THIRD EDITION

SPACE PLANNING BASICS

MARK KARLEN

INCLUDES STAIR DESIGN RESOURCE

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Space Planning Illustrations by Kate Ruggeri and Mark Karlen

Building shell drawings CAD-generated by Peter Hahn

Stair Design Illustrations by Kathryn Hunchar and Mia Kang

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Preface

I remain pleased that Space Planning Basics continues to be used by students and their faculty at many colleges and universities across the country. The previous edition focused on the increasing impact of digital technology on design procedures, from web research and the design process to importing standard design elements and presentation techniques. In the past five years since that publication, those relatively new methods have become entrenched as standard practice. The Third Edition features revised and expanded Skill Development Exercises, clearer illustrations, and updated information on building codes.

A primary purpose in creating this 3rd Edition is the addition of a stair design component. Over many years as a design studio teacher and critic, I have been regularly reminded of the significant difficulty that many students have in learning to design and draw stairs correctly. From a design perspective, stairs are among the more complex elements within buildings, particularly when there are multiple levels to be accommodated and/or complex building configurations to be considered. There are very few resources to turn to: the graphics standards publications offer a very limited number of pages, and that's about it. As is the case with space planning, most designers learn stair design in a mentorship mode with the help from a teacher in a classroom setting, or an experienced professional in a professional office. It is intended that the Stair Design Resource in this book will serve as a handy reference source.

The initial thoughts about an instructional resource for stair design were generated by sitting in on a critique of the work of second year design students. Stefan Klein (one of the most gifted teachers I've ever known) made repeated critical comments on his students' stair designs, a central element of the design project being critiqued. With each project, Stefan was necessarily critical about the stair design and the drawing conventions that were used. As I listened to Stefan, I heard my own voice making the same critical comments to countless students in the past. Listening to Stefan that day was the impetus for writing this stair design resource.

In addition to my appreciation for Stefan Klein providing a focus for this effort, I want to thank several people for their help in making this Third Edition possible. John Wiley and Sons, the publisher, provided the results of anonymous critical reviews of the Second Edition, from several faculty who have used it in their classrooms