the sales of VisiCalc. Also the development costs of VisiOn and the litigation had affected the financial viability of VisiCorp. VisiCorp merged with Palladin Software in November 1984. Then Software Arts was purchased by Lotus Development Corporation for $6.5 million in April 1985. Daniel Bricklin became a consultant for Lotus, then he founded a new software publishing company called Software Garden, Inc.

Other Spreadsheets

See Section 10.4 for the Apple Computer LisaCalc and Section 12.6 for details of Microsoft Electronic Paper, Multiplan and Excel spreadsheets.

SuperCalc was designed by Gary Balleisen and released by a company called Sorcim for the CP/M market. Richard Frank owned the company whose name is micros spelled backwards. Subsequently improvements were incorporated in the release of SuperCalc3 and SuperCalc5 that featured 3-dimensional capabilities. The spreadsheet was acquired by Computer Associates International in 1984.

Randy Wigginton developed Full Impact for the Macintosh in 1989. The program was marketed by Ashton-Tate.

Quattro Pro was a spreadsheet program developed by a company in Hungary and released by Borland International in 1987. Version 2.0 was released in November 1989.

Other spreadsheet programs developed during the 1980's were: Javelin by Javelin Software, pfs:Plan by Software Publishing, SCO Professional by Santa Cruz Operation, T/Maker by Heidi and Peter Roizen, VP-Planner by Paperback Software and WingZ for the Apple Macintosh by Informix. Spreadsheet add-on programs were released during the 1980's to provide additional features. Examples of these are pfs:Graph by Software Publishing

and a program called Sideways, which as the name suggests printed a spreadsheet sideways.

13.5 ... Databases

dBASE

The dBASE database program was initially developed by C. Wayne Ratliff in 1979 under the name of Vulcan. However he was not able to market the software successfully.

George Tate and Hal Lashlee founded a company called Software Plus as a discount mail-order software service in August 1980. In late 1980 they signed a marketing agreement with Wayne Ratliff to market his Vulcan database software. The company name was then changed to Ashton-Tate, Inc. The Ashton name does not represent anything and was selected for marketing considerations. Ratliff joined Ashton-Tate later as the chief scientist.

The software was introduced as dBASE II for 8-bit computers with a CP/M operating system in January 1981. There never was a dBASE I, the II implied an improved product. It was one of the earliest full functional relational data base programs for personal computers. The software included capabilities for programming customized requirements. The company offered innovative support services that quickly resulted in its success.

In mid-1983 Ashton-Tate purchased the dBASE II technology and copyright from Wayne Ratliff. The company went public in November 1983. Version 2.4 of dBASE II was released in 1983 with capabilities to run on both an IBM PC computer and a CP/M operating system.

dBASE III for 16-bit computers was released in May 1984. It provided extended functions, pull-down menus and a limited networking capability. dBASE III PLUS was released with built-in multi-user capabilities in November 1985. A dBASE III PLUS LAN PACK was available to share dBASE III files in a network. dBASE Mac was released for the Apple Macintosh computer in September 1987. However, it did not receive good reports.

Oracle

Lawrence J. Ellison, Robert N. Miner and Edward A. Oates founded Software Development Laboratories (SDL) in June 1977. The company had just received a contract to provide software for a mass storage device.

Before the contract was finished the company decided to diversify by developing a packaged software product. This new product would be a relational database system, that was first described by Edgar F. Codd of IBM in the June 1970 issue of the *Communications of the ACM*. It would also incorporate a **S**tructured **Q**uery **L**anguage (SQL), developed by the System R (Relational) group at IBM's Research Laboratory in San Jose, California. SQL was the user interface for the database system. Miner and Bruce Scott were principals in the development of the new program that was named Oracle. The program was developed on a DEC minicomputer and was introduced in 1978. IBM had conceived the relational database system, but SDL had beaten them to the market (IBM did not release a relational system until February 1982). Shortly after the introduction the company name was changed to Relational Software Inc. (RSI) then later to the Oracle Corporation.

