

1999. Rittner, D., and Kawasaki, G. *The iMac Book*. Scottsdale, AZ: The Coriolis Group.
2000. Freiburger, P. and Swaine, M. *Fire in the Valley: The Making of the Personal Computer*, 2nd Ed. New York: McGraw-Hill.

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## PERSONAL DIGITAL ASSISTANT

See PORTABLE COMPUTERS.

## PERSONAL FINANCE

For articles on related subjects see ADMINISTRATIVE APPLICATIONS; DATABASE MANAGEMENT SYSTEM; ELECTRONIC COMMERCE; ELECTRONIC FUNDS TRANSFER; PERSONAL COMPUTING; SPREADSHEET; and TRANSACTION PROCESSING.

### Introduction

Personal finance applications are programs devised to facilitate the tasks of budgeting, banking, financial strategizing, investing, retirement planning, and tax planning and filing, primarily on personal computers. Starting with the advent of personal computing in the early 1980s, personal financial management software has rapidly developed into one of the most widely used PC computer applications with over 12 million users in the USA alone. Many personal finance applications include the ability to interact with the Internet (*q.v.*) and particular financial institutions. Financial management programs are intuitive easy-to-use tools that can shorten the time required for household or home business financial tasks.

The goal of personal financial management software is to help people create a financial profile, set goals, and save money to meet those goals. Accounts are developed that list the value of all the user's assets and liabilities. The software tracks expenses and income until it accumulates enough data to develop yearly cash flow statements. This allows individuals to structure budgets that are used to meet financial goals, such as increasing savings. Some financial management programs include "what if" scenarios that suggest ways to reduce taxes and other expenses or to increase income. The software then monitors expenditures to ensure that budgeting stays on track. Individuals may check their continually updated net worth statements periodically to see if they are on target.

### Brief History

The first personal finance software appeared between 1980 and 1983. These programs began as electronic

checkbook "add-ins" for spreadsheet programs but soon progressed to include sufficiently well-automated financial management functions to become standalone programs. When Intuit's *Quicken* was introduced in 1984, it faced 40 competitors. In that same year, Mecca launched *Manage Your Money*, a financial management program that included computerized financial planning advice from financial management expert Andrew Tobias. *Microsoft Money* debuted in 1992. By 1998, there were over 12 million users of personal finance software, with *Quicken* and *Money* dominating the market. Current personal finance packages are full-featured financial planners with audio and video help files. Personal financial management software is typically priced from \$30 to \$100 in the USA, depending upon the product's features. Trial evaluation versions and complete programs can be downloaded from the Internet, mail ordered, or purchased in stores. The leading programs require a computer with a minimum of 40 MB of RAM, 120 MB of hard disk (*q.v.*) space, and, of course, a modem (*q.v.*).

### Basic Operations

The three leading personal finance software programs—*Managing Your Money*, *Microsoft Money* (Fig. 1), and *Quicken*—are shipped with a Web browser and include automatic onscreen help, links to relevant Websites, online tutorials, and personalized financial advice based on user input. These personal finance software programs include predefined reports and support the ability of users to customize content and appearance, to import data from other sources, to create instant reports from transactions, and to view supporting data. Graphics include three-dimensional charts and graphs that can be personalized and displayed simultaneously in multiple windows.

Personal finance software typically includes the following functions:

- ◆ **Budgeting** Budgeting support includes the splitting of transactions among several categories, automatically setting up budget accounts based on the user's input from the prior year, and automatic preparation of a preliminary budget based on that prior year.
- ◆ **Checking and bill paying** Personal finance software can track from one to a dozen bank accounts, memorize recurring transactions, schedule future transactions, reconcile bank statements, and link to credit card statements and bill-reminder and bill-paying services offered by banks and "middleware" vendors such as Pay Online, Intuit CheckFree Financial Services, and similar companies.

