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THESIS

COMPUTER-BASED TRAINING FOR STRATEGIC DECISION MAKING DEVELOPMENT OF THREE TUTORIALS

by

Sherrie S. Aly

September 1987

Thesis Advisor: Tung X. Bui

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Computer-Based Training for Strategic Decision Making
Development of Three Tutorials

by

Sherrie S. Aly
Lieutenant Commander, United States Navy
MA, University of Central Florida, 1985

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN INFORMATION SYSTEMS

from the

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ABSTRACT

The objective of this thesis is to cover the status and trends in Computer-Assisted Instruction (CAI) and Computer- Based Training (CBT) and to develop three tutorials which will provide computer-based training for managers. CBT for Strategic Decision Making is contrasted with conventional technically oriented training. This contrast is based primarily on the complexity of problem solving to be supported. A methodology for development of tutorials is presented and illustrated through three tutorial examples. The tutorials demonstrate the methodology utilizing three common personal computer-based application packages: (1) Lotus 1-2-3, (2) JAVELIN, and (3) IFPS/Personal. Appropriate uses for each application package are discussed.

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I. INTRODUCTION

A. NEED FOR TRAINING

Over the last decade, a number of significant and sweeping changes have occurred in the business and industrial world. The basic underlying contributing factor for these changes is the quantum leaps in technological advancements. Of all the technological advances, the one which has had the most significant impact on the workplace is the computer. "Few devices in recent years have aroused expectations as great as those for the personal computer. Some proponents believe the personal computer is in the vanguard of a revolution that will reshape the way we work and even think."[1]

The introduction of computers into the workplace is occurring at a very rapid pace and is affecting everyone, from the worker on a production line to the corporate head. Managers, in particular, must be prepared to continually adjust their business strategies to successfully incorporate these changes. As more and more information becomes available and critical as a result of improved technology, managers are being required to digest this overwhelming volume of information. Managers at all levels perform basic tasks or functions including planning, organizing, staffing, and controlling. The successful execution of these functions is dependent upon how well information needs of the managers are being met. The advent and evolution of the computer to its current state of technology was and is the significant tool for management of this volume of information. However, as the computer has evolved and literally thousands of applications packages have

[1] Hillhouse, 1984, p. 39.

been developed, there appears to have been a lag in corporate (and specifically management) education and training concerning the computer and its utilization. The background and training of many managers is inadequate for the task of understanding and meeting the needs of the highly technological computer world. "User-managers generally lack full awareness of both the potential and the limitations of computer systems - sometimes they try to change too much too fast; more often, they hit the symptoms and overlook the cause."[2]

B. PURPOSE OF RESEARCH

Given the proliferation of computers in the workplace, and specifically, their use by management, the primary objective of this thesis is to develop three tutorials explaining the use of typical commercially available spreadsheet and financial personal computer applications software packages and the use of these applications packages in the construction and manipulation of a simple strategic decision making scenario.

C. SCOPE OF RESEARCH

This thesis will examine the introduction and growth of computers in education and specifically their use in teaching strategic decision making. The theory concerning development of Computer-Based Training (CBT) learning material will be discussed and a particular methodology will be presented and used to develop three microcomputer based tutorials. The tutorials will be developed for use by general managers. Therefore, the tutorials will be generic and not aimed toward a narrow, specific business or activity.

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[2] Sanders & Birkin, 1980, p. 204.

D. THESIS ORGANIZATION

Chapter Two will cover the growth of computer usage and the current state of the art in industry and education. It will present current instructional techniques for teaching strategic decision making. It will also contrast strategic decision making with more technically oriented general training. A project is proposed to develop three tutorials to respond to a need for CBT for strategic decision makers. Chapter Three will discuss theory behind designing computer based tutorials and a methodology to be used in developing this project. Chapter Four will discuss how the methodology presented in Chapter Three was applied to this project. There are three appendices. Appendix A contains the tutorial manual for LOTUS 1-2-3. Appendix B contains the tutorial manual for JAVELIN. Appendix C contains the tutorial manual for IFPS/Personal.

II. SURVEY OF INSTRUCTIONAL TECHNIQUES IN STRATEGIC DECISION MAKING

A. CURRENT STATE OF THE ART IN EDUCATIONAL USE OF COMPUTERS AND COMPUTER BASED-TRAINING

1. Background

The use of computers as educational and training tools began in the 1960's. The computer was primarily used as a teaching machine, presenting programmed instruction and performing limited management functions. During the 1970's, the educational and training functions performed by computers expanded significantly.[1]

2. Current Uses of Computers in Education

> "More recently, the computer has been used to accomplish a variety of tasks in providing formal schooling at institutions (education) and in teaching technical or vocational skills (training). Two general uses of the computer in these areas are to assist directly in (1) teaching or training a particular content area or skill (Computer-Aided Instruction (CAI)) and (2) organizing and managing a course by performing such functions as test scoring, providing feedback of test results, record keeping, and scheduling (Computer-Managed Instruction (CMI))."[2]

CAI and CMI have quite different meanings. CAI refers to the use of computers to actually teach or train a particular skill or content area. CMI refers to course management or administrative functions being performed by computers. In CMI, the computer is an administrative, managerial tool as opposed to an instructional tool to be used by the student. However, a wide vocabulary exists when referring to use of computers in education and the functions performed. Such terms as

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[1] McGrath, 1984, p. 84.

[2] NPRDC TN82-17, 1982, p. 1.

Computer-Based Learning (CBL), Computer Based-Instruction (CBI), Computer-Assisted Learning (CAL), Computer-Based Education (CBE), Computer-Based Training (CBT), and Computer-Integrated Instruction (CII) are utilized to describe the wide ranging functions performed utilizing computer technology in education and training arenas. Throughout this work, the terms CAI and CBT will be used to indicate the use of computers in providing education and training to students or users.

The uses of computers in education and training are diverse. For instance, IBM uses CBT to train field engineers on more than 400 remote terminals. The engineers are trained on the functions and maintenance of equipment. The training materials are in text form (manuals) and mastery testing is on-line. Widespread use of CBT and CAI within numerous industries is occurring. The effectiveness of CBT and CAI has been repeatedly proven.

> "Careful implementation of CBI in military courses has had positive results on factors related to effective teaching. In contrast to a traditional course, CBI provided better management of the students and increased their time studying the material, their contact with equipment they must learn to use, and their interactions with instructors on the course topics"[3]

The use of CBT and CAI is providing a substitute for costlier and frequently unavailable real equipment or simulators. As an example, many major airlines and the military perform their flight training utilizing CBT and simulation.

The value of CBT has been demonstrated in industries where the technology is advancing rapidly. Many corporations use CBT programs to upgrade the training of engineers and technical personnel on the frequent changes. The consistent improvements in timeliness and reduced costs have proven that the use of CBT is most beneficial and effective.

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[3] NPRDC TR85-11, 1984, p. 2.

3. Trends in Computer-Based Training

"In the educational environment, many school systems are currently purchasing networked CBT and CAI materials in varied subjects. Over 150,000 students receive daily training in 24 states, and this has led to significant gains on achievement tests."[4] A nationwide effort in developing courseware for educational institutions exists, called the National Development Programme in Computer-Assisted Learning Project. To date, they have developed, with governmental support, 35 courses at 47 different educational institutions.[5] The widespread use and successes of CAI and CBT have resulted in a need for more efficient means of generating and developing the courseware itself.

Michelis, Morris, and Swope[6] have categorized Computer-Based Instruction (CBI) systems into four primary categories: (1) Computer-Based Instructional Management (CBIM), (2) Computer-Based Instructional Administration (CBIA), (3) Computer-Based Instructional Support (CBIS), and (4) Computer-Based Instructional Delivery (CBID). They state that the areas of CBID and CBIM have almost unlimited potential for development and growth. CBIM includes functions of managing a student through an instructional sequence such as testing, response, analysis, prescriptive guidance, and student monitoring. CBID includes all computer based medial options such as CAI, computer graphics, computer-controlled video, computer simulation, and computer based training devices. It is expected that, in the next decade, any function associated with education and instruction that can be computerized will be.

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[4] Suppes, 1979, p. 5.
[5] NPRDC TR85-11, 1984, p. 5.
[6] Michelis, Morris, and Swope, 1980, pp. 7-10.

Within CBIM, two major conclusions have been found: (1) There is a high probability that the use of CBIM will increase significantly during the 1985 to 1995 time frame, and (2) During the 1985 – 1995 time period, CBIM will become decentralized and highly autonomous. Factors which influence these conclusions include:

- Decreasing computer systems hardware costs.
- Increasing software development efficiency.
- Increasing software capability.
- Wider acceptance of computer-based applications.
- More powerful stand-alone computers are available.
- Improved reliability, maintainability, and versatility of systems.

In CBID, which includes all media-based instructional systems,

> "two relatively new forms of instructional media have great potential for future instructional delivery systems, namely, 2-D interactive computer graphic display systems and videodisc.... The 2-D interactive computer display can provide visual 2-D simulations with keyboard, lightpen, sonic pen, photo sensing or touch panel student interactive capability. This interactive feature can be used in combination with direct input 3-D training components and other peripheral equipment for a fully integrated training system capability."[7]

Videodisc is a new and growing technology which is having a major impact on instructional delivery.

> "Videodisc is considered a revolutionary development in training technology because of its mass information storage capabilities and the flexibility in media materials which can be stored. It can store all displays that are now delivered on any audiovisual medium, such as color slides, super 8 mm film, videotape, or motion picture.... It integrates the features of several different media into one simple storage and retrieval system."[8]

Videodisc is expected to become competitive with other instructional delivery systems such as audiocassettes, videocassettes, floppy discs, and printed texts and materials.

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[7] TAEG TR No. 89, 1980, p. 32.
[8] TAEG TR No. 89, 1980, p. 35.

A major trend in CAI is expected away from linearity or fixed presentation of material toward increased interaction between user/trainee and the medium.

> "In addition, intelligent courseware will increase rapidly. Strategies such as the following will be used: simulation of a performance environment (e.g. troubleshooting a circuit), diagnostic model of the trainee's status (e.g. discrepancies in procedural knowledge), prescriptive model for tutoring a trainee (e.g. giving hints for trouble shooting)."[9]

One very current trend in CAI is the development of Intelligent Computer-Assisted Instruction (ICAI). ICAI improves upon conventional CAI by providing natural language processing, knowledge representation, extensive data, a model of the student's learning process, and 'teaching ability', i.e., understanding when and how to provide information and ask questions.[10]

B. CURRENT INSTRUCTIONAL TECHNIQUES FOR TEACHING STRATEGIC DECISION MAKING

1. Background

Organizations and individuals need to plan. In the complex and challenging environment of today, the necessity for thorough planning and informed decision making is crucial to success. Planning must be committed to action, and the process of developing and selecting a course of action to solve a particular problem is called decision making. "Strategic planning is the process of selecting an organization's goals, determining the policies and programs necessary to achieve specific objectives enroute to the goals, and establishing the methods necessary to assure that the policies and strategic programs are implemented."[11]

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[9] TAEG TR No. 89, 1980, p. 37.
[10] McGrath, 1984, p. 41.
[11] Stoner & Wankel, 1986, p. 114.

2. Definitions

Decision making is activity in which a course of action is chosen to deal with a specific problem. Decision making involves identifying, defining, and diagnosing problems, generating alternative solutions, and evaluating and choosing among the alternative solutions. Strategic decision making, then, involves a change in strategy and requires identification, evaluation, and selection alternative strategic approaches. Strategic decision making occurs primarily in situations that are ill-defined, i.e., non-structured or non-programmed. Frequently, this type of decision making scenario concerns a problem that has not come up often enough to be covered by a policy or is so important that it deserves special handling. Strategic decision making problems are non-repetitive, unique situations. Since the modern business world is quite complex, managers who are tasked with making strategic decisions must operate using multiple sources of knowledge. They must possess and use deep knowledge versus surface knowledge. Generally, they are operating with an information overload and frequently have missing or incomplete information concerning the strategic decision to be made. In strategic decision making situations there can be potential conflicting answers and potential solutions. And, lastly, the effectiveness or efficiency of a strategic decision is difficult to assess due to the usually overwhelming complexity and uniqueness of the decision environment. Most of the problems that managers will face, however, are strategic in nature. "For this reason, most management development programs try to improve managers' abilities to make nonprogrammed decision - usually by trying to teach them to analyze problems systematically and to make logical decisions."[12]

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[12] Stoner & Wankel, 1986, p. 143.

3. Theory Development

Many theories of management, and in particular strategic decision making, have been developed. "There is a diversity of disciplines, there is cleavage between those who deal with the outcomes and those who deal with the process of strategic decision making and there is confusion about future avenues of research."[13] In his report, Pennings reaches the conclusion that the field of decision support has little cumulative knowledge. Yet, there are efforts in most large organizations for training managers in the skills associated with effective and efficient management. There is continuing debate and controversy concerning whether management is an art, a science, or a profession. Most agree, however, that certain skills, including technical, human, and conceptual are important to managers.

Strategic planning and decision making require well developed conceptual skills. Conceptual skills have been difficult to teach, primarily because they involve mental habits that are developed early in life. Consequently, efforts in management training have proven most effective in areas considered to be more technically oriented.

4. Instructional Techniques

There exist several primary instructional techniques for teaching strategic decision making. By and large, the primary mode of structured managerial instruction takes place in formal classroom environments. Lectures and texts combine to provide managers with many tools that will assist them in developing effective decision making skills. Textbooks and formal classroom instruction present relevant information in an orderly, systematic way.

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[13] Pennings, 1984, p. 2.

Another primary mode of providing instruction to strategic decision makers is through experience and example.

> "Richard Normann, associated with the Service Management Group, Paris, France, provides a framework for organizational learning and strategic management capability ...he suggests that strategy and strategic change can be viewed at three levels: (1) problem solving, (2) learning to solve problems, and (3) learning to learn problem solving. If organizations learn to learn they can reorient themselves continuously whenever conditions in a particular domain are modified."[14]

Pennings feels that domains which impact heavily on strategic decision makers include interpersonal skills, analytical language, organizational skills, and ecological positioning. Learning in these domains, he feels, will facilitate growth of strategic management capabilities. The Chief Executive Officer or top manager of an organization is a primary actor in generating learning in these domains by setting the preconditions for others actions. "The best way to learn to be an effective manager is by working with and observing good managers."[15]

Teaching strategic decision making formally appears to be performed primarily in colleges, universities, and in large organizations' training programs. Management behaviors and actions have been studied and a variety of theoretical approaches have been developed to describe management.

5. Leading Theories on Strategic Decision Making

Scientific management, the earliest formal theory of management, sought to develop a true science of management, including determining a best method of task performance, scientific selection of workers and assignment of workers to tasks, scientific education and development of the worker, and good rapport between management and labor.

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[14] Pennings, 1984, p. 6.

[15] Stoner & Wankel, 1986, p. 21.

The next major theory concerning management was the Classical Organizational Theory. This theory divided business operations into six major categories, the last of which is the focus - managerial.

Another established theory in managerial education and training is the behavioral approach, in which human behavior, psychology, and sociology were critical elements. As this school of thought evolved, it became more objective and scientific in its underlying research and thus came to be classified as the behavioral science approach.

As organizational internal and external environments became more complex and demanding, new methods became necessary for tracking and evaluating all relevant factors. Consequently, the techniques of management science were developed. 'Operations research' teams were initially formed, using key persons from fields related to the problem, such as mathematicians, physicists, and other scientists, to solve complex problems. "Today, the management science approach to solving a problem begins when a mixed team of specialists from relevant disciplines is called in to analyze the problem and propose a course of action to management."[16]

6. Summary

All of the theoretical approaches described above impact on managerial decision making and certainly form the bases for the teachings in strategic decision making.