RSI's first customer was the Central Intelligence Agency (CIA). However the CIA required the database to run on other operating systems such as IBM's or DEC's VAX. This and other customer requirements resulted in a rewrite of the database program in the C language to make it portable to different computer platforms. In the late 1980's, an easy-to-use version of the Oracle database was developed for the Apple Macintosh computer. This was followed by a version to run on a personal computer using Microsoft Windows. The company also developed network and client-server software for the personal computer market.

The company went public in 1986 and is now the world's largest supplier of database software. Oracle Corporation is the second-largest independent software company after Microsoft.

pfs:File

Software Publishing Corporation (SPC) was founded in 1980 by three Hewlett-Packard associates, Janelle Bedke, Fred M. Gibbons and John D. Page. The initial impetus for establishing the company was by Gibbons. The company president is Gibbons, the vice president of software development is Page and the vice president of marketing is Bedke. Page had created a database for a minicomputer at Hewlett-Packard. He then developed SPC's first program called Personal Filing System, that was abbreviated to pfs:File

The program was developed with the concepts of being simple, easy-to-use and of low cost. The program was written in Pascal with assembler routines for performance critical functions. The program was released in September 1980 for the Apple II computer.

Other programs such as pfs:Graph, pfs:Plan, pfs:Report and pfs:Word have been released using the same design concepts. The programs have also been adapted for various computers such as the IBM PC and Radio Shack models. IBM markets the pfs programs using the IBM Assistant series of labels. See Sections 13.3 and 13.4 for additional details of other Software Publishing products.

Other Databases

Informix Software Inc., is another major database software company founded by Roger Sippl in 1980. The company went public in 1986 and Phillip E. White became the chief executive officer in 1989.

Rupert Lissner developed QuickFile that was an early Apple II database program marketed by Apple Computer in 1980. A version for the Apple IIe was subsequently released named QuickFile IIe.

Jim Button developed a simple inexpensive shareware database program called PC File. He founded a company called ButtonWare around 1983 that was one of the earliest shareware companies.

Mark B. Hoffman and Robert S. Epstein founded Sybase, Inc., in 1984. The company developed relational databases, operating systems and now specializes in client-server software. The company went public in 1991.

Laurent Ribardiére and Maryléne Delbourg-Delphis of France developed the 4th Dimension database for the Apple Macintosh computer in 1985. The program was a powerful graphic database and was acquired by Apple Computer. However, due to pressure from Ashton-Tate who were developing dBASE for the Macintosh, Apple Computer decided not to release the program. The developers founded the French company Analyses Conseils Informations (ACI) to market the program. In April 1987, the company formed ACIUS to market the program in the USA and appointed Guy Kawasaki who had been an executive with Apple Computer as president of ACIUS.

In 1987, Borland International bought Ansa Software and its database management system called Paradox. Borland released its version of Paradox in 1989.

13.6 ... Integrated Programs

In the early 1980's, integrated programs that combined features such as a word processor, spreadsheet and database became very popular.

Context MBA

Context MBA was a powerful integrated software package developed by Context Management Systems and released in July 1982. It featured a powerful spreadsheet, communications program, database, graphics and word processor. To improve portability it was developed for the UCSD operating system. However the system was slow, was not user friendly and could not compete with the faster programs such as Lotus 1-2-3. The company subsequently went out of business.

AppleWorks and 3 E-Z Pieces

AppleWorks is an integrated software package developed by Rupert Lissner starting in 1982. It evolved from the QuickFile database program by Lissner and was initially called Apple Pie. The program was written in machine language. It is an integrated word processing,

spreadsheet and database software package which was introduced for the Apple IIe in November 1983.

The program was marketed by Apple Computer and sold for $250. AppleWorks became one of the world's best selling programs and enhanced the sale of Apple IIe computers. Its popularity resulted in the formation of the National AppleWorks Users Group (NAUG). An improved Version 2.0 of AppleWorks was released in September 1986. Then Apple Computer's subsidiary Claris Corporation, contracted with Beagle Bros. to develop a major update of the program. This was released as Version 3.0 in March 1989 and a networked version in August.