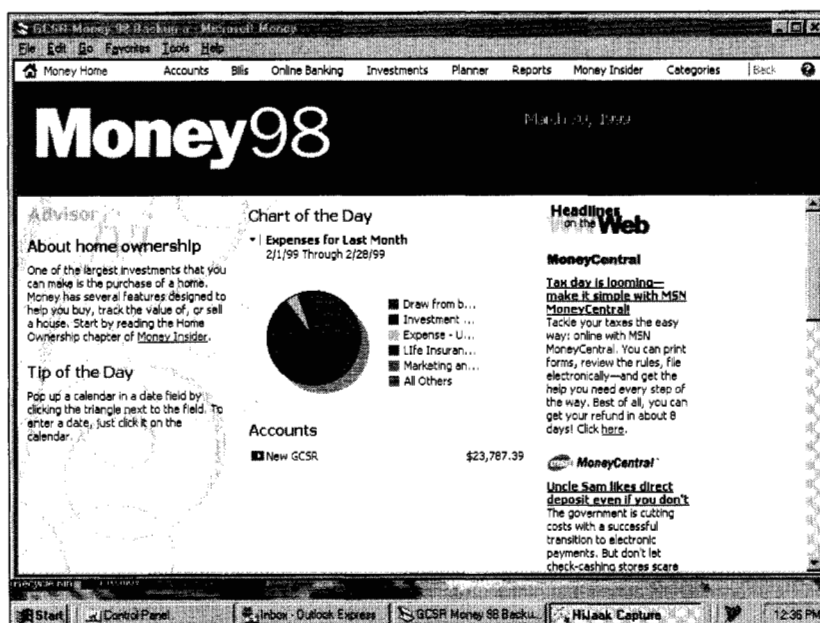


Figure 1. A screen from Microsoft Money, the Microsoft personal finance software program (courtesy of Microsoft).

- ◆ **Financial planning** Financial planning includes loan calculation and amortization tables; automatic crediting of loan payments transferred from checking accounts; accounting for the splitting of payments among principal, interest, and escrow; analyses of net worth, expenditure patterns, and cash flows; and “what if” scenarios to help users determine their life insurance needs and plans for debt reduction and retirement.
- ◆ **Investing and portfolio management** This function provides links to free online stock, bond, and mutual fund quotation services; online trading; portfolio optimization and analysis; tracking stocks, bonds, and real estate and other investments; and several user-customized views of multiple portfolios.
- ◆ **Mortgage information** This function helps users decide whether to rent or buy; records home purchases and calculates the cost savings for refinancing an existing mortgage loan; and indicates the cost savings of early mortgage repayment.
- ◆ **Small or home business advice** This function provides advice for making a business more successful; suggests ways to find specific information; compares a business to other similar businesses; guides the user to relevant industry news; and includes information on paycheck creation and tax withholding adjustments.
- ◆ **Tax planning** This function helps identify tax deductions; establishes tax liability; links categories to specific tax forms and schedules; exports data to

major tax programs; and allows the viewing and printing of preliminary forms and schedules.

## Home Banking

Home banking provides customers who have a computer, modem, and appropriate software with the ability to download their personal bank data; transfer funds from one account to another; monitor checking and savings accounts; and pay bills electronically by sending payment authorizations directly to financial institutions. Some online banking programs allow consumers to buy and sell securities. Bank data can include savings account, checking account, mortgage, loan, and credit card information.

There are three ways consumers can access their personal banking data: bank-owned software using a direct dial-up, Internet access, and personal finance software. The following explains each method.

### PROPRIETARY BANK SOFTWARE

A few banks have developed their own software and others have purchased off-the-shelf programs. For example, in May 1995 NationsBank and Bank of America purchased Mecca's *Manage Your Money* for \$35 million. At that time, the program accounted for about 5% of the total personal finance software market. After the purchase, NationsBank and Bank of America took *Manage Your Money* off the market so that it could be used as their proprietary online banking application. Bank customers receive the software free of charge, use bank dial-up instructions, and access their personal financial data.