> "A variety of creative, flexible management training techniques are emerging. Aside from being highly effective learning methods, they offer managers challenge and fun. One of these is the Management Assistance Program, known as Project MAP. Project MAP focuses on enabling participants to enhance their management skills in areas such as leadership, communications, decision making

[16] Stoner & Wankel, 1986, p. 42.

and time management .... Using a workshop setting, the group facilitator guides, rather than instructs the participants with a variety of extensive video and print-based materials - providing consistent training without extensive instructional expertise."[17]

Levine discusses the computer-based applications for managerial training and instruction, stating that CBT has many added benefits over more conventional methods of instruction.

C. CONTRAST BETWEEN CBT FOR STRATEGIC DECISION MAKING AND TECHNICALLY ORIENTED TRAINING

A wide variety of CAI and CBT applications exist today. As has been described in this project, CBT is being used by users and students in a wide variety of instructional settings.

Computers offer the means for providing drill and practice, tutorial instruction, testing, simulation, games, and expert system support to users.

The primary utilization of CBT has been in technically oriented instructional environments. In instructional functions, the computer has been used as a medium of instruction, presenting individualized tutoring, drill and practice, and textual/graphic information to students. It has also been used as an instructional resource, providing simulation, modeling, games, and complex problem solving.

To contrast the use of CBT for more technical applications with their use in managerial decision making applications, one must first understand the fundamental differences in the context and content.

Technically oriented training is generally quite structured and well-defined. It is repetitive in nature. Generally, technical training involves a small number

[17] Levine, 1984, p. 32.

of sources of knowledge (such as related technical manuals) and the knowledge is usually complete and/or exact. The solutions or answers in technically oriented training are generally specific, i.e., not conflicting, and it is quite possible to assess the consequences of actions taken.

As described earlier, managerial and strategic decision making include non-structured, poorly defined, non-repetitive situations which require deep knowledge and which may have possible conflicting solutions or answers. Additionally, the consequences of strategic decision making are usually difficult to assess. Given these very basic differences in the context of instruction, it is apparent that the nature of the CBT programs would be quite diverse.

There exist some excellent examples of the use of computers to provide both technical and strategic decision making training.

> "The computer can simulate either simple or complex equipment. Computer-generated graphics or computer-controlled film, slides, videodisc, or videotape are used to present the student with a pictorial representation of the actual equipment on a terminal screen. The student responds to the visual representation either by touching the screen directly or via a keyboard. A data base, consisting of the operational characteristics of the equipment, is stored, and instructional programs are written to accomplish a variety of training goals."[18]

Using equipment simulation, students may learn specific actions for equipment operation and may learn diagnosis, repair, and maintenance activities. "This type of computer simulation is particularly well suited to technical training, since students can be offered extensive and highly individualized learning experiences with complicated equipment that would be too dangerous or costly to provide using the actual equipment itself."[19]

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[18] NPRDC TN 82-17, 1982, p. 4.
[19] NPRDC TN 82-17, 1982, p. 5.

In stark contrast to the type of CBT utilized in technical training, sophisticated applications involving expert knowledge and artificial intelligence provide a mechanism for portraying strategic decision making scenarios. Complex models can be built which "simulate" a decision making scenario. CBT, in this context, provides general guidance and information pertaining to the problem and provides the capability to perform repeated analyses based on variations in relevant factors. An excellent example of the use of CBT in strategic decision making is the military's wargaming efforts. Applications are developed which simulate complex strategic factors. The computer's ability to store vast quantities of information and perform complex calculations quickly allow students to numerically manipulate variables and explore alternative solutions to problems which would otherwise be solved analytically.

As mentioned previously, improving corporate management skills through the use of CBT is rapidly expanding as an area of interest. As the underlying skills and techniques of effective managerial or strategic decision making are studied and described by researchers, learning objectives are being described and taught by CBT application. The power and advancing technology of computers has enabled practice in actual strategic decision making with complex information storage, retrieval, and manipulation abilities.

The techniques described above can be compared and contrasted. Their basic commonalities are based on their purpose, which is to assist in training and education functions. Their differences are many and varied. Some techniques employ only text presentation while, at the other extreme, sophisticated equipment and complex environments are actually simulated, presenting the user a realistic, operational, and controlled training experience. Each technique is best suited to a particular type of task. Such factors as structure, definition, and knowledge

requirements require specific types of CBT while more technically oriented environments require quite specific approaches in CBT. Thus, the varied techniques of CBT are viewed as serving quite different and specific purposes.

III. CONSIDERATIONS IN DESIGNING TUTORIALS

A. BACKGROUND

The design of instructional materials is an area which has been studied in great detail. Psychologists, sociologists, educators, physiologists, and many others examine the human learning process and determine what influence various factors have in the process. Collectively, these areas of study may be referred to as human factors engineering.

The use of computers as learning tools began in the 1960's. The technological advances in computers since that time have been rapid and impressive. As a result of the technological advances accompanied by trends and advances in educational/instructional technology, human factors engineers became involved in the design of instructional materials which utilized latest technology.

> "Human performance in the use of computer and information systems will remain a rapidly expanding research and development topic in the coming decades. This interdisciplinary journey of discovery combines the experimental methods and intellectual framework of cognitive psychologists with the powerful and widely used tools developed from educational psychologists, instructional designers, graphic artists, technical writers, and traditional areas of human factors or ergonomics."[1]

B. METHODOLOGY

In his article entitled The Psychology of How Novices Learn Computer Programming, Richard Mayer discusses such issues as memory, understanding of technical information, understanding versus rote learning and modeling as they relate to increasing a novice user's understanding of computers and computer programming. His article presents evidence that models influence learning by providing a

[1] Schneiderman, 1987, p. 4.

familiar context for assimilating new information. "Since novices lack domain-specific knowledge, one technique for improving their understanding of new technical information is to provide them with a framework that can be used for incorporating new information." This technique is aimed at ensuring availability of knowledge in long term memory.

DuBoulay and his colleagues[2] present two basic approaches to learning to interact with computers. The first approach is called the "black box" approach in which the user views the computer as a magical box that creates answers. No relation is formed between commands and an understanding of what goes on in the computer. "The second approach is what can be called the glass box approach. In this approach the user attempts to understand what is going on inside the computer. Each command results in some change in the computer and these changes can be described and understood. The level of description need not - indeed should not - be at the 'blood and guts' level."[3]

Monk[4] discusses dialog design and user knowledge.

> "When people with little or no expertise in computing learn how to use an interactive software package, they must typically acquire a good deal of new knowledge in order to achieve their task objectives in an efficient and effective manner.... They must also acquire knowledge about the operations performed by the system, the circumstances in which the operations can and cannot be invoked and what other consequences are. In order to invoke the operations, they must learn to communicate with the system via the interface dialogue."[5]

The design of this user interface must take into account a number of complex (and often vague) factors. Knowledge of the user, dialog style, structure, content,

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[2] DuBoulay, B. et al, 1980.
[3] Mayer, 1981, p. 126.
[4] Monk, 1985.
[5] Monk, 1985, p. 127.

cognitive context, and characteristics and strategies of the user are all relevant factors.

Richardson and Mock[6] state that in designing your courseware, you need to be aware of the instructional approaches that you will use. You need to concern yourself with a number of elements. They list 15 elements that should be considered. Among these elements, highlights include:

- How will the student be introduced to the lesson?
- How will the student find out what the learning objectives are?
- What media can best be used to present material?
- Will the instruction be hard copy, on the computer, or lecture.
- How will the text be presented (windows, colors, placement, etc.)?
- How will the student leave the lesson?

The methodology used to develop the tutorials in Appendices A, B, and C was based primarily on the guidelines presented by B. Schneiderman.[7] Schneiderman presents comprehensive coverage of topics related to design and development of computer based instructional material.

One of the first steps in design of CBT is to perform task analysis. The functionality of the system must be adequate to perform the necessary task, while not being excessively functional, i.e., excessive complexity which results in difficulties in implementation, maintenance, and learning. Reliability, scheduling and budgeting are also primary concerns in designing systems.

Users of computers require some training. "Learning anything new is a challenge. Although the challenge is usually joyous and satisfying, when it comes to learning about computer systems many people experience anxiety, frustration, and

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[6] Richardson and Mock, 1986, p. 52.

[7] B. Schneiderman, 1987, pp. 359-374.

disappointment. Much of the difficulty flows directly from the poor design of the commands, menus, display formats, or prompts that lead to error conditions or simply from the inability of the user to know what to do next."[8]

There are a number of ways to assist users in using computers. Among them, the traditional users manuals are quite common as are computer-based materials, including online user manuals, online help facilities, and online tutorials. Numerous studies have been conducted to evaluate performance of users utilizing these two forms of instruction.

> "The technology of printing text on paper has been evolving for more than 500 years. The paper surface and color, font design, character width, letter sharpness, text contrast with the paper, width of the text column, size of margins, spacing between lines, and even room lighting have all been explored to produce the most appealing and readable format.... In the last 30 years, the cathode ray tube (CRT) has emerged as an alternate medium for presenting text, but researchers have only begun the long process of optimization to meet user needs."[9]

Research indicates that performance in terms of accuracy of proofreading, speed of reading, comprehension, and test results were consistently better if material to be read was in the form of hardcopy text.

> "Traditionally, training and reference materials for computer systems were printed manuals. Writing these manuals was often left to the most junior member of the development team as a five percent effort at the end of the project. As a result, the manuals were often poorly written, not suited to the background of the users, delayed or incomplete, and inadequately tested."[10]

The primary job in creating a tutorial is to understand the user, the user's task, and the user's environment.

> "A precise statement of educational objectives is an invaluable guide to the author and the reader. The sequencing of instructional content is governed by the reader's current knowledge and ultimate objectives... the author should attempt

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[8] Schneiderman, 1987, p. 358.
[9] Schneiderman, 1987, p. 359.
[10] Schneiderman, 1987, p. 362.

to present concepts in a logical sequence with increasing order of difficulty to insure that each concept is used in subsequent sections, to avoid forward references, and to construct sections with approximately equal amounts of new material...the manual should have sufficient examples and complete sample sessions."[11]

Additional research has found that when a tutorial was written at the 5th, 10th, and 15th grade levels, subjective preferences significantly favored the 5th grade version. Other research has concluded that subjects learning word processors experienced numerous difficulties as they actively try to make the system work, read manuals, watch and understand the screen and work with the keyboard. Users want to perform meaningful, familiar tasks immediately and see results. Research found that users apply real-world knowledge, previous computer experience, and guesswork in achieving their goals. The results of their findings concluded that manuals should have reduced verbiage, encourage hands-on experience, provide error recovery, focus on realistic tasks, and promote guided exploration of the features of the system.

One final guideline that Schneiderman proposes is the avoidance of an anthropomorphic style of writing. Many writers have a tendency toward referring to the computer as if it were human (for instance, when referring to the computer, the use of such verbs as tell, ask, know, think, understand, etc.) Most users, after initial familiarization with the computer, will find this style to be annoying or distracting. The focus of attention should be on the user and the specific task which the user must accomplish. Such terminology as use, direct, operate, program, control, process, print, store, etc., provides precise guidance to the user while avoiding anthropomorphic words or phrases.

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[11] Schneiderman, 1987, p. 368.

IV. PROJECT DESIGN AND DEVELOPMENT

A. INTRODUCTION

The tutorials which resulted from this study were designed using the methodology described in Chapter Three. These guidelines provided the information necessary to permit a logical and consistent product development. This chapter will discuss the steps taken in designing the tutorials included as Appendices A, B, and C.

B. DISCUSSION

One of the requirements for designing a tutorial is to examine the potential users and the environment in which they will utilize the tutorial. The potential users of the tutorials developed in this thesis are managers who are tasked with making complex strategic decisions that concern the financial or operational conditions of an organization. It is also anticipated that other persons who may be solely interested in learning to use Lotus 1-2-3, JAVELIN, or IFPS/Personal may use the tutorials.

It is expected that the persons using the tutorials developed in this study will be familiar with the basic operation of personal computers/microcomputers. The environments in which the user will use the tutorial will probably range from a busy office environment to a quiet evening home environment. The tutorial must be 'self-sufficient' in that an 'instructor' will not be available.

The various backgrounds of the prospective students limited the scope and depth of the tutorials somewhat. The tutorials needed to be general enough to show relevance to widely varying financial strategic decision making settings, yet

provide enough detail to demonstrate the particular capabilities of the particular software. The tutorial had to be basic enough to allow the new user to gain the knowledge and experience with the particular software.

C. GOALS

Certain goals were developed as minimal requirements for the tutorials. These were developed in discussion with the advisor for this study.

1. Software Initialization

The first goal of the tutorials is to provide the user with a basic introduction and familiarization with the operation and utilization of the particular commercial software package (LOTUS 1-2-3, JAVELIN, or IFPS/Personal). The specific objectives toward accomplishing this goal were:

- Understand the purpose of the software package.
- Understand the basic makeup and structure within each software package.
- To utilize the software to create a model.
- To manipulate the model using available commands and capabilities of the software, i.e., to perform 'what if' and/or goal seeking analyses.

2. Relevancy to Strategic Decision Making

The second goal of the tutorials was to clearly demonstrate the usefulness of the software package(s) in financial or operational strategic decision making situations. By using the tutorials, the user develops a model and then performs analyses on chosen variables. In so doing, it is hoped that the user will realize the value of such computer based analyses, and learn how to utilize these analyses in the performance of their duties which involve strategic decision making.

D. PRESENTATION

The basic presentation will use a tutorial manual and will involve actual computer interaction. The tutorials are constructed so as to initially provide general information, including background for the software package, equipment/materials required to use the software package, installation/set-up information, and conventions used in the tutorials for describing keystrokes or actions. The case is then described briefly. The tutorial quickly takes the user into actual use of the particular software package. The models are built, data is input, and then sensitivity analyses are performed. Additional functions of the software packages are introduced, including graphing, printing, and report generation functions.

E. SUMMARY

The tutorials were developed based on the goals listed. The wide variety of backgrounds from which users might come limited the depth of the tutorials. However, the tutorials do provide introduction to a majority of the primary functions of each software package. The tutorials also provide the user the ability to proceed at a pace they are comfortable with.

Based on testing accomplished, the tutorials appear to meet the criteria established in Chapter Three and the goals described in this chapter.

V. CONCLUSIONS

The tutorials developed in this project are expected to provide users with a thorough introduction to the use of LOTUS 1-2-3, JAVELIN, and IFPS/Personal. They emphasize those capabilities of the particular software package which are useful to managers who perform financial planning and strategic decision making activities. Experience with the three applications revealed that each is well suited to a particular business environment. LOTUS 1-2-3's spreadsheet format makes it particularly useful where data is numerically oriented and columnar in format. LOTUS 1-2-3 is quite appropriately utilized in accounting or budgetary business environments. JAVELIN and IFPS/Personal were found to be particularly well suited to applications which involve business analysis, reporting, and calculations. They allow the user to create and define variables. Quite importantly, JAVELIN understands time (such as days, months, quarters, etc.). Both packages are quite well suited to performing "what-if" queries and allow you to easily model complex interrelationships among variables by developing and using formulas. All packages provide a graphing option. Each package provides an extensive list of built-in functions which are quite powerful for analyzing or manipulating data.

The overall goal of this project was to develop three tutorials that could be used by managers to introduce them to powerful software packages which, if used properly, could assist them in making complex financial or operational strategic decisions. The tutorials were developed realizing that users would have vastly different levels of knowledge and computer hardware and/or software experience.

The tutorials were developed using the guidelines presented in Chapter Three. This methodology was independent of the software or hardware used.

The software packages used in this project are commercially available programs. All are considered popular and easy to use, i.e., 'user friendly'. There are numerous other software packages available which users would find valuable as strategic decision making tools. It is recommended that future studies examine other software packages and that tutorials be written to describe these packages to users. Additionally, development of more advanced versions of Appendices A, B, and C is recommended for use by users who are already experienced with LOTUS 1-2-3, JAVELIN, and IFPS/Personal.