A similar program called 3 E-Z Pieces was simultaneously developed by Lissner for the Apple III. Lissner sold the marketing rights for this program to Haba Systems.

Subsequently a number of add-on enhancements were made for the AppleWorks program by other companies. Pinpoint Publishing released Pinpoint Desk Accessories in 1985 and Beagle Bros. released MacroWorks in June 1986 and a series of TimeOut modules starting in 1987.

3-Plus-1

3-Plus-1 is an integrated program that was developed by Commodore and included with their PLUS/4 computer which was released in January 1984. The program included a word processor, spreadsheet, business graphics and a file manager.

Symphony and Jazz

Lotus Development Corporation introduced an integrated program called Symphony for the IBM Personal Computer in February 1984. It was a five function integrated package with spreadsheet, business graphics, word processor, database manager and telecommunication capabilities. The project leader on the software development was Raymond Ozzie. However users felt it was too complex and sales were below expectations.

Jazz is a five function integrated program by Lotus similar to Symphony but for use on the Apple Macintosh computer. It was announced in November 1984

for release in March 1985, but the release was delayed until May. The software had a price of $595. However Jazz received mixed reviews. It was reported to be slow and lacked macros as on Lotus 1-2-3. The sales were to some extent affected by the release of the highly successful Microsoft Excel spreadsheet. Lotus reduced the price of Jazz, but it was not a successful product.

Framework

The Framework software was developed by Robert Carr who has both a bachelor's and master's degree in computer science from Stanford University. Carr had previously worked on Context MBA and at the Xerox PARC (Palo Alto Research Center) on software for future products. In 1983, Carr co-founded Forefront Corporation with Marty Mazner. The company was financed by Ashton-Tate in exchange for marketing rights to the software. The software integrated a word processor, data base, spreadsheet, graphics and communication capabilities.

The five function integrated software package named Framework was introduced by Ashton-Tate in July 1984. In 1985 Ashton-Tate acquired Forefront Corporation and Carr became chief scientist. Framework II, a second generation of the software was introduced in September 1985. It included improved functionality and ease of use features.

First Choice

Was released by Software Publishing Corporation (SPC) in 1986. First Choice was an easy to use program that integrated four popular programs into one package.

GS Works and AppleWorks GS

GS Works was initially developed by Styleware for the Apple IIGS computer and was announced in July 1988. The program was subsequently purchased by Claris and released as AppleWorks GS. It is an integrated software package with a Mac-style user interface in six integrated modules. The modules are: a word processor with a spelling checker and thesaurus, database, spreadsheet, graphics with printing and drawing features, page-layout and telecommunications.

AlphaWorks, Enable, Ovation, Q & A and Smart were other integrated programs developed or released in the 1980's.

13.7 ... Miscellaneous

Accounting Programs

Peachtree Software, Inc., started as a retail computer store in 1975 and changed to a software company in 1978. It was one of the first companies to develop accounting software for personal computers. IBM selected Peachtree Software to provide an accounting package for the IBM Personal Computer in 1980. The software was called the Business Accounting Series, that included general ledger, accounts receivable, accounts payable, inventory management and payroll modules. Programs for the IBM PC computer were released in August 1981.

In 1981, Peachtree Software became a wholly-owned subsidiary of Management Science America Inc. Then in May 1985, Peachtree was purchased by Intelligent Systems. Bill Goodhew became the president and chief executive officer. Significant improvements and price reductions were made to the high-end software, that was renamed Peachtree Complete in 1986. Then in 1988, Goodhew, other management and outside investors purchased the company from Intelligent Systems.

BIOS - Basic Input/Output Systems

The Basic Input/Output System (BIOS) for the IBM Personal Computer was developed by David J. Bradley in 1980/81. The BIOS code controls the transfer of information between elements of the hardware system. IBM made the BIOS code proprietary by copyrighting it. This prevented other companies from using the BIOS unless the obtained a license from IBM, or reverse engineered it.