## INTERNET ACCESS

For Internet access, consumers use browsers that support securely encrypted transactions. They may access their personal bank data, transact business, and get real-time information about their account balances, payments and investment securities. Customers do not need to use special bank software or personal finance software. In the USA about 150 traditional banks including Wells Fargo use this method, but there are also Internet-based banks. Data is stored at the Internet host site and is not downloaded to local personal finance software. The first Web-based bank, Security First Network Bank, was launched in 1995. Such banks have account access via the Internet, but maintain no "bricks and mortar" branch offices.

## PERSONAL FINANCE SOFTWARE

Over 125 banks use personal finance software such as Intuit's *Quicken* or Microsoft's *Money* for online banking. These personal finance software programs allow users to connect to the bank by dialing directly from the user's computer. Once connected, users can issue electronic payment instructions and download their personal financial data to local personal finance software or to a spreadsheet. Putting your accounts on Quicken or Money helps you organize, but electronic banking and bill paying offer the greater time savings. You begin by telling your bank which accounts should have electronic connections to Quicken or Money. When you first go online and type your PIN, either program will download the last 30 to 90 days of transactions to your local files. After that, you can stay current without having to call or visit your bank or wait for statements.

## Middleware

The development of *middleware*—applications that link databases to a user interface—has extended the capabilities of personal finance software and made online banking popular. Home banking includes electronic bill payment requests that are sent to middleware companies. These firms pay bills, but account transfers and balance information requests are handled by the appropriate financial institution. Middleware companies started in 1981 when Peter Kight established CheckFree in order to collect monthly health club membership fees electronically. The company quickly realized the need for electronic bill presentment and payment services and proceeded to form the necessary bank partnerships and develop the needed software. Middleware companies proliferated to the point where, in March 1996, Microsoft launched Open Finance Exchange (OFX), a specification for middleware created in a joint effort with CheckFree and Intuit. This specification enables customers or small

Table 1. Personal finance software access to online banking.

Description	1995	1996	1997	1998
No. of banks providing access to personal finance management (PFM)	19	59	120	350
PFM online bank users	20,000	510,000	800,000	2,500,000
Online banking households		1,800,000	3,500,000	4,400,000

businesses to connect directly to their financial institutions in order to issue and download their own data. In September 1996, Intuit announced Open Exchange and three months later merged with OFX, though a bill presentment specification was not added until June 1997. All this resulted in a standard that developers use to create software that allows consumers to connect directly to their brokerages, banks, and other financial institutions. The specification also allows consumers to have their choice of computer platforms, processors, and personal finance or other software applications.

In July 1995, Microsoft Money and Intuit's Quicken personal software programs were upgraded to include the tools necessary for online banking and electronic bill paying. Table 1 shows the number of banks that provide online banking access by personal finance software, the number of consumers who subscribe to the service, and the total number of online banking households in the USA.

In 1995, only 19 banks provided consumers with the ability to download account information and pay bills electronically via their personal finance software, and only 20,000 bank customers subscribed to the service, but these numbers increased dramatically over the next four years. The increased use of the Internet, a large base of installed PCs, and ease of use of software have now brought a reasonable level of maturity to online banking. By 1998, about 2.5 million of 4.4 million online banking households subscribed to the services of 350 financial institutions. Despite the growth, these are actually small numbers considering that there are 12 million personal finance software users and over 100 million checking account holders in just the USA. But forecasts indicate that by 2003 there will be 25 million online banking households. In 1995, personal finance software sales totaled just \$212 million, but sales are expected to reach \$1.2 billion by 2003.

## Personal Finance Programs As Value-Added Browsers

In 1993 the Internet lifted a ban against commercial transactions. By May 1995, *Quicken 96* included an

Internet connection in its personal finance software that allowed users to access the company's Website to read personal finance tips, read reviews of online banking services, and order Intuit software. Shortly thereafter, that Website began to offer free online stock quotes and other financial management data. Now both *Microsoft Money* and Intuit's *Quicken* include browsers that let users move seamlessly between the software and online resources.