APPENDIX A

TUTORIAL GUIDE FOR LOTUS 1-2-3

PART I

A. INTRODUCTION

If you are using LOTUS 1-2-3 for the first time, you are about to embark on a wondrous and rewarding trip. The personal computer's capabilities, combined with versatile commercially available software packages, make it an invaluable tool for managers who must make complex decisions that require analysis of large amounts of data. A software package that is quite popular for business and professional use is LOTUS 1-2-3 by the Lotus Development Corporation. This software package combines spreadsheet, graphics, and database programs to provide an invaluable tool for planning, analysis, and decision making. LOTUS 1-2-3 is a quite functional program, offering numerous performance features. The LOTUS 1-2-3 program spreadsheet is like a very large grid of squares (specifically 256 columns wide and 8192 rows long!) in which you can enter data and formulas. In addition to displaying the contents of your spreadsheet on a screen, LOTUS 1-2-3 allows you to prepare graphs of your worksheet contents and also allows you to perform database management functions within the same worksheet.

The intent of this tutorial is to introduce you to the basic functions of LOTUS 1-2-3 and enable you to observe the usefulness of 1-2-3 as a strategic decision making tool. The tutorial will first introduce you to LOTUS 1-2-3 basic organization and concepts. Then, a short case in decision making will be described. You will be guided in the use of LOTUS 1-2-3 as you explore alternative solutions to the case.

You will build a Data Table 1, a 'MACRO' for graphing, and you will explore making 'what if' sensitivity analyses on chosen variables.

B. GETTING STARTED

Requirements: To use LOTUS 1-2-3 (Release 2), you must have at least the following:

- A personal computer from IBM, COMPAQ, or AT& T, or a LOTUS 1-2-3 certified compatible with at least 256 K of main memory (RAM).
- At least one double-sided, double-density floppy disk drive.
- A monochrome or color monitor.
- One of the following keyboards:
  - IBM PC, PC/XT, Portable PC, PC/AT, PCjr, and 3270-PC,G,or GX.
  - COMPAQ Portable, PLUS, or DESKPRO.
  - A T& T PC 6300.

Optional Equipment: Graphics printer or plotter, math coprocessor, or additional memory will allow you to more fully take advantage of LOTUS 1-2-3's capabilities.

The LOTUS 1-2-3 package includes the following:

- 'Quick Reference' guide.
- 'Getting Started' guide.
- Reference manual.
- Keyboard Templates.
- Keyboard Guides.
- Six program diskettes.
- Write protect tabs.
- Extra disk labels.

The following steps outline the procedures for setting up LOTUS 1-2-3 for use on your computer. This tutorial assumes you have available the information that came in your LOTUS 1-2-3 package. You are encouraged to use the keyboard templates and guides that came in the 1-2-3 package. It also assumes you will be using one disk drive (the 'A' drive) to operate LOTUS 1-2-3. You are referred to it whenever you want additional information concerning use of 1-2-3.

STEP 1: Using the Disk Operating System (DOS) diskette that came with your computer system, start ('boot') your computer. You are referred to your operating manual for instructions on booting your computer if you are not already familiar with this procedure.

STEP 2: You will be using a diskette to save the spreadsheet you create. You need to FORMAT A BLANK DISKETTE to use as your data diskette. If you do not have a formatted data diskette, you are referred to your DOS manual for instructions on preparing one now.

STEP 3: Using LOTUS 1-2-3 requires that it be 'installed' for use with your particular computer and peripheral equipment. Given the wide variety of options in equipment, you are referred to the booklet entitled 'Getting Started', Chapter 2, for instructions concerning installation. If you are using LOTUS 1-2-3 on a machine on which it has previously been 'installed', you may skip this installation step (step 2).

STEP 4: Once the 1-2-3 disks have been prepared ('installed'), you are ready to run the program. The procedure is outlined below:

Place the LOTUS 1-2-3 System Disk in Drive A. To begin the LOTUS 1-2-3 program type "LOTUS" following the A prompt. After some 'whirring' of disk drives, you will see a menu of options. This is the LOTUS main menu. '1-2-3' should be highlighted. Hit the [enter] key. This should bring up to the screen

a blank worksheet. You are now ready to use LOTUS 1-2-3. The following section will describe the management decision making scenario in which you will use LOTUS 1-2-3 to explore possible alternative solutions. The following is general information which will be useful throughout the entire tutorial:

[XXXX] - Brackets indicate a key which is to be used, i.e., [Ctrl] means that the control key should be depressed.

123 - Keystroke commands (listed in the command column) should be typed EXACTLY as they appear (including any punctuation and spaces).

[Down] - Indicate arrow keys (located on the numeric pad on the right side of the keyboard.

[F1] - Indicate function keys (located on the left side of the keyboard).

[Esc] - Takes you back to the previous screen.

If, at any time, you need help, you may hit the F1 function key [F1]. This will cause a help message to display on the screen. This message will display the options available to you at the moment. If you make a keystroke mistake, you may either backspace and retype the correct entry (if you are entering data in a cell), you may hit escape to 'go back' to the previous screen, or you may completely retype the cell contents by placing the cursor on the cell and typing a correct entry. The edit function is also available to you by hitting the [F2] function key. The edit function will allow you to change a specific portion of a cell's entry, leaving the remainder intact.

C. THE CASE

1. Introduction

BIRDS, Incorporated is a small bird store in California. As in most businesses, the management of this small, independent business must examine their operations and financial status continuously to determine the 'health' of the business. They must also make decisions concerning the future of the business. To facilitate their decision making, the company has decided to buy a personal computer and utilize LOTUS 1-2-3 software. They are going to place the company's income statement categories into LOTUS 1-2-3 and make projections based on various figures. The following will describe the background and steps necessary to set up an initial spreadsheet for BIRDS, Inc.

2. Spreadsheet background

A spreadsheet, i.e., LOTUS 1-2-3, is a powerful tool for processing numbers and formulas. It is a large grid, composed of cells (the intersection of each row and column is a cell). In each cell, you may enter numbers, text, or a formula. LOTUS 1-2-3 includes mathematical, statistical, and financial functions that may be utilized simply by entering the appropriate command. Utilizing an electronic spreadsheet, you will be able to enter changes to the worksheet. The effects of these changes on the entire worksheet can be seen within a fraction of a second. For instance, in the first part of this tutorial, you are going to examine the effect on the business that changes in growth rate cause. This is called "what if" analysis or sensitivity analysis, and is quite useful for managers who must subsequently make a determination concerning growth rate, for instance.

When working with an electronic spreadsheet, you view on the screen a small window of the entire 256 x 8192 matrix. This window views 20 rows down and as many columns across as will fit on the screen, depending upon the width

you have assigned them. The window displayed on the screen can be moved to different parts of the worksheet by simply moving the cell pointer.

The normally displayed screen is made up of two distinct areas; the control panel and the worksheet, separated by the border area. The control panel indicates the status of what the system is doing. It tells you the current cell, specifically the address, display format, protection status, and contents of the current cell. A mode indicator is located at the far right of the screen. The second line of the control panel changes as you select different options. If you are placing an entry into a cell, it will display what you are typing. Once you push the enter key, the entry will move to the cell contents of line one to the cell location in the worksheet. As you work through this tutorial, you are STRONGLY encouraged to enter keystrokes carefully and slowly, WATCHING THE SCREEN as you make entries. You will be surprised at how easy and straightforward LOTUS 1-2-3 basic screen movement and cell entries are to perform.

The individual cells can display labels that you create (such as 1987, commission, net profit, etc.), numeric values (such as 4300, $400.00, 5%, etc.), or the results of a formula which you have programmed into the cell (such as +B6*B8). The actual formula will be displayed in line one of the control panel when that cell is highlighted.

Now, you will begin creation of the spreadsheet for BIRDS, Inc. financial planning worksheet. Prior to beginning this portion of the tutorial, ensure you have a formatted diskette on which you will save your work (see your DOS manual for formatting a blank diskette).

3. Worksheet preparation

Figure A.1 depicts the format of the financial planning worksheet which you will be creating and subsequently using for sensitivity analysis.

At this point, you should have a formatted data diskette for data storage prepared, you should have LOTUS 1-2-3 installed properly and should have invoked the 1-2-3 spreadsheet by typing 'LOTUS', then highlighting '1-2-3' on the menu, and hitting the enter key. You should now have the 1-2-3 spreadsheet showing on your monitor and the cursor should be highlighting cell A1. To get a quick idea of how movement from cell to cell occurs, hit the right arrow key (the number 6 on the numeric keypad on the right of your keyboard), then the down arrow key [down], the left arrow key [left], and finally the up arrow key [up], to return you to the A1 cell. As you progress through the tutorial, you will also learn how to move over many cells with just one or two keystrokes.

Now, let's build the spreadsheet for BIRDS, Inc. Remember, as you work through the tutorial, you should enter the keystrokes slowly and precisely. WATCH the screen as you enter each keystroke and you will see and learn quickly the command structure and functioning of LOTUS 1-2-3. You will also undoubtedly be curious about the many command options that appear on the screen. You will be using many of these commands as you progress through the tutorial. For your information, three figures (Figure A.2, A.3, and A.4) are included at the end of this tutorial which depict the function keys, the menu structure, and the powerful built-in functions of LOTUS 1-2-3. If you have questions about specific commands and functions, you may, at any time, call up a HELP menu by pressing the [F1] key. You may also wish to refer to the LOTUS 1-2-3 reference manual for additional information. The following instructions guide you through setting up BIRDS, Inc. financial planning worksheet using LOTUS 1-2-3. In the left column, the location in which the cursor should be placed is listed. The center column provides the exact keystrokes for the highlighted or current cell. The right column provides an explanation for the keystrokes listed in the center column. This tutorial is a 'learn by doing' approach - have fun!!

CELL	COMMAND	EXPLANATION
A1	[Caps Lock]	Puts all letters in upper case.
A1	/WCS13 [enter]	Changes the width of column A to 13 characters.(/WCS13 does the following: Select Worksheet, Column, Set-width, 13 Characters)
A1	BIRDS, INCORPORATED [enter]	Enters the label in cell A1. Note - the label is 18 characters long. The extra characters spill over into the next cell, provided it is empty.
A2	FINANCIAL PLANNING WORKSHEET [enter]	Enters the label in cell A2.
A3	\ -[enter]	Fills the entire cell with dashes (creating a line).
A3	/C [enter][right] [right][right] [right][enter]	Copies the contents of cell A3 to cells B3 to E3. The period (.) anchors cell B3, and the pointing method is used to define the range to be filled with a copy of the contents of cell A3.
B5	GROWTH RATE [enter]	Enters the label in cell B5.
B6	COGS (% OF SALES) [enter]	Enters the label in cell B6.
B8	1987 [enter]	Enters the label in cell B8.
A9	SALES [enter]	Enters the label in cell A9.

A10	COMMISSION [enter]	Enters the label in cell A10.
A11	NET SALES [enter]	Enters the label in cell A11.
A12	COGS [enter]	Enters the label in cell A12.
A13	GROSS PROFIT [enter]	Enters the label in cell A13.
A14	TAX [enter]	Enters the label in cell A14.
A15	NET PROFIT [enter]	Enters the label in cell A15.
B9	4300 [enter]	Enters a value in cell B9.
D5	.05 [enter]	Enters the growth rate in cell D5.
D5	/RFP [enter][enter]	Formats the cell as percent with two decimal places.
D6	.6 [enter]	Enters the percent of NET SALES for COGS.
D6	/RFP [enter][enter]	Formats the cell as percent with two decimal places.
C8	+B8+1 [enter]	Places the value of cell B8 + 1 in cell C8. Here, you are labeling the the next column for the next year.
C8	/C [enter] D8.E8 [enter]	Copies the relationship in cell C8 to cells D8 through F8. Note that the formula copied is RELATIVE, not absolute, i.e., D8 will take the value in C8 and increment it by one, E8 will take the value in D8 and increment it by one, etc.
C9	+B9+($D5*B9) [enter]	Takes the initial sales figure, multiplies it by the growth rate,

		and calculates the next year's sales. Note - the $ sign indicates an "absolute" location (One in which the value remains constant. It is unaffected by relative value changes.).
C9	/C [enter] D9.F9 [enter]	Copies the relationship between growth rate and sales to each succeeding column, i.e., year.
B10	+B9*.02 [enter]	Calculates a figure for commissions. Commissions are 2% of sales (.02).
B11	+B9-B10 [enter]	Calculates Net Sales (sales- commission).
B12	+$D6*B11 [enter]	Calculates COGS (sales * net sales).
B13	+B11-B12 [enter]	Calculates Gross Profit (net sales - COGS).
B14	+B13*.48 [enter]	Calculates Tax (Gross Profit * .48).
B15	+B13-B14 [enter]	Calculates Net Profit (Gross Profit - tax).
B10	/CB10.B15 [enter] C10.E15 [enter]	Copies the relationships between sales, commission, net sales, COGS, gross profit, tax, and net profit into each succeeding year(column).
B9	/RFC0 [enter] B9 E15 [enter]	Formats the column figures to currency with zero decimal places.

B9	/RFC2 [enter] B9 E15 [enter]	Reformats the column entries to currency with 2 decimal places. Note - stars indicate that cell width is too small for entries.
B9	/WGC12 [enter]	Changes all worksheet column widths to 12 characters. Now, the column widths accommodate the number of characters in columns.

Now, ensure your data diskette is in your active drive, i.e., your 'A' drive. The next command will cause your worksheet to be saved to your data disk under the file name BIRDS.

B9	/FSBIRDS [enter]	Saves the worksheet under the file name of BIRDS.

Now, examine your worksheet carefully and compare it with Figure A.1. If there are any discrepancies, you will have to correct them. If you are not sure how to correct them, you may wish to begin at the beginning of this tutorial again.

The following 2 steps assume you have a printer and properly described it during the installation procedures at the beginning of this tutorial. If you do not have a printer, skip the next two steps.

You should now turn on your printer, align the printer paper properly, and ensure the printer in 'on-line'. The next steps will create a printed output of your worksheet.

B9	/PPRA1.E15 [enter] AG	Watch the screen closely to see what each letter of the command means. You will be printing the range A1 to H15, which includes all of your worksheet. 'G' causes the printer to begin printing.
B9	/PPRA1.E15 [enter] OOCQAG [enter]	This command will cause a printout of the cell formulas. This will be useful as you make future changes to formulas or entries in your worksheet. Keep it for reference.

At this point, you have prepared a planning worksheet for the years 1987 - 1990 and have a printed copy of the actual worksheet and have produced a printout of all cell formulas and contents. You are probably already beginning to see some of the power of LOTUS 1-2-3!! If you would like, you may take a break at this point. You have saved your spreadsheet, so you will be able to come back at a later time and resume your work.

To QUIT, first replace your data disk with the LOTUS 1-2-3 system disk. Type '/Q' to get back to the 1-2-3 main menu. Now, replace the system disk with your DOS disk, and type 'E' for exit. This procedure should be followed whenever you wish to quit using LOTUS 1-2-3. Remember to always save your work prior to quitting.

PART II

Now, as the manager tasked with the strategic planning for BIRDS, Inc., you will see the usefulness of the powerful LOTUS 1-2-3 program. Examine the printed report you have which shows the actual planning figures for the years 1987-1990. In this section, you are going to learn how to use what is called a 'DATA TABLE 1' to perform a sensitivity analysis on the data in your spreadsheet.

You realize that you must make decisions concerning the GROWTH RATE of BIRDS, Inc. (growth rate may be defined as the degree to which you increase the entire scope of your business - it impacts on the number of birds placed in the store for sale, the additional cages and supplies, number of employees, etc.). You would like to see what effect varying the company's growth rate has on net profits. You are interested in looking at the growth range between 3 and 7 percent, in increments of 1 percent. To perform a calculation on a single variable, i.e., growth rate, LOTUS 1-2-3 uses the 'DATA TABLE 1'. Perform the following steps for such an analysis. If you already have the "BIRDS" worksheet active on your computer, then you may start with the 2nd command below. Bring up LOTUS 1-2-3, then put in your data diskette which contains the 'BIRDS' worksheet you created earlier.

CELL	COMMAND	EXPLANATION
A1	/FRBIRDS [enter]	Retrieves the worksheet from your data diskette. This step is not required if you already have BIRDS active as your current worksheet.
B6	/WWH [enter]	Freezes rows 1 - 6 on the screen.

B6	[end][home]	Tells you the size of the current worksheet. This helps determine where to place your Data Table 1.
A1	[F5] A24 [enter]	Causes the current cell to become cell A24. This cell location will not interfere with your current worksheet. Cell A23 will be the 'northwest corner' of your data table 1.
A24	/DFA24.A28 [enter] .03 [enter] .01 [enter] .07 [enter]	The data fill command fills cells A24-A28 with numbers beginning with .03 to .07 in increments of .01. These values will be used as percentages for GROWTH RATE.
A24	/RFP1 [enter][end] [down][enter]	Reformats the parameter cells as percent with one decimal place.
B23	+B15 [enter]	Places the location of the cells to be tested in the top row and adjacent to the NW corner of the Data Table 1. 1987 Net Profit is being tested.
C23	+C15 [enter]	1988 Net Profit to be tested.
D23	+D15 [enter]	1989 Net Profit to be tested.
E23	+E15 [enter]	1990 Net Profit to be tested.
B23	/RFT [right] [end][enter]	Changes the format of the formula in this cell to text, making it easier to read.

A23	/DT1A23.E28 [enter]	Defines the location that the Data
	D5 [enter]	Table 1 occupies on the worksheet.
		Specifies the location into which
		data values are to be substituted.
B24	/WWC [enter]	Unfreezes window showing in the top
		part of your screen.
B24	/RFC2 [enter]	Reformats output values to currency
	B24.E28 [enter]	with two decimal places.
B24	/FSBIRDS [enter]	Saves your worksheet, including your
		newly developed Data Table 1.

You should now have showing on your screen the Data Table 1 filled in for the increments of growth rates you specified in your data table. This table shows the net profit for each year at the various growth rates. If you would like a copy of this table, you may perform the following steps:

CELL	COMMAND	EXPLANATION
B24	/PPRA24.E28 [enter] AG	This will cause a copy to be printed.

If you wish to take a break now, you must follow the instructions for quitting, provided in the preceding section of this tutorial.

PART III

The last portion of this tutorial shall demonstrate some additional 'what if' calculations. You will also be creating what is called a "MACRO" for creating graphs of your spreadsheet.

As the manager of BIRDS, Inc. you have decided that the employees deserve an increase in commission rate. You currently are paying them 2% of their sales figure. You would like to see the effect that giving them 3, 4, or 5% of sales will have on the worksheet financial status. Rather than using a data table 1, you are going to make the changes 'manually' in the worksheet and then will graph each result.

First, you will need to create the MACRO for graphing the worksheet. A MACRO is simply a sequence of keystroke commands which are saved under a unique name. By using MACROS for repetitive tasks (such as producing monthly reports and summaries), a good deal of time can be saved. Additionally, the potential for error is reduced and reporting consistency and accuracy are enhanced. The MACRO you will be building will create a bar graph on the screen which shows each planning sheet category (except tax), organized by year. All you will need to do whenever you want to have a graph is to press '[alt]G'. To begin building the MACRO, we will want to be in a remote location on the spreadsheet. Note - the [enter] in the following command columns indicate that you should hit the enter key. DO NOT type "[enter]", just hit the enter key. Also, you will see a funny looking symbol (~). This is called a 'tilde'. It causes an [enter] to occur when the MACRO command is executed. It must be typed in as you type the command into the cell.

CELL	COMMAND	EXPLANATION
B24	[F5] AD1 [enter]	Makes cell AD1 the current cell.
AD1	'\ G [enter]	Single quote (') prevents execution of the command as it is typed. Backslash (\) indicates a MACRO name follows. 'G' will be our MACRO name.
AE1	/WRCS20 [enter]	Changes the column width to 20 spaces to accommodate the MACRO commands.
AE1	'/GTBX.B8.E8~ [enter]	The ' prevents the / from activating the command menu while you are building your MACRO. This MACRO command will cause a bar graph to be created. Note - the tilde (~) must be typed.
AE2	AB9.E9~ [enter]	Specifies the 'A' data range (sales for years 1987- 1991).
AE3	BB15.E15~ [enter]	Specifies the 'B' data range.
AE4	CB10.E10~ [enter]	Specifies the 'C' data range.
AE5	DB11.E11~ [enter]	Specifies the 'D' data range.
AE6	EB12.E12~ [enter]	Specifies the 'E' data range.
AE7	FB13.E13~ [enter]	Specifies the 'F' data range.
AE8	OTFBIRDS,INC~ [enter]	Using Options, creates a graph main title, BIRDS, Inc.

AE9	TSSUMMARY GRAPH~ [enter]	Creates a second line for main title.
AE10	LANET PROFIT~ [enter]	Labels the 'A' data, i.e., NET PROFIT).
AE11	LBSALES~ [enter]	Labels the 'B' data.
AE12	LCCOMMISSION~ [enter]	Labels the 'C' data.
AE13	LDNET SALES~ [enter]	Labels the 'D' data.
AE14	LECOGS~ [enter]	Labels the 'E' data.
AE15	LFGROSS PROFIT~ [enter]	Labels the 'F' data.
AE16	TXYEAR~ [enter]	Titles the X axis of the graph.
AE17	TYTOTAL DOLLARS~ [enter]	Titles the Y axis of the graph.
AE18	ESCV [enter]	Takes program to menu for viewing graph. Note-there is no tilde in this command. Ensure you type the command as shown (i.e., type the 'funny' bracket, then E,S,C. etc.)
AE19	GR~ [enter]	Causes the graph settings to be cleared for future graph creations.
AE20	Q~ [enter]	Quits the graph mode.
AE21	ESC [enter]	Takes you back to your worksheet. Note - there is no tilde in this command.
AE1	/RNC\ G [enter]	This command names your MACRO using the /Range Names Create command. The name of your MACRO is 'G'. Ensure you type your slashes and

		backslashes correctly, i.e., / or \).
AE1	/FSBIRDS[enter]R[enter]	Saves you entire worksheet, including your newly created MACRO. If, when you typed the '/FS' BIRDS was already showing in the command status line, you may hit return instead of typing in "BIRDS" again. You must still specify 'R' for replacing the current version with the new version of BIRDS.

Now, you would like to change the commission to 3% of sales.

CELL	COMMAND	EXPLANATION
AE1	[F5] B10 [enter]	Moves cursor to cell B10, which contains the formula for commission.
B10	+B9*.03 [enter]	Enters new commission rate and automatically recalculates the spreadsheet. You may now examine the changes in the worksheet.
B10	[alt] G	While holding down the [alt] key, press 'G'. Will create a graph of the new worksheet.
B10	[enter]	Ends graph display.

Now, you want to see the effect that a 4% and 5% commission rate will have. Try this one on your own. See the above steps if you are not sure how to do it. You will be changing the .03 to a .04 and to .05. See how easy this is!!

Another important factor in the company's strategic planning is the COGS. This figure is currently 60%, meaning that for each dollar of net sales, i.e., after commission is paid, $ .40 is profit (before taxes). You would like to see the effect that a 1% increase in COGS would have on the company financial condition, given that sales remain constant for the given growth rate.

CELL	COMMAND	EXPLANATION
D6	.7 [enter]	Changes COGS percentage to 7%.
D6	\ G	Creates a graph of the new worksheet.
D6	[enter]	Ends graph display.

Again, you may experiment here with other COGS percentages and examine the effect they have on the worksheet. You may want to attempt a DATA TABLE 1 for this experiment, as previously demonstrated. For an extra challenge, you may want to explore the LOTUS 1-2-3 function called a DATA TABLE 2. With a DATA TABLE 2, you can manipulate two variables simultaneously and see the results. Now, you may QUIT this session of LOTUS 1-2-3.

You have now developed some mastery at moving around the worksheet, making data and formula entries, changing and deleting entries, setting up Data Tables,

graphing, and performing various sensitivity analyses. We have only 'skimmed the surface' of LOTUS 1-2-3. It is quite powerful and versatile. You are strongly encouraged to explore the many functions available in LOTUS 1-2-3. Your reference manual describes, in detail, all the capabilities of LOTUS 1-2-3. There is also a wide variety of informative instructional manuals and books available in local bookstores and libraries which offer easy to understand guidance in using LOTUS 1-2-3.

I hope you have seen LOTUS 1-2-3's usefulness for managers tasked with strategic decision making and I hope you will use it frequently and fully for your particular decisions.

B9: (C2) 4300 READY

	A	B	C	D	E
1	BIRDS, INCORPORATED				
2	FINANCIAL PLANNING WORKSHEET				
3					
4					
5		GROWTH RATE		5.00%	
6		COGS (% OF SALES)		60.00%	
7					
8		1987	1988	1989	1990
9	SALES	$4,300.00	$4,515.00	$4,740.75	$4,977.79
10	COMMISSION	$86.00	$90.30	$94.82	$99.56
11	NET SALES	$4,214.00	$4,424.70	$4,645.94	$4,878.23
12	COGS	$2,528.40	$2,654.82	$2,787.56	$2,926.94
13	GROSS PROFIT	$1,685.60	$1,769.88	$1,858.37	$1,951.29
14	TAX	$809.09	$849.54	$892.02	$936.62
15	NET PROFIT	$876.51	$920.34	$966.35	$1,014.67
16					
17					
18					
19					
20					

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Figure A.1. Bird, Inc., Financial Planning Worksheet

FUNCTION KEY

HELP	F1	F2	EDIT
RANGE NAME	F3	F4	ABSOLUTE
GO TO	F5	F6	CHANGE WINDOW
REPEAT QUERY	F7	F8	REPEAT DATA TABLE COMMAND
RECALCULATE	F9	F10	REDRAW GRAPH

Figure A.2. LOTUS Function Keys

LOTUS 1-2-3 MENU STRUCTURE

WORKSHEET

-GLOBAL
  FORMAT
  LABEL PRIFIX
  COL WIDTH
  RECALC
  PROTECT
  DEFAULT
-INSERT
  COLUMN
  ROW
-DELETE
  COLUMN
  ROW
-COLUMN WIDTH
  SET
  RESET
-ERASE
  NO
  YES
-TITLE
  BOTH
  HORIZONTAL
  VERTICAL
  CLEAR
-WINDOW
  HORIZONTAL
  VERTICAL
  SYNC
  UNSYNC
  CLEAR
-STATUS

RANGE

-FORMAT
  FIXED
  SCIENCE
  CURRENCY
  GENERAL
  ,
  +/−
  PERCENT
  DATE
  RESET
-LABEL PREFIX
  RIGHT
  LEFT
  CENTER
-ERASE
-NAME
  CREATE
  DELETE
  LABEL
    RIGHT
    DOWN
    LEFT
    UP
  RESET
-JUSTIFY
-PROTECT
-UNPROTECT
-INPUT

DATA

-FILL
-TABLE
-SORT
-QUERY
-DISTRIBUTION

COPY

MOVE

FILE

-RETRIEVE
-SAVE
-COMBINE
  COPY
  ADD
  SUBTRACT
-EXTRACT
  FORMULAS
  VALUES
-ERASE
  WORKSHEET
  PRINT
  GRAPH
-LIST
  WORKSHEET
  PRINT
  GRAPH
-IMPORT
  TEXT
  NUMBERS
-DISK

QUIT

-NO
-YES

PRINT

-PRINT/FILE
  RANGE
  LINE
  PAGE
  OPTION
    HEADER
    FOOTER
    MARGINS
    BORDERS
    SETUP
    PAGE LENGTH
    OTHER
      AS DISPLAYED
      CELLFORMULAS
      FORMATTED
      UNFORMATTED
    QUIT
  CLEAR
  ALIGN
  GO
  QUIT
-GRAPH
-TYPE
-X,A,B,C,D,E,F
-RESET
-VIEW
-SAVE
-OPTIONS
  LEGEND
  FORMAT
  TITLE
  GRID
  SCALE
  COLOR
  B & W
  DATA LABELS
  QUIT
-QUIT

Figure A.3. LOTUS 1-2-3
Menu Structure

LOTUS BUILT-IN FUNCTIONS

Mathematical Functions

ABS(x)
EXP(x)
INT(x)
LN(x)
LOG(X)
MOD(x,y)
PI
RAND
ROUND(x,n)
SQRT(x)

Statistical Functions
COUNT(range)
SUM(range)
AVG(range)
MIN(range)
MAX(range)
STD(range)
VAR(range)

Financial Functions
IRR(guess, range)
NPV(x,range)
FV(pmt, int, term)
PV(pmt, int, term)
PMT(principal, interest, term)

Special Funtions

IF(condition, x,y)
VLOOKUP(x,range,offset)
HLOOKUP(x,range,offset)
CHOOSE(a,vo,vi,...vn)

Date Functions
DATE(year,month,day)
DAY(date)
MONTH(date)
YEAR(date)
TODAY

Data Base Statistics Functions
DCOUNT(in range, offset, cr rg)
DSUM
DAVG
DMIN
DMAX
DSTD
DVAR

Figure A.4. LOTUS Built-in Functions

APPENDIX B

TUTORIAL GUIDE FOR JAVELIN

PART I

A. INTRODUCTION

JAVELIN, manufactured by Javelin Software Corporation, is an extremely versatile financial analysis and reporting program. Javelin allows you to enter formulas, define variables, construct data files, create worksheets, create graphs, and make editorial and informative notes as you desire. One of the main features of JAVELIN is that as you are building or once you have built your model, you are able to see the information from one of ten 'views', or perspectives. Each view is suited to a particular aspect of analysis. For instance, you may wish to view only formulas that affect a particular variable, or you may want to see your data in rows and columns or in a graph. You will no doubt be most impressed with the power and versatility of JAVELIN. You are probably anxious to get started, so continue reading for instructions on getting JAVELIN 'up and running'!

B. GETTING STARTED

Your JAVELIN package should have included the following:

- A 'Diskettes and Installation' binder, including installation instructions, client service information, quick reference booklet, registration card, keyboard template, and eight diskettes.
- A manual entitled 'Guide to Learning JAVELIN'.
- A manual entitled 'Reference Manual'.

In order to fully utilize the capabilities of JAVELIN, you must first 'install' it on your computer system. JAVELIN is designed for use with IBM PC/XT/AT, Compaq, and Compaq Deskpro, and 100% IBM PC Compatibles. Your computer must have the following:

- At least 512 K bytes of memory (RAM)
- Two double-sided floppy disk drives, or one double-sided floppy drive and a hard disk.
- Disk Operation System(DOS), version 2.0, 2.1, 3.0, 3.1 or later.

Given the length of instructions for installation and the variety of systems on which JAVELIN can operate, you are referred to the small booklet entitled 'Installation Instructions' for guidance on installing JAVELIN on your computer. Be sure to CAREFULLY read all sections of this booklet that apply to your system. Note that you may not copy the 'Startup' diskette. You are also only allowed two installations per startup disk (see page 10 of the booklet).

You are strongly encouraged to use the keyboard template and the 'Quick Reference ' booklet provided in your JAVELIN package. This template fits over the function keys and will help you remember the function each key serves. The Quick Reference booklet will provide information on commands. You should become familiar with its contents for future reference. For your information, Figures B.1, B.2, and B.3 are provided. They depict the function keys, the menu structure, and the built-in functions of JAVELIN.

The instructions in this tutorial will assume you are running JAVELIN on a computer which has two disk drives. At the end of the installation process, you were directed to type "JAV[enter]" . This command resulted in a screen display similar to Figure B.4.

Once you have this screen, you are ready to use JAVELIN to build or manipulate a model. You will note that the screen in Figure B.1 has two "windows". The top half of the screen is called the "Diagram View" window. As you build your model, this diagram view will show, schematically, the relationships among your variables. The bottom window, called the "Table View" window, will reflect the actual data values that you enter for specified time periods. You are also able to change the view in either the top or bottom windows if you desire (i.e. you may create a "Chart" or graph view in either window). In the next portion of this tutorial, you are going to build a model that is representative of a real world business situation. After a short description of the business, you will be guided very specifically on entering the problem in JAVELIN as a model, and then you will learn how to change parameters and perform analyses on the model.

Prior to actually beginning the entry of the model, you need to understand some conventions that will be used in this tutorial. The majority of the tutorial consists of guidance for keyboard entries for building and manipulating the model. The instructions will be organized into two columns. On the left, the 'Command/Action' column appears , and on the right, an explanation for the command/action appears. The following is guidance concerning the Command/Action column:

XXXXXX - Describes a specific set of keystrokes. Enter exactly as shown.

(XXXX) - Parentheses represent an ACTION. An action is something you must perform without specific keystroke guidance (i.e., 'move the cursor to the 'Edit' command' means you must look at the screen and be able to move the cursor to the appropriate place using arrow keys)

[XXXX] - Brackets indicate that a particular KEY should be depressed (i.e. [ctrl] means that you should depress the control key, [enter] means you should hit the return or enter key, and [F5] means you should hit the function key labeled 'F5'.

[up] - Indicates use of the arrow (− >) keys, located
[down] on the numeric keypad (up means up arrow, down
[right] means down arrow, etc.).
[left]

[tab] - Indicates use of the "tab" key (the key that has opposing arrows on it - normally located immediately above the [ctrl] key)

[esc] - takes you back to the previous screen.

JAVELIN is not case specific, so you may enter lower or upper case letters for any command or variable and JAVELIN will recognize it accurately.

If, at any time, you need HELP, press the [F1] key. JAVELIN will prompt you to insert the 'Help' diskette. After you have returned to the screen you needed help on, replace the help diskette with the 'Program' diskette and continue your work.

C. THE CASE

The case will center around a company called "The New Wave", a major slalom water ski manufacturer located in Central California. The New Wave plant has operating and production expenses associated with the production of competition slalom water skis. The accounting system used at The New Wave uses the following major accounting categories:

- Direct Material Cost (DMC) - includes raw materials that actually become part of the finished product.
- Direct Labor Cost (DLC) - those labor costs which are associated with the specific product.
- Prime Cost - the sum of direct material cost and direct labor cost.
- Overhead - includes all production costs other than direct material and direct labor costs. Includes such costs as heat, light, power, depreciation, taxes and insurance related to any assets used in the production process.
- Full Production Cost (FPC) - the sum of prime and overhead costs.
- Selling Cost - includes marketing (or order-getting costs) and logistics costs (order-filling or physical distribution costs).
- General & Administrative (G and A) - includes research, development, engineering costs, public relations costs, and miscellaneous items. This is a 'catchall' classification.
- Full Cost - the sum of full production cost, selling cost, and G & A.
- Net Profit - Is Sales minus Full Cost.
- Sales - This is the number of skis sold times the ski price.
- Ski Price - A fixed retail amount.
- Number Skis Sold - Equal to the number of skis produced.

This tutorial is a 'learn by doing' experience. Beyond this point, there will not be in-depth textual descriptions provided on the many aspects of JAVELIN. Instead, you will be provided specific keyboard command/action guidance with a brief explanation of each action/command. You are most strongly encouraged to type accurately and slowly and WATCH the screen as you perform commands. You will, in this manner, quickly grasp the way in which JAVELIN performs.

In the section that follows, you will be entering the model and then will enter data for the first six months of the year 1987 (JAN - JUN). The following instructions will guide you through entry of the model. At this point, you should have on your screen the view matching Figure B.4.

Again, you are reminded to enter keystrokes carefully and accurately and watch the screen to see how JAVELIN responds to your commands.

COMMAND/ACTION	EXPLANATION
(you may begin typing the formula for Full Cost, as follows)	Just a note to let you know you should type the next command exactly as it appears.
Full Cost = Full Production Cost + Selling Cost + G and A [enter]	By typing this formula, you enter the formula for Full Cost. Notice the 'diagram' view (the top window) of what you have just entered. The bottom window shows the formula you just created and indicates that it has not been 'calculated' yet. You will see later what this means.
Full Production Cost = Prime Cost + Overhead [enter]	Enters formula for Full Production Cost.
Net Profit = Sales - Full Cost [enter]	Enters formula for Net Profit.
Prime Cost = Direct Material Cost + Direct Labor Cost [enter]	Enters formula for Prime Cost.

Sales = Ski Price * Number Skis Sold [enter]	Enters formula for Sales.

You have just entered the formulas that will be needed to assess the company's financial status. Now, you will need to enter the data for each 'undefined' variable.

COMMAND/ACTION	EXPLANATION
[F5]	Using the 'GO TO'function key, you want to see the 'table view for Direct Labor Cost.
Dir[tab]	You begin typing the first letter of "Direct Labor Cost". However, instead of typing out the entire variable name, you use the "SPELL" function. Any variable that begins with the letters you specified is now listed for you to select from (both DLC and DMC should be showing on your screen).
[enter]	DLC should have been 'highlighted', so by hitting the [enter] key, you have chosen DLC as the specific variable to 'GO TO'.

Notice that in the first line of the table view it says that the variable Direct Labor Cost is "undefined". This is because you have not yet entered monthly values for this variable. Now, you will enter the monthly values for DLC.

COMMAND/ACTION	EXPLANATION
(use the up arrow key to 'move' back to JAN of the year 1987)	Note how the table began with the current month and year (the date you typed when you started your system up using DOS). By using the [up] arrow key, JAVELIN moves backward in time, month by month. Stop when you see JAN 1987. If you overshoot this date, you may use the [down] arrow key to move the highlighted area to the correct date (JAN 1987). Errors in numeric entries may be correct by retyping or may be deleted by the [del] key.
300000[enter]	Enters the JAN 1987 figure for DLC. Now the highlighted area should be resting at FEB 1987.Note-use of the [num lock] key will make the arrow keys inoperative. You must disable the Num Lock function prior to using the arrow keys.
295000[enter]	Enters the FEB 1987 DLC.
312000[enter]	Enters the MAR 1987 DLC.
310000[enter]	Enters the APR 1987 DLC.
305000[enter]	Enters the MAY 1987 DLC.
301000[enter]	Enters the JUN 1987 DLC.

[F5]Dir[tab]	You are now ready to enter monthly values for Direct Material Cost (DMC).
(highlight the variable "Direct Material Cost" by using [down] arrow key)	Moves the highlighted area to DMC.
[enter]	Selects DMC as the variable to view. You will now enter DMC values for JAN-JUN 1987.
(use the arrow key to move up to JAN 1987)	Moves from the current date back to the beginning of the year 1987.
20000[enter]	Enters the JAN 1987 value for DMC.
20000[enter]	Enters the FEB 1987 value for DMC.
25000[enter]	Enters the MAR 1987 value for DMC.
26000[enter]	Enters the APR 1987 value for DMC.
25000[enter]	Enters the MAY 1987 value for DMC.
21000[enter]	Enters the JUN 1987 value for DMC.
[F5]G[tab][enter]	Selects G & A as the variable to view. Note-you did not see a window with a list of variable because you only have one variable that begins with the letter "G".
(move the highlighted area back to JAN 1987)	Moves backward to JAN 1987.
15000[enter]	Enters the G & A amount for JAN 1987.
14000[enter]	Enters the G & A amount for FEB 1987.
16000[enter]	Enters the G & A amount for MAR 1987.
15500[enter]	Enters the G & A amount for APR 1987.

15250[enter]	Enters the G & A amount for MAY 1987.
15050[enter]	Enters the G & A amount for JUN 1987.
[F5]O[tab][enter]	To see the table view for Overhead.
Overhead=10000[enter]	Typing the equal sign indicates that Overhead will be constant for all periods (=10000).
[F5]sell[tab][enter]	Selects Selling Cost as the variable to view in the table section.
(use arrow keys to move to JAN 1987)	Moves highlighted area to JAN 1987.
10000[enter]	Enters the Selling Cost for JAN 1987.
9500[enter]	Enters the Selling Cost for FEB 1987.
10500[enter]	Enters the Selling Cost for MAR 1987.
10250[enter]	Enters the Selling Cost for APR 1987.
10200[enter]	Enters the Selling Cost for MAY 1987.
10100[enter]	Enters the Selling Cost for JUN 1987.
[F5]Num[tab][enter]	Selects Number Skis Sold for viewing.
(move highlighted area to JAN 1987 with arrow key)	Moves back to JAN 1987.
1775[enter]	Enters Number Skis Sold for JAN 1987.
1700[enter]	Enters Number Skis Sold for FEB 1987.
2100[enter]	Enters Number Skis Sold for MAR 1987.
2050[enter]	Enters Number Skis Sold for APR 1987.
2000[enter]	Enters Number Skis Sold for MAY 1987.
1810[enter]	Enters Number Skis Sold for JUN 1987.

[F5]Ski[tab][enter]	Selects Ski Price for table viewing.
Ski Price = 300[enter]	Ski Price will be constant at $300.00.

Now, you would like to see some 'bottom line' calculations for full cost and net profit:

COMMAND/ACTION	EXPLANATION
[F9]	CALCULATES your formulas.
[F5]Full[tab]	Shows two variables.
[enter]	Selects Full Cost as the variable you wish to view. The Table View should now be showing the JAN-JUN 1987 values for Full Cost (Full Production Cost + Selling Cost + G & A).
[F5]Net[tab][enter]	Selects Net Profit for viewing. Now the table view shows values for Net Profit which have been calculated based on the formulas!

Now, you have entered quite a bit of information and are probably ready to take a 'breather'. Whether or not you desire to quit, now is a good time to SAVE what you have done so far. The following instructions are provided for 'saving' your work to a disk, and should be referred to again throughout the rest of the tutorial whenever you desire to quit.

COMMAND/ACTION	EXPLANATION
(Ensure you have the JAVELIN PROGRAM disk in the A drive.)	The disk in drive A will be used to save you work on.
/[right][right][right] [right][right] (the cursor should now be at "FILE")	The 'slash' command creates a menu near the top of your screen. The [right] arrow key moves the highlighted area to each successive command option. Note that for each option, a unique list is provided of 'sub-commands' available for the option. (You may also have used the slash command '/FS' to save your work)
[down][enter]	Selects the SAVE option. You will now be prompted for a filename.
NEWWAVE[enter]	Provides the filename "NEWWAVE" (note that there are no spaces in the filename) Now, you have saved your work on the Program Diskette in a file called "NEWWAVE.MDL". The 'MDL' is a 'file type' that JAVELIN automatically assigns to all JAVELIN model files.

Congratulations. You have now entered the formulas for modeling the New Wave ski manufacturing company, you have entered their YTD data, and you

have saved your work. In the next part of this tutorial, you will explore some of the powerful functions available in JAVELIN, including, restarting JAVELIN and loading a model from disk, using windows, and using more 'views', such as the formulas and bar charts views.

If you would like to QUIT for now, you may do so by typing "/Q", then type "Y" for yes. Since you have already saved your work, you will be able to 'reload' it into the computer when you begin your next JAVELIN session.

PART II

A. THE CASE - CONTINUED

In this portion of the tutorial, you are going to learn how easy JAVELIN is to use for such functions as changing windows, changing views, creating charts, and displaying formulas. First, you will need to load into the computer the model you have built. If you already have 'Newwave' active, you may skip directly to the next section.

COMMAND/ACTION	EXPLANATION
(boot your computer with the DOS diskette)	You are referred to your DOS manual if you have any questions concerning starting (booting) you computer.
(at the A prompt, insert the Startup disk in Drive A)	The Startup Diskette is required to use JAVELIN.
JAV[enter]	Invokes the JAVELIN Program. You will be prompted to place the Program disk into the A drive.
(insert the Program Disk into the A Drive)	
/FL	A 'slash' command for 'File' and 'Load'.

COMMAND/ACTION	EXPLANATION
[tab]	Use of the Spell key in this mode will display a list of all files on the disk.
New[tab][enter]	Chooses the filename spelled and loads it into your computer's active memory. You are now ready to use "NEWWAVE".

Now, you are going to change windows, synchronize windows, create plot graphs, and view 'roots'.

COMMAND/ACTION	EXPLANATION
[F5]Net[tab][enter]	Chooses Net Profit as the view variable.
[F6]	Moves the cursor from the table window to the other window(diagram).
[F5]Net[tab][enter]	Selects Net Profit as the view variable in the 'diagram' window.
[left]	Moves the cursor left to Sales.
[left]	Scrolls the view to the right, bringing the new variables that feed into sales into view.
[left]	Moves the cursor to Ski Price.
[down]	Moves the cursor to Number Skis Sold.
[F3]	The [F3] key is the SYNC key

	(synchronizing) . Now the bottom window should be showing the table view for the variable that is highlighted in the top window.
[right]	Moves the cursor in the top window to Sales and the bottom window reflects this new variable.
[F3]	Turns off the SYNC function. The window that is not the active window remains on the variable and view until a new variable and/or view are specified.
(using the [F6] key, ensure the cursor moves to the bottom window)	Switches cursor to the bottom window.
/W1	Enlarges the bottom window to fill the entire screen, thus creating one window.
/W2	Creates a '2 window' view
(use [F6] to move cursor to top window)	Switches cursor to top window.
/VD[enter]	Returns top window to diagram view.
/W1	Creates one window again.
/VC	Selects the 'View Chart' command.

Dir[tab][enter]	Selects DLC as the variable you wish to view a chart of. Note that the cursor rests on JAN 87 (the first time period with values assigned).
/W2	Creates two windows.
(using [F6], move cursor to the bottom window)	
/VT[enter]	For the table view of DLC.
[F3]	Synchronizes the windows.
(use [F6] to move cursor to top window)	Moves cursor to top window.
(use arrow key to move cursor to MAY 87 in the chart view)	Moves cursor to MAY 87.
[up]	Changes the value of DLC from 305000 to 327500. This increase will now be reflected in all views of your model (including tables and worksheet). Table view should be showing that the change you made in the chart has been made to the MAY 1987 value. Note that the increment for increase or decrease is determined by the increments along the 'Y' axis. If you

	desired, you could enter a specific numeric chart value vice using arrow keys.
(move cursor to bottom window using [F6]	Moves cursor to bottom window (table).
(use arrow keys to move cursor to JAN 87)	Moves cursor to JAN 87.
370000[enter]	Changes the JAN 87 value of DLC to 370000. Note the change in the top window chart view.
(use [F6] to move cursor to top window)	Switches the cursor to the chart view.
(move cursor to JAN 87 using arrow keys)	Moves cursor to JAN 87.
[up]	Changes the JAN value of DLC to 396500 in the chart view as well as the table.
/W1	Creates one window.
/VFA	The 'slash VF' command allows you to view formulas. The 'A' selects 'ALL'.
/VFR	This command allows you to see the roots of any given variable. A root is any variable that affects the chosen variable directly or indirectly.

Net[tab][enter]	Shows the roots for the Net Profit variable.
/W2	Returns to two windows.
(ensure the cursor is now in the bottom window)	
/VT[enter]	View Table for current variable (Net Profit).
(using [F6], move cursor to top window)	Moves cursor to top window.
/VD[enter]	Returns the top window to Diagram View.

Now, you have learned some powerful functions of JAVELIN. You should be feeling confident now at moving around within JAVELIN. JAVELIN also offers other views which will not be covered in this tutorial. They include a notes view, error view, graph view, quick graph view, and macro view. You are encouraged to explore these views of JAVELIN (the manuals and on-line case studies provided in your JAVELIN package will be useful).

The final section of this tutorial shall introduce you to the more advanced concepts of dealing with time and using the worksheet view. You will then learn how JAVELIN may be used to assist in strategic decision making by allowing manipulation of variables.

You may take a breather now if you like. You've accomplished quite a lot. REMEMBER TO SAVE YOUR WORK. Use the '/FS' command prior to quitting (see the end of Part I for instructions on how to save and quit).

PART III

JAVELIN is a very versatile tool that you will be able to use in almost any facet of a business operation. Now you will learn two very powerful functions of JAVELIN : 1) Its ability to deal with time periods, and 2) its ability to use the 'worksheet' as a display or data input/manipulation tool. You will then learn how to perform some 'What If' analyses to aid in making strategic decisions for the New Wave company.

You are now going to add a new variable called 'Investment Return'. This amount is income generated by an investment by the New Wave company in stocks. It is received QUARTERLY (MAR, JUN, SEP, DEC).

COMMAND/ACTION	EXPLANATION
(if you QUIT at the end of Part II, you need to reload the NEWWAVE file back into your computer)	You may see the beginning of Part II if you don't remember how to 'reload' a file. This step makes NEWWAVE the active file, if it is not already. The active window should now be the top window.
/W1	To create one window.

COMMAND/ACTION	EXPLANATION
/VFA	To view formulas
Net Profit After	Adds the new formula to the model.
Investment Return =	
QUARTERLY(Net Profit)	
+ Investment Return	
[enter]	
/DVInv[tab][enter]	To define the variable 'Investment Return'. You should now see a strange screen display titled 'Settings Sheet'. You will be setting the period for the variable 'Investment Return'.
[right][down][down]	Moves the cursor to QUARTER.
[down][down][down]	
[down]	
[enter]	Selects Quarterly as the time period for Investment Return.
[esc]	Leaves the 'Settings Sheet'. Notice that the formulas view now lists "Investment Return" as a Quarterly variable.
/VTInv[tab][enter]	Changes to table view for Investment Return. You will be entering the data now.

(using arrow key, move cursor to '1 Q 1987')	Selects the first quarter, 1987 for data entry.
500[enter]	Enters the first quarter (JAN- MAR) amount.
475[enter]	Enters the second quarter(APR- JUN) amount.
[F9]	Calculates the Quarterly Net Profit after Investment Return.

[F5]Net[tab] (move cursor to highlight "Net Profit After Investment Return") [enter]	Selects 'Net Profit After Investment Return' as the variable to view.

Now, the final JAVELIN view, the 'worksheet view', will be presented and you will see its usefulness in manipulating variables. Think of the worksheet as a grid of cells for text and data entry. The following commands demonstrate the worksheet.

COMMAND/ACTION	EXPLANATION
/VW	Brings up the JAVELIN Worksheet View.
Sensitivity[enter]	Names the worksheet which you will create "Sensitivity".

[down]	Moves the cursor to the second line of the border area.
Dir[tab]	Variable names will be listed.
(move highlighted area to Direct Labor Cost)	
[down]	Enters DLC into the cell in the border area. The [down] caused the cursor to move to the next cell below what was the current cell.
Dir[tab]	Variable names again listed.
(move highlight to Direct Material Cost)	
[enter]	
[down]	Selects DMC as the next variable to place in your worksheet border.
G[tab][down]	Places G & A in the border.
Ov[tab][down]	Places Overhead in the border.
Ski[tab][down]	Places Ski Price in the border.
Num[tab][down]	Places Number Skis Sold in the border.
Se[tab][down]	Places Selling Cost in the border.
Sa[tab][down]	Places Sales in the border.
Net[tab]	Places Net Profit in the border.
(select Net Profit)	
[enter][enter]	
/*W21[enter]	The 'Slash-Star' Commands allow you to set up the worksheet format. You are

	changing the width of the border to 21 characters.

Now, you will select APR 1987 as the date you would like shown in the worksheet. APR 87 is considered to be a good representative month for how the company performs on an average. It (APR 1987) shall be used as a 'basis' to perform variations on for the 'sensitivity analysis'.

COMMAND/ACTION	EXPLANATION
(using the arrow keys, move the cursor to the first cell of the top border - one cell above and to the right of the title "Direct Labor Cost".)	You are getting into position to enter the dates in the top border.
APR 87[right]	Enters the data for APR 87 into the worksheet. Moves the cursor to the right into position to enter the next time period.
JUL 87[down]	Enters JUL 87 as the time period. However, there is currently no data for JUL 87. Now, you will learn how to perform a 'What if' analysis by entering data for JUL 87.

As the manager of The New Wave, you are interested in looking at the effect that changing several variables might have on Net Profit in JUL 87. You are interested in looking at what would happen if the ski price changed from $300.00 to $350.00. You would also like to know what the effect would be of increasing production by 2000 skis (this change will also affect DLC, DMC, and Selling Cost).

COMMAND/ACTION	EXPLANATION
(the cursor should be resting immediately under the title JUL 87)	
310000[down]	Enters the DLC for JUL 87. Moves the cursor to the next cell down.
26000[down]	Enters the DMC for JUL 87.
15500[down]	Enters the G & A for JUL 87.
10000	Enters the Overhead for JUL 87.
350[down]	Enters the new Ski Price for JUL 87.
2050[down]	Enters the Number Skis Sold for JUL 87.
10250[enter]	Enters the Selling Cost for JUL 87.
[F9]	CALCULATES Sales and Net Profit for JUL 1987, given the figures you input. Note that since Ski Price is a constant, all your previous calculations now reflect the new price. You will restore the price to its original value shortly.

(move the cursor to the figure for JUL 1987 DLC - 305000)	
315000[down]	Enters a new value for DLC for JUL 87.
26000[down]	Enters a new value for DMC for JUL 87.
(move the cursor to JUL 87 Selling Cost figure)	
10500[enter]	Enters a new value for Selling Cost for JUL 1987.
(move the cursor to JUL 87 Ski Price)	
300[down]	Returns the Ski Price to the original cost of $300.00.
4000[enter]	Enters a new value for Number Skis Sold.
[F9]	CALCULATES new Sales and Net Profit for JUL 87 given the variable values you provided. This calculation only affected JULY 87 figures, as the constants were not changed (after Ski Price was restored).

You may also change entire formulas from the worksheet view by moving the cursor to any cell on the line of the variable you wish to change (for instance, you could change the formula for Net Profit to 'Net Profit = Sales - .90(Full Cost)', thus changing Net Profit to Sales minus 90% of Full Cost). This change would be

reflected in every part of your model. For an extra challenge, you are encouraged to try this one on your own!

Well, you have now come a long way. You should be feeling very pleased with what you have learned.

As you have seen, JAVELIN is a very versatile and useful financial accounting, planning, and reporting tool. You are strongly encouraged to experiment with it, using the on-line case studies, the 'Guide to Learning JAVELIN' and the reference manual that came with your JAVELIN package. There are also many books written to help you in learning about and using JAVELIN which should be available in your local bookstores. I hope you will use JAVELIN to the maximum extent in your work and studies!!

JAVELIN FUNCTION KEYS

HELP	F1	F2	EDIT
SYNC	F3	F4	PRINT / SPELL
GO TO	F5	F6	WINDOW
MACRO	F7	F8	QUICK GRAPH
CALC	F9	F10	GRAPH

Figure B.1. JAVELIN Function Keys

JAVELIN MENU STRUCTURE

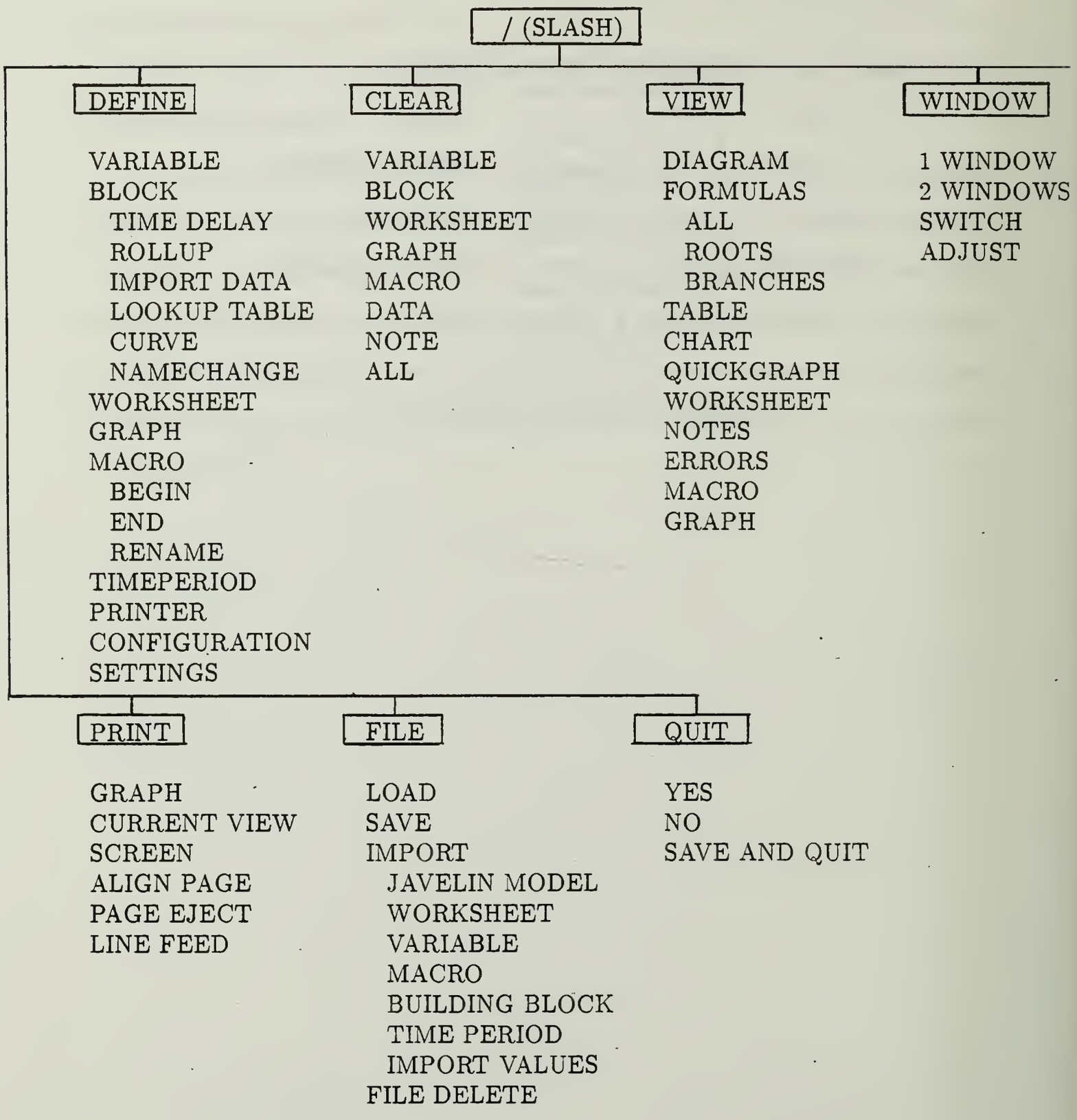

Figure B.2. JAVELIN Menu Structure

JAVELIN BUILT-IN FUNCTIONS

Mathematical Functions
SUM
AVG
MAX
MIN
CUM
RSUM
RAVG
RMAX
RMIN
YTD
QTD
MTC
TSUM
TAVG
TMAX
TMIN
SQRT
ABS
MOD
LN
EXP
ROUND
INT

Time Functions
BEGIN
END
RANGE
NEXT
PREVIOUS
VALUE
CHANGE
PCT
INTERP

Financial Functions
NPV
IRR
PV
FV
PMT
GROW
GROWRATE
BONDPRICE
BONDYTM
DEPRSL
DEPRDECL
DEPRSOYD

Period-Conversion Functions
YEARLY
QUARTERLY
MONTHLY
WEEKLY
DAILY
A(expr)
B(expr)

Logical Functions
IF
AND
OR
NOT
SELECT
F(expr1,expr2,...)

Calendar Functions
BETWEEN
LENGTH
COUNT
SINCE
UNTIL
MDAYS
QDAYS
YDAYS

Statistical Functions
VAR
STDEV
TREND
TRENDCORR
TRENDSLOPE
TRENDSTART
CORR
SLOPE
INTERCEPT
PREDICT

Figure B.3. JAVELIN Built-In Functions

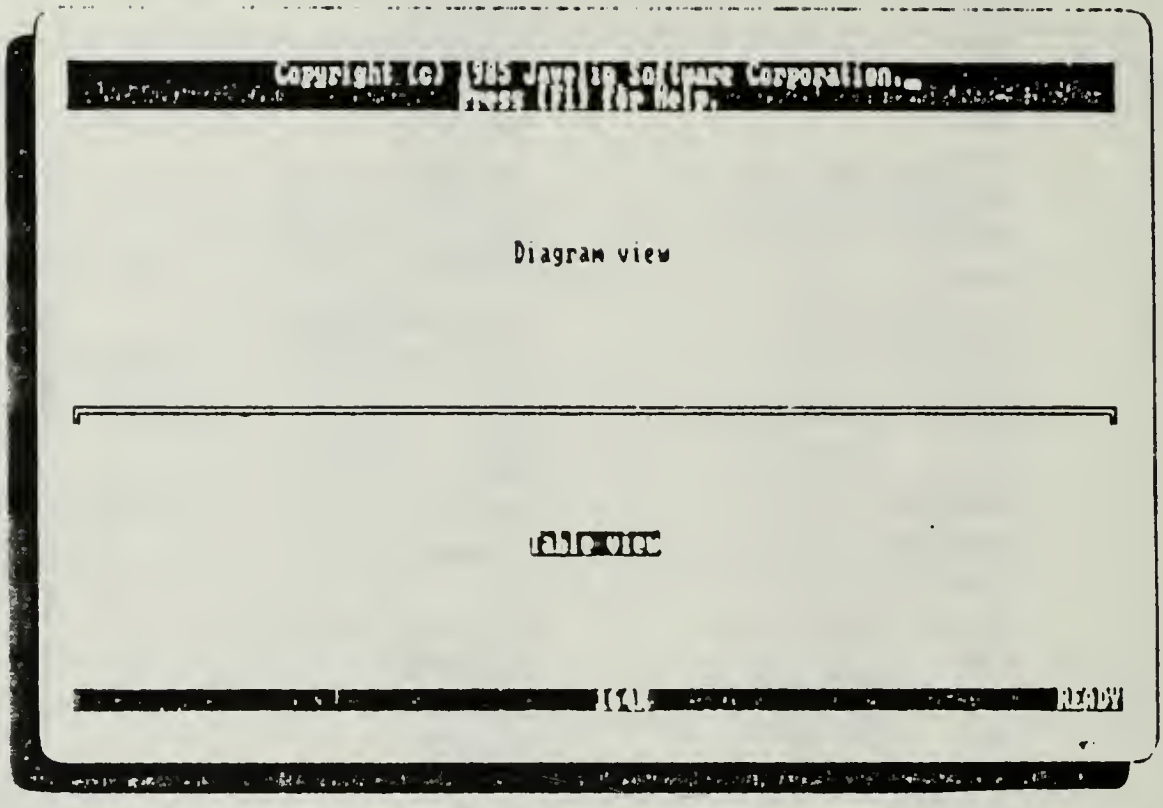

Figure B.4. JAVELIN Initial Screen Display

APPENDIX C

TUTORIAL GUIDE FOR IFPS/PERSONAL

PART I

A. INTRODUCTION

Welcome to IFPS/Personal. If you have never used IFPS/Personal before, you will undoubtedly find it an exciting new tool for use in a wide variety of applications.