Compaq Computer Corporation was the first company to reverse engineer the functions of the IBM BIOS to obtain compatibility for their portable computer released in November 1982. Then Neil Colvin who founded Phoenix Technologies Ltd., also reverse engineered the

IBM BIOS software. Phoenix released a chip for IBM compatible computers in May 1984. These developments would have a significant impact on the creation of the IBM clone market.

Computer Assisted Drafting (CAD)

John Walker founded Autodesk, Inc., in 1982. The company purchased its main product AutoCAD that was designed by Michael Riddle. Autodesk is a major supplier of computer assisted drafting (CAD) software for use on personal computers by architects and engineers. The software is available in different versions. The company went public in 1985.

Desktop Publishing

Hardware technology that provided the bit-mapped screen and the WYSIWYG (What-You-See-Is-What-You-Get) display of text enabled desktop publishing. The hardware technology was refined at Xerox PARC (Palo Alto Research Center) and implemented in a practical manner on the Macintosh computer. This software made a significant difference in the publishing process by utilizing a relatively inexpensive personal computer. Articles could be readily composed by manipulating text and graphics. The file could then be transferred digitally to a publishing company.

John E. Warnock and Charles M. Geschke founded Adobe Systems Inc., in 1982. Their original product called PostScript was derived from technology that Warnock had developed at the University of Utah and Xerox PARC. Warnock had co-developed at PARC a language called JaM that stands for John and Martin (John Warnock and Martin Newell). This language was the predecessor of PostScript that Adobe introduced in March 1985. The PostScript software contains a page description language that controls the text, graphics, images and color. This facilitates the communication of electronic documents. A special font technology enables the printing of virtually identical characters on various printers with different resolutions. The page-description language also enables a page to be printed with a mix of text and graphics at any resolution. Shortly after the founding

of Adobe, Apple Computer made a significant financial investment in the company. Steven Jobs wanted PostScript released for the new Macintosh computer and LaserWriter printer. Adobe Systems became a publicly held company in 1986.

Print Shop is a desktop publishing program developed by Brøderbund Software and announced for Apple computers in May 1984.

PageMaker is a desktop publishing program developed by Aldus initially for the Apple Macintosh computer and LaserWriter printer. Paul Brainerd and colleagues founded Aldus Corporation in 1984 and released PageMaker in July 1985. It became a popular program and contributed significantly to an increase in sales of the Macintosh computer. The Aldus company was acquired by Adobe Systems in 1994.

Ventura Software Inc., was founded in 1985 by three Digital Research employees. The company introduced in 1986 the earliest desktop publishing program for the IBM PC, called Ventura Publisher. Ventura Software was acquired by Xerox Corporation in 1990, who sold it to Corel Corporation in 1993.

Quark, Inc., initially founded as a word processing company, introduced QuarkXPress, a desktop publishing program in 1987. Quark has become a leading supplier of desktop publishing programs.

Timeworks released Publish It!, a desktop publishing program for the Apple II computer in January 1988.

Games

A lot of software has been developed to provide games for personal computers in the 1980's. The following are a few of the more significant companies and their releases.

Zork I was initially developed for mainframe computers by Tim Anderson, Marc Blank, Bruce Daniels and Dave Lebling of MIT in 1977. The game was written using a MIT language called MDL. Albert Vezza who was chief of the programming research group wanted to commercialize some of the capabilities at MIT. Vezza, Joel Berez, the initial developers of Zork and other associates founded

Infocom Inc., in June 1979. The mainframe version of Zork I was then adapted for personal computers and released in December 1980. Joel Berez became president and Personal Software was the initial marketer of Zork. Zork II was released in 1981 and Deadline in 1982.

Douglas G. Carlston and Gary Carlston were principals in the founding of Brøderbund Software, Inc., in February 1980. Brøderbund is a Swedish word for brotherhood. The company released a battle game called Galactic Empire and a game of barter called Galactic Trader for the TRS-80 computer that had been programmed by Douglas Carlston. The games were offered for sale at the West Coast Computer Faire in April 1980. The programs became part of the Galactic Saga series of games. Shortly after the games were converted to run on the Apple II computer. A distribution agreement with a Japanese company called Star Craft allowed Brøderbund to market their games. A number of games such as Alien Rain, Choplifter, Lode Runner, David's Midnight Magic and Space Quarks have been successful. Through the mid 1980's Brøderbund expanded its product line to include items other than games. Brøderbund released an educational program, "Where in the World is Carmen Sandiego?" that teaches geography in 1985. Gary Carlston left the company in 1989.