Quick Web entry and one-step update functions also speed up access to Internet-based online accounts. This makes the latest personal finance software programs look and behave like *value-added browsers* rather than standalone software products. These new programs look like Web pages, even down to a portal to different sections of the software program such as online banking, investing, and tax planning. They offer direct connections to Web-based insurance quotes, car-buying guides, virtual travel agencies, and real estate listings. Features include online banking and bill payment through financial institutions that support *Money* and *Quicken*. Today's personal finance software programs allow users to access the Web to trade shares, transfer funds, and retrieve statements from credit card companies and brokerage houses, and then automatically post the updated information to the user's personal finance program files.

### Other Products

In addition to *Quicken*, Intuit also markets a very popular program called *TurboTax* which, given relevant data, will prepare a user's US federal income tax return, right down to filling out forms, printing them out, and, at the user's request, electronically filing the return with the IRS. Supplements purchased separately will do the same for any state income tax return. Intuit also sells *QuickBooks* which, though simple to use, does all of the intricate bookkeeping and accounting necessary to run a small business. Peachtree Software offers a competitive package.

### The Future of Personal Finance Applications

Future personal finance applications are all likely to be value-added browsers. Features that are now available will become faster and more sophisticated. It will be difficult for financial institutions to "brand" their products because consumers will have a hard time differentiating between the features of the personal finance software and those of the financial institutions they have selected. Relative to the rapidly increasing number of users of online personal financial services, those who choose not to use them are more likely to suffer

from the results of inaccurate bank information, improperly prepared tax returns, and losses due to the lack of investment monitoring.

### Bibliography

- 1996. Goldstein, D., and Flory, J. *The Online Guide to Personal Finance Investing*. Chicago: Irwin Professional Publishing.
- 1997. Morris, K. M., and Siegel, A. M. *The Wall Street Journal Guide to Understanding Personal Finance*. New York: Lightbulb Press.
- 1998. Langer, M. *Quicken 99: The Official Guide*. New York: McGraw-Hill.
- 1998. Nelson, S. L. *Microsoft Money 99 at a Glance*. Redmond, WA: Microsoft Press.
- 1999. Franco, S. C., and Klein, T. M. *Online Financial Services Update, Fourth Quarter 1998*. Piper Jaffray Equity Research, Online Financial Services Update (<http://www.piperjaffray.com>).
- 1999. Gilbert, J. *Teach Yourself TurboTax Deluxe in 24 Hours*. New York: Macmillan.
- 1999. Sindell, K. *Investing Online for Dummies*, 2nd Ed. Indianapolis, IN: IDG Books.
- 1999. Sindell, K. *CheckFree: About the Corporation*. <http://www.checkfree.com>.

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## PERSONNEL IN THE COMPUTER FIELD

For articles on related subjects see COMPUTER SCIENCE—PH.D. STATISTICS; INFORMATION TECHNOLOGY; PROGRAMMER; SYSTEMS ANALYST; and WOMEN AND COMPUTING.

### Introduction

During the last years of the 20th century, the increase in the number of computers in use in business and industry, corporations, government, and the home caused more jobs to be created than ever before. During the 1980s the personal computer and workstation (*q.v.*) became prevalent, but during the 1990s the computer became ubiquitous and connected to the world. The Internet (*q.v.*) became a major communications tool, with access becoming available in the workplace, libraries, hotel rooms, at home, and even at cyber-cafes. The information technology business, usually defined as computing combined with telecommunications and networking, is now the largest industry in the USA.

Every discipline has been affected by information technology. Librarians now work with computers every day, as do journalists, farmers, doctors, and artists. "Across careers, information technology opens up new niches" (Cyberjobs, 1995). Positions such as computer programmer, systems analyst, database administrator, systems administrator, etc. continue to exist, with new positions arising, such as Web developer, Internet coordinator, computer security officer, and help-desk