IFPS/Personal (herein after called "IFPS/P"), is the International Financial Planning System, produced by Execucom, Incorporated for use on personal computers. It is a high level financial planning language that allows you to build a 'model' of a real life business situation and then test it for different values of parameters or variables. IFPS/P allows you to plot or graph results and print hard copies of results. It can also be interfaced with a mainframe computer. The exposure and experience you will get with Personal in this tutorial should be most beneficial to you. Get ready for an enjoyable and rewarding experience.

B. ORGANIZATION

The tutorial will begin by explaining some basic general principles of IFPS/P. Some basic terminology peculiar to Personal will be presented. Additionally, unique keyboard functions in IFPS/P will be discussed and the basic screen will be explained. The concept of modeling will be briefly discussed, then a case which is representative of a real business situation shall be presented. You will then be guided, step by step, as you build the case using Personal. You shall be guided

through the use of many of the powerful functions of IFPS/Personal for performing sensitivity analysis, goal seeking, and analysis of variables as parameters are changed.

C. IFPS/PERSONAL GENERAL INFORMATION

IFPS/P is a fourth-generation language, which means that the user is able to utilize it more easily. You are going to be able to use commands and phrases close to English in IFPS/P. In fact, you will be able to use words that you have created which describe your problem explicitly. IFPS/P allows you to build models in English terminology, permits 'what if' and goal-seeking interrogation, preparation of high quality reports, storage of command files for repetitive tasks, data files for data input, and IFPS/P has many predefined functions and subroutines. You are able to view solutions on the screen and IFPS/P offers menu selections for valid commands. You will have available a full-screen editor for making corrections, and you will be able to save your queries for specific cases.

Your IFPS/Personal package should have included the following:

- IFPS/Personal Tutorial.
- IFPS/Personal Reference Manual.
- IFPS/Personal Diskettes.

In order to use IFPS/P, you will need the following:

- Personal computer with at least 512 K memory.
- Compatible printer (if you desire printed reports).
- The two program diskettes provided in your IFPS/Personal package.

The instructions provided within this tutorial assume that you are using an IBM or compatible, with two disk drives. Hard drive users are referred to the IFPS/Personal Tutorial for any guidance they may need concerning file handling.

D. GETTING STARTED

This tutorial is written primarily for managers who will be using IFPS/Personal to make strategic decision. It is assumed that you are familiar with basic computer operation, i.e., you know how to 'boot' your computer, i.e., start it and get to the DOS prompt, and you know how to format a blank diskette.

STEP 1: You must first start your computer using the disk operating system (DOS) diskette that comes with your system. You are referred to your reference manual for instructions on booting your system.

STEP 2: For Floppy Disk Users - Remove the DOS diskette from your 'A' drive and place the disk marked "IFPS/Personal Program " in drive A and shut the door. Now, insert the disk marked "IFPS/Personal Support" into drive B and shut the door. Type 'B:' then hit the enter key to transfer control to the B drive. Now, type "A:IFPS" and press the [enter] key.

For Hard Disk Users - Boot your computer and log to the A drive. Now, insert the disk marked "IFPS/Personal Support" into the A drive. Type "Copy A:*.*C:/V", then hit [enter]. Now, type "C:" and hit [enter]. Insert the disk marked "IFPS/Personal Program" into the A drive. Now type "A:IFPS" and hit [enter].

STEP 3: You should now see a screen that looks similar to Figure C.1. This is the IFPS "Main Menu".

Just to get familiar with the screen, study Figure C.1 and your screen closely. The right side of the status line (near the bottom of your screen), tells you which model (if any) is currently active. Near the left of the status line is an area reserved for dynamic information (that which changes frequently). Below this status line, you will see a line that begins with "IFPS: Model...". This line, and the one below it, are called the IFPS Menu. This line lists the commands which are available to

you at any given time. You will see shortly what these various commands are. The IFPS Menu is what is called a 'ring menu'. To see how to move the cursor to various commands, hit the space bar several times. Continue hitting the space bar. Notice that once you move past the "HELP" menu option, the cursor jumps back to the beginning of the menu again (thus it forms a 'ring'). During this tutorial, you will enter commands using the command option, in which you type a single letter to invoke a particular command. You will also be shown how to enter them using the 'ring' menu. For your information, Figures C.2, C.3, and C.4 depict the function keys, menu structure, and built-in functions of IFPS/P.

Well, I'm sure you're anxious to begin, so let's get started. In the next section, you will read about Wine Coolers, Incorporated and will build the model for their operations using IFPS/Personal.

E. THE CASE

Wine Coolers, Incorporated is a manufacturer of wine coolers. This year the firm sold 800,000 bottles of wine cooler at a retail price of $1.36 per bottle. Since production capacity at the plant is 1,000,000 bottles, Wine, Inc. is operating close to its production limit. Analysis of prior data has yielded cost estimates for the coming years. You will be entering the estimates into the model shortly.

This tutorial is based on a 'learn by doing' approach. So, beyond this point, you will see only brief explanations. The primary emphasis is on keystrokes. You are STRONGLY ENCOURAGED to enter your keystrokes carefully and slowly and WATCH THE SCREEN as you make entries. In this manner, you will learn more quickly how IFPS/Personal responds to your commands.

In the portions of the tutorial that follow, you will see two columns - "KEYSTROKES/ACTION" and "EXPLANATION". The keystrokes are listed EXACTLY as they should be typed. Conventions used for keystrokes are as follows:

[XXXX] - indicates that a particular key should be depressed, i.e., [enter] means hit the enter or return key, [ctrl] means to depress the control key, etc.

(XXXX) - indicates that you must take the ACTION described, i.e., "(move the cursor to 'Edit')" means that you will have to, on your own, use the appropriate keys to move the cursor to the desired location.

[right] - indicates use of the arrow keys. [right] means to
[left] hit the right arrow key, [left] means to use the
[up] left arrow key, etc.
[down]

[esc] - indicates that you should hit the escape key. Note, the [esc] will take you back to the previous menu that you were using. It is most helpful when you are not sure where you are.

[F1] - indicates use of the function keys, located on the left side of your keyboard. Note that the [F1] key is the "HELP" key. Hit it any time you need on-line help.

The explanation column provides information concerning the keystrokes. It briefly describes the action that should occur as a result of the keystrokes.

You will now build the model. At this point you should be looking at the IFPS Main Menu (see Figure (1)).

KEYSTROKES/ACTION	EXPLANATION
(hit spacebar until the cursor rest on 'Edit') [enter]	Using menu mode, you are activating the IFPS/Personal editor. This will enable you to enter the text which will describe the model.
Model Wine [enter]	Enters the model name.
A	Selects the Append mode. You are now ready to begin entering the model.
Column 1987 thru 1991 [enter]	Labels 5 columns with the years 1987, 1988, 1989, 1990, and 1991.

The following commands are all portions of the model. No explanation will be provided for each statement. They are assumed to be self-explanatory. Remember to enter the keystrokes carefully and watch the screen to learn how IFPS/Personal responds to you command. If you make any mistakes while typing a line, you may use the backspace and arrow keys to move to the error and correct it (as in any full screen editor). If you discover a mistake AFTER you have entered a line, you will have to enter the 'Visual' mode to correct it. If the cursor is in the working area, [F10] will bring up the 'Edit' menu. If it is on the command line, [F9] will create the menu. From the edit menu, select 'Visual'. Using the arrow keys, move to the line of the error. Then, you may move to the error and correct it. You are referred to Chapter Six of the IFPS Tutorial that came with your package for more guidance on error correction, if necessary. Note that IFPS/Personal is

not 'case specific'. This means you may enter characters in lower or upper case. IFPS/Personal will not distinguish between the cases, i.e., Sales may be typed as SALES, sales, or Sales and will be recognized regardless of the case of its letters. Also, in the formula for "Fixed Costs", you will note an apostrophe ('). This is called a continuation character. When a desired statement exceeds the line length of the terminal, the single apostrophe will indicate to IFPS/P that the current statement continues on the next line.

Now, to continue entering the model:

KEYSTROKES/ACTION

Fixed Costs = Fixed Production Costs + G and A + '[enter]

Advertising + Interest + Depreciation [enter]

Growth Rate = 1.10 [enter]

Fixed Production Costs = 86000 [enter]

G and A = 125000, previous * Growth Rate [enter]

Advertising = 48000, previous * Growth Rate [enter]

Interest = 39000 [enter]

Depreciation = 50000 [enter]

Variable Costs Per Bottle = Labor Per Bottle + Material Per Bottle [enter]

Labor Per Bottle = .35 [enter]

Material Per Bottle = .75 [enter]

Variable Costs = Variable Costs Per Bottle * Number of Bottles Sold [enter]

Sales Revenue = Number of Bottles Sold * Retail Sales Price [enter]

Number of Bottles Sold = 800000, previous * Growth Rate [enter]

Retail Sales Price = 1.36 [enter]

Profit Before Tax = Sales Revenue - Fixed Costs - Variable Costs [enter]

Return on Sale = Profit Before Tax / Sales Revenue * 100

You have now entered the entire model that describes Wine Coolers, Inc. In the following portion of this tutorial, you will learn how to 'view' the model, how to create solutions, how to reset a model to the original solution, how to use windows, how to change formats, and how to print reports.

KEYSTROKES/ACTION	EXPLANATION
[F10]	Ends the 'screen' mode.
S	Selects Save from the Edit menu. You have now saved your model in a file that you named when you began building your model (WINE.MOD). The '.MOD' is a file extension that is automatically assigned to model files.
[esc]	Leaves the Editor Mode. Brings back the Personal Main Menu. ('IFPS: ..').
M	Selects 'Model'.
G	Selects 'Get'.
WINE [enter]	Enters the name of the model you previously created and saved.
V	Selects View from the Model menu. After 'compiling' your model, and if you do not have any spelling mistakes the screen will look like Figure C.5. The top window has the 'solution' of the model for the years (columns) you specified. The bottom

	window shows the model that you entered (as much as will fit onto the screen).
(use the [down] arrow key to scroll the cursor down so that the bottom portion of your solution is visible)	Scrolls solution variables into view. Notice the 'stars' that appear in many of the columns. You will correct this later by adjusting the column width. Note-the stars appeared because the size of the number exceeds that width of the column.
[esc]	Exits the View mode.
V	Return to the View Mode.
C	Selects a particular column for viewing.
1987, 1991 [enter]	Selects only 2 columns for viewing, 1987 and 1991.
[F10]	Moves the cursor from the solutions window to the model window.
[F10]	Switches cursor back to solutions window.
V	Creates View menu by specifying variables to be displayed.
Profit Before Tax, Return on Sale [enter]	Specifies variables to show in the solutions window.
V	Selects Variables.
All [enter]	Selects 'All'. Restores all variables in the top window.

[F10]	Moves cursor to Model window.
V	Selects Variables.
All [enter]	Selects 'All'.
[F10]	Moves cursor to solutions window.
C	Selects Columns.
All [enter]	Selects All. This returns columns 1987 through 1991.
[esc]	Returns to IFPS Main Menu.
V	Selects View Mode.
(using [F10], ensure cursor is in the model window - lower portion of screen)	
I	Selects Windows.
M	Selects Model-lines.
3 [enter]	Reduces the size of the model window from 9 (default) to 3 lines. Notice that this permits 6 extra lines to show in the other (top) window. Figure C.6 shows the new screen format.
I	Selects Windows.
M	Selects Model-lines.
9 [enter]	Returns the bottom window size to 9 lines.
F	Selects 'Format' from the view menu.
N	Selects 'Name-width'.

10 [enter]	Changes the namewidth area from 20 spaces (default) to 10.
F	Selects 'format'.
N	Selects Namewidth.
d [enter]	Returns the Namewidth to 20 characters.
F	Selects Format.
A	Selects All-columns.
12 [enter]	Changes all column widths to 12 spaces.
[enter]	Selects default decimal places number.
(now hit [down] arrow key until the last lines of the solution scroll into view.	Notice the 'stars' are gone since we now have enough spaces to display 7-digit numbers.
[esc]	Leaves Format and Edit Menus.

IFPS/Personal allows you to create horizontal windows, open subwindows, and design particular displays for windows. You are encouraged to explore these more advanced capabilities on you own. Chapter Five of the IFPS/Personal Tutorial covers these topics.

The following portion of of this section of the tutorial will guide you in building a file that will create a printed copy of your solution. You will be able to call on this file at any time that you may want a printed report.

KEYSTROKES/ACTION	EXPLANATION
(ensure your printer is "on-line")	
(from the IFPS Main Menu)	

L	Selects Log.
L	Selects Learn.
Y	Selects Yes.
F	Selects File.
Winerpt [enter]	Provides file name.
I	Selects Input.
[alt][F5]	Hit these keys at the same time.
	This will take you to Main Menu.
M	Selects Model.
G	Selects Get.
Wine [enter]	Names the model file to get.
R	Selects Report.
F	Selects File.
Prn [enter]	Establishes file specification.
O	Selects Options.
C	Selects Column-width.
12 [enter]	Sets column width to 12.
D	Selects Decimal.
2 [enter]	Sets Decimal points to two.
[esc]	Goes back to Report Menu.
T	Selects Titles.
P	Selects Position.
C	Selects Center.
Wine Coolers, INC [enter]	Provides Title of report.
[esc][esc]	Returns to Report Menu.
K	Selects Skip.

2 [enter]	Creates 2 blank lines after title.
C	Selects Columns.
1988..1991 [enter]	Titles columns 1988 through 1991. You will only view the last 4 years.
T	Selects Titles.
O	Selects Column Titles.
P	Selects Print.
A	Selects Automatic.
N	Selects 'Do Not turn off column titles.'
[esc][esc]	Returns to Report Menu.
V	Selects Variables.
All [enter]	Selects All variables.
W	Selects Show.
P	Moves to next printer page.
N	Selects new page.
[esc]	Returns to Report Menu.
S	Selects Save.
[alt][F5]	Returns to IFPS Main Menu.
L	Selects Log.
S	Selects Save. You have now saved a file which you may use at any time to create a printed copy of the solution of your 'Wine' model.
[esc]	Returns you to IFPS main menu.

You have now created a file which you can use to print a report from the model file 'Wine'. This is most useful as you make changes to the model and would like to see a printed summary of the solution. You may also print the solutions to your 'What-if' queries. In order to cause the report to be printed, the following commands must be provided:

KEYSTROKES/ACTION	EXPLANATION
(from the IFPS Main Menu)	
X	Selects Execute.
F	Selects File.
N	Selects Name.
Winerpt [enter]	Provides name of file to execute.
(a printed report should now be produced. After printing, to go back to Main Menu, press [esc])	

IFPS/Personal also offers a number of graphing options, such as clustered, percent graphs, pie charts, and line graphs and allows you to save your graphs. You are encouraged to explore these features of IFPS/Personal at a later time (Chapter Eight of the IFPS/Personal Tutorial covers these topics).

Congratulations. You've come a long way! You are probably ready to take a 'breather' at this point. Since you have already saved your model, you may quit. You will be able to resume you work exactly where you left off. To QUIT, you just

need to get to the IFPS Main Menu by typing [esc] until the menu appears. Then, type "Q" for selecting the QUIT option. IFPS/Personal will then return you to your DOS operating system.

In the next part of this tutorial, you will explore some of the more powerful 'Interrogation' capabilities of IFPS and those that will actually help you in strategic decision making situations.

PART II

In this portion of the tutorial guide, you are going to explore some of the powerful functions of IFPS/Personal. You will find out how to perform variable analysis, 'What if' analyses, and 'Goal-seeking' analyses. You will also learn how to save your interrogations.

As the manager of Wine Coolers, Inc. you need to make some major decision that will have significant impacts on the future financial 'health' of your organization. Specifically, you want to know the following:

- What are the profit and Return on sale at Full Capacity, i.e., at a 1,000,000 bottles production level?
- What selling price will result in a ROS of 15 per cent at full production?
- What is the breakeven point in bottles sold at any given price, i.e., at what number of bottles sold will profit before tax equal zero?

The following steps guide you through these strategic decision making analyses:

KEYSTROKES/ACTION	EXPLANATION
(boot your computer, then activate IFPS, as described in the first part of this tutorial. Ensure that you are now at the IFPS Main Menu)	Turns on your computer and makes IFPS active for you to use again.
M	Selects 'Model' option.
G	Selects Get.

Wine [enter]	Names the file to place into active status.
V	Selects View Option.
(using the arrow key, move cursor to the bottom of the solutions window to Return on Sale)	Notice the stars in some columns. You will have to reset the column widths to 12.
F	Selects the Format option.
A	Selects All-columns.
12 [enter][enter]	Changes all column widths to 12. Changes Decimal points to 2. Notice that the stars that were in some columns have now been replaced by numbers.
I	Selects Windows.
S	Selects Syncronization of windows.
Y	Selects Yes for SYNC.
A	Selects Analyze.
Return on Sale [enter]	Selects the variable name to be analyzed. Your screen now shows the solution values and model statements for all variables that contribute directly to the computation of ROS.

[esc]	Returns to 'Model' Menu.
V	Selects View.
W	Selects the 'What-if' option. Note the "case" window at the bottom of the screen. This will allow you to perform "case studies".
E	Selects the 'Edit-case' option. Now, you may type in the 'What-if' assumptions.
Number of Bottles Sold=1000000 [enter]	Sets the number of bottles sold to one million, the full production capacity of Wine Coolers, Inc.
[F10]	Returns you to the "What if" menu.
V	Selects the Solve option. Notice that the top and bottom window have changed now. The new figures and formulas represent a fixed number of bottles sold. Notice column settings that you established earlier must be reset.
[esc]	Creates view menu.
W	Selects "What if" option.
O	Selects 'Goal-seek' option.
Return on Sale=15 [enter]	Enters the "Goals" for this case.

	Notice that the case you set up earlier is still active, i.e., bottles sold = 1,000,000.
Retail Sales Price [enter]	Enters the variable to 'Adjust'. The solution is automatically calculated and should be showing on your screen. This solution solved for price if ROS was fixed at 15% and Bottles Sold = 1000000.
N	Selects Name option.
Mycase1 [enter]	Names this case 'Mycase1'.
S [enter]	Saves the case as 'Mycase1.cse'. Note that IFPS/P assigns the file extension automatically.
B	Selects Base case option. Restores original model and solution to the screen.
E	Selects Edit Case option.
Retail Sales Price = 1.20 [enter]	Establishes Retail Sales Price.
[F10]	Returns to What-if menu.
V	Selects Solve option.
[esc]	Returns to View menu.
W	Selects What if option.

O	Selects Goal-Seek option.
Profit Before Tax	Enters the goal variable.
=0 [enter]	
Number of Bottles	Causes number of bottle sold to be
Sold [enter].	adjusted to meet the goals.
N	Selects Name option.
Mycase2 [enter]	Provides name of file.
S [enter]	Saves file as 'Mycase2.cse'.
[alt][F5]	Returns to IFPS Main Menu.
Q	Quits IFPS. Returns to DOS.

Congratulations! You have just completed the tutorial and should be feeling quite accomplished at using IFPS/Personal. This tutorial has only 'skimmed the surface' of the power and flexibility of IFPS/Personal. You are most strongly encouraged to familiarize yourself with more of the various functions and characteristics of IFPS/Personal. It is a very useful tool that should assist you immensely in performing financial recording, reporting, and planning tasks.

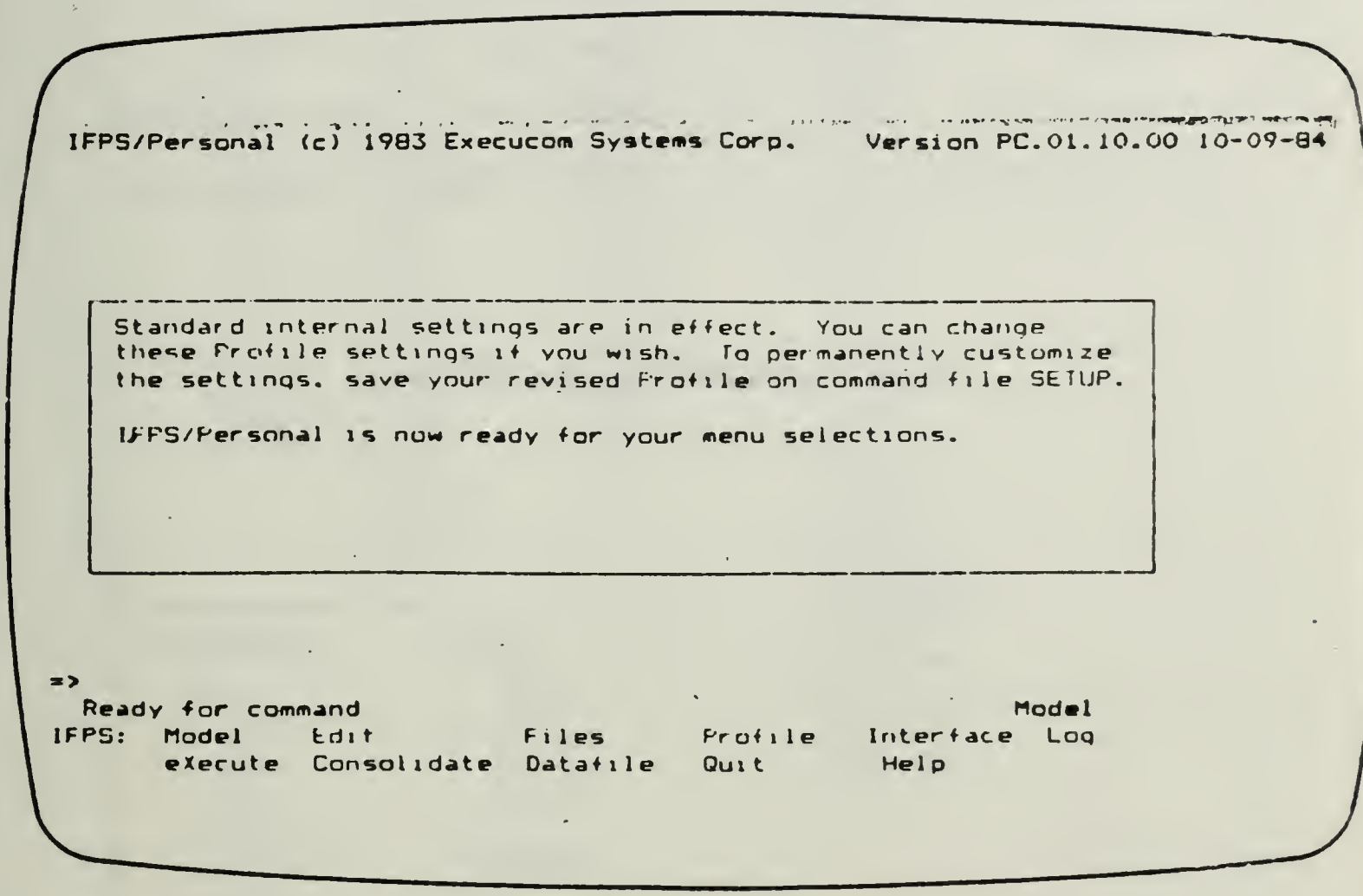

Figure C.1. IFPS/Main Menu

IFPS/PERSONAL FUNCTION KEYS

ALT		FUNCTION KEYS			ALT
	HELP	F1	F2	COPY TO CHAR	COMM PAUSE
	RETRIEVE	F3	F4	DEL TO CHAR	
	UNDO	F5	F6	COPY LINE	
	INSERT LINE	F7	F8	DELETE LINE	BRK TERM MODE
PR	COMMAND LINE	F9	F10	CHANGE WINDOW	PC/TERM MODE
SC					

Figure C.2. IFPS/PERSONAL Function Keys

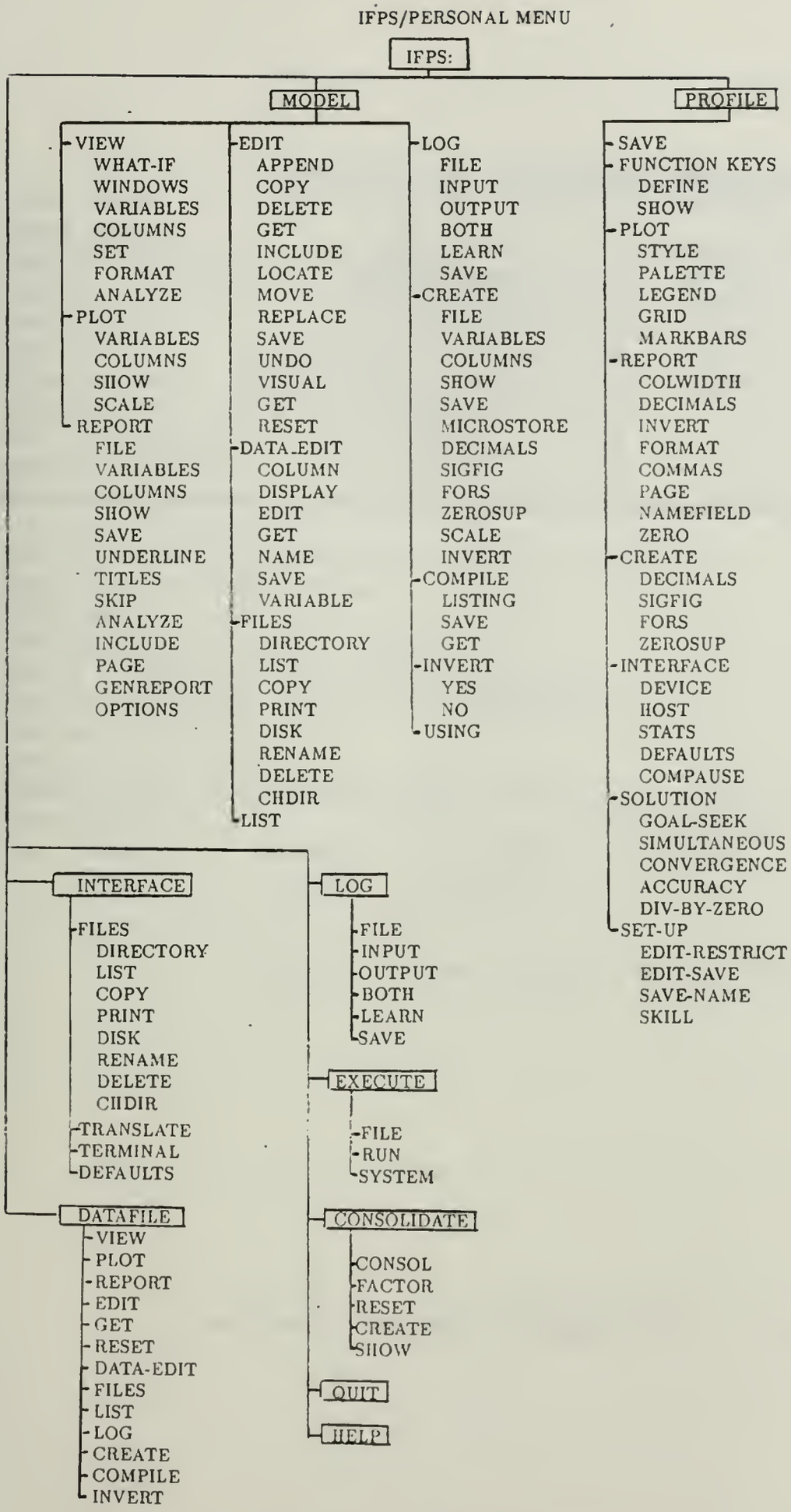

Figure C.3. IFPS/PERSONAL Menu Structure

IFPS/PERSONAL BUILT-IN FUNCTIONS

Discounted Cash Flow Functions
CIRR
GROWTHRATE
MDIRR
IRR
NPT
PVCC

Subroutines
ACRS[DEPR]
AMORT
DECBAL[DEPR]
GENDECBAL[DEPR]
STLINE[DEPR]
SUM[DEPR]

Mathetical Functions
ABS
COLNUM
INTERPOLATION
LOG10
MAXIMUM
MEAN
MEDIAN
MINIMUM
NATEXP
NATLOG
ROUND
ROUNDUP
STDEV
STEP
SUM
TRUNCATE
VMATRIC
XPOWERY
MOVAVG
POLYFIT
TREND

Figure C.4. IFPS/PERSONAL Built-In Functions

	1987	1988	1989	1990	1991
Fixed Costs	108300.00	109165.00	110073.25	111026.91	112028.26
Growth Rate	1.05	1.05	1.05	1.05	1.05
Fixed Production Cos	86000.00	86000.00	86000.00	86000.00	86000.00
G and A	12500.00	13125.00	13781.25	14470.31	15193.83
Advertising	4800.00	5040.00	5292.00	5556.60	5834.43
Interest	3900.00	3900.00	3900.00	3900.00	3900.00
Depreciation	5000.00	5000.00	5000.00	5000.00	5000.00
Variable Costs Per B	1.10	1.10	1.10	1.10	1.10
Labor Per Bottle	0.35	0.35	0.35	0.35	0.35
Material Per Bottle	0.75	0.75	0.75	0.75	0.75

```
Fixed Costs = Fixed Production Costs + G and A + '
Advertising + Depreciation
Growth Rate = 1.05
Fixed Production Costs = 86000
G and A = 12500, previous * Growth Rate
Advertising = 4800, previous * Growth Rate
Interest = 3900
Depreciation = 5000
Variable Costs Per Bottle = Labor Per Bottle + Material Per Bottle
  Base Solution                          VIEW MODE          Model WINE.MOD
View:  What_if     wIndows    Variables     Columns
       Set         Format     Analyze
```

Figure C.5. View of Solution for the "WINE" Model

	1987	1988	1989	1990	1991
Fixed Costs	108300.00	109165.00	110073.25	111026.91	112028.26
Growth Rate	1.05	1.05	1.05	1.05	1.05
Fixed Production Cos	86000.00	86000.00	86000.00	86000.00	86000.00
G and A	12500.00	13125.00	13781.25	14470.31	15193.83
Advertising	4800.00	5040.00	5292.00	5556.60	5834.43
Interest	3900.00	3900.00	3900.00	3900.00	3900.00
Depreciation	5000.00	5000.00	5000.00	5000.00	5000.00
Variable Costs Per B	1.10	1.10	1.10	1.10	1.10
Labor Per Bottle	0.35	0.35	0.35	0.35	0.35
Material Per Bottle	0.75	0.75	0.75	0.75	0.75
Variable Costs	880000.00	924000.00	970200.00	*********	*********
Sales Revenue	*********	*********	*********	*********	*********
Number of Bottles So	800000.00	840000.00	882000.00	926100.00	972405.00
Retail Sales Price	1.36	1.36	1.36	1.36	1.36
Profit Before Tax	99700.00	109235.00	119246.75	129759.09	140797.04
Return on Sale	9.16	9.56	9.94	10.30	10.65

Fixed Costs = Fixed Production Costs + G and A + '
Advertising + Depreciation
Growth Rate = 1.05

Base Solution VIEW MODE Model WINE.MOD

View: What_if wIndows Variables Columns
Set Format Analyze

Figure C.6. View with Bottom Window Size Decreased

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