Ken Williams and his wife Roberta Williams founded On-Line Systems in early 1980. Roberta Williams conceived a game situated in a mysterious house with challenges similar to the Adventure games introduced in the 1970's. Ken Williams developed the software for the game program that included graphics of rooms inside the house. The program was introduced with the name Mystery House for the Apple II computer in May 1980. The game became quite successful and another game called Wizard and the Princess was released shortly after. By 1982, the company name had changed to Sierra On-Line Inc. In 1984, a game called King's Quest was released.

Terry Bradley and Jerry Jewell founded Sirius Software in early 1980. The first entertainment products released by the company were developed by Nasir Gebelli. The first software released was a graphic utilities program called E-Z Draw, then the game programs Both

Barrels, Cyber strike and Star Cruiser followed. Sirius became a major supplier of game software in the early 1980's. However, in the summer of 1984, the company had financial difficulties and became bankrupt.

Bill Budge founded his own company called Budgeco in early 1981, to market a new game he had developed called Raster Blaster. The program was a computer version of a pinball game with innovative graphics. It simulated the bouncing of the steel ball, flippers and the effect of gravity. It became a very successful game program for the Apple II computer. Budge then developed another innovative program called Pinball Construction Set and marketed it through Electronic Arts.

William "Trip" Hawkins who had been a manager at Apple Computer, founded Electronic Arts Inc., in 1982. The company is a creator and distributor of recreational software. Hawkins contracted with independent software developers and created a unique company image by promoting these developers as software artists, similar to musicians, writers and other popular stars. Other company strategies were the direct distribution of its software to retailers, an innovative process for managing creative software development and technology leverage. Two early successful programs were Pinball Construction Set by Bill Budge, and Music Construction Set by Will Harvey. The company started developing video game systems in 1990 and Hawkins left Electronic Arts in 1993 to start another game system company.

Flight Simulator is a popular game designed by Bruce A. Artwick that was initially sold by a company called subLogic. It simulates the flight of a Cessna 182 aircraft. The game is now marketed by Microsoft. A version was released for Windows 95 in November 1996.

Graphics

Mark Pelczarski founded a graphics company called Penguin Software in mid 1981. An early graphics utility called Magic Paintbrush was released for the Apple II computer.

In-A-Vision is a graphics drawing program developed by Micrografx Inc., a company founded by George D. Grayson and J. Paul Grayson in 1982. It was

released in July 1985. It was one of the earliest application programs available for Microsoft Windows.

Michael C. J. Cowpland founded the Canadian company called Corel Systems Corporation in April 1985. Corel is an acronym for Cowpland research laboratories. Previously he had co-founded a Canadian telecommunications company called Mitel Corporation and a venture capital company called Bytec Management Corporation. However Mitel had financial difficulties in 1984 and was purchased by British Telecom. Corel Systems originally focused on integrated turnkey systems using a laser printer for word processing and desktop publishing. The company then started assigning resources to the development of graphics software and introduced Version 1.0 of CorelDRAW in January 1989. The product was highly successful and the company went public In November.

Harvard Graphics is a graphics program supplied by Software Publishing, Inc.

Networks

AppleTalk is the network software developed by Apple Computer for Apple computers in January 1985. Related software was LocalTalk and AppleShare.

CP/NET was developed by Digital Research and introduced in late 1980. It connected users of Digital Research's CP/M and MP/M operating systems through the use of an arbitrary network protocol.

GRiD Server is a software package that was released in the early 1980's for communication between different GRiD computers and IBM users.

Novell Data Systems started in 1980 as a manufacturer of personal computer peripherals. Between 1981 and 1982, Safeguard Scientics, a venture capital firm acquired an 88 percent share of the company. The company name was changed to Novell, Inc., with its incorporation in January 1983 and Raymond Noorda was brought in as chief executive officer. Its early UNIX based software was a network communications program called NetWare, released in 1983. This program was the first to introduce the concept of a file server in a local area network (LAN), that controlled access to

shared devices, such as disk drives and printers. Drew Major was the lead architect in developing the program, and became chief scientist at the company. The company became a public corporation in 1985.

IBM released PC Network in the spring of 1985 for use with Version 3.1 of MS DOS from Microsoft.

cc:Mail is a network communications electronic mail program that was created by Lotus Development Corporation.

Other Applications and Companies

Avant-Garde Creations was a unique company founded by Don Fudge and Mary Carol Smith that evolved from a book publishing venture started in 1976. The company specialized initially in psychological self-help programs such as the Creative Life Dynamic series introduced in 1980 that complemented their books. Avant-Garde also developed educational, game and utility programs that enjoyed some success. The company was acquired by David Silver, a venture financier, around 1984 and Tom Measday became president.

Human Engineered Software (HES) is a company that had a rapid rise and fall of fortunes in the early 1980's. The company was founded by Jay Balakrisman in 1980, to market a utility program he had developed. Around 1982, Balakrisman sold his company to USI International, a supplier of microcomputer components who wanted to enter the software market. However, in 1983, USI encountered financial difficulties and sold HES to new investors. HES was a casualty of the software market decline in 1984, and became bankrupt in October.

Spinnaker Software Corporation is another company started to exploit the educational segment of the personal computer software market. It was founded in the early 1980's by William Bowman and C. David Seuss.

In 1978/79 Mitchell Kapor wrote a program called Tiny Troll which did line charts, multiple regressions, statistical analysis and had a text editor. Following this he made an agreement with Personal Software (later VisiCorp) to develop two graphical programs to work with the VisiCalc spreadsheet program. The two programs were VisiPlot for doing charts and VisiTrend a statistics

package which were released in April 1981. VisiPlot was initially priced at $199.50. Personal Software purchased the rights to the two programs from Kapor in October 1981 for $1.5 million.

Typing Tutor was designed by Dick Ainsworth and Al Baker. The program was marketed by Microsoft and Kriya Systems in 1982. Sat Tara Singh Khalsa was a principal in the founding of the Kriya Systems.

Gary Hendrix, who was an expert in artificial intelligence, founded Symantec Corporation in 1982. Then in 1983, Gordon E. Eubanks left Digital Research and with Dennis Coleman founded the C & E (Coleman & Eubanks) software company. In 1984, C & E purchased the Symantec Corporation. Gordon Eubanks is the president and chief executive officer of Symantec that went public in 1989.

TK!Solver (TK for Tool Kit) was a program that provided a framework for building and experimenting with expert systems in engineering, scientific and other knowledge disciplines. It was developed by Daniel Bricklin and Bob Frankston and released by Software Arts in February 1983.

Sidekick is a terminate-and-stay-resident (TSR) program introduced by Borland International in mid 1984. Once the program was loaded in memory, it could be recalled at the touch of a key or two while running another program. It was released in June 1984. It had an appointment calendar, calculator, phone dialer, address book and a Word-Star compatible text editor.

Charles B. Wang and Russell M. Artzt started a joint venture with Swiss company Computer Associates (CA) International, Inc., in 1976. Wang purchased control in 1980. CA has become a major worldwide software company by purchasing numerous software companies. Although the company's main focus is on business software for large computers, it has acquired personal computer software products such as EasyWriter word processor in 1983, the SuperCalc spreadsheet in 1984 and the BPI accounting software in 1987.

Quicken is a popular personal finance program that was introduced by a company called Intuit, Inc., in

1984. Intuit was founded by Scott D. Cook and William V. Campbell is the president and chief executive officer.

Roger Wagner Publishing released HyperStudio for the Apple IIGS computer in May 1989. The program used concepts similar to the Macintosh HyperTalk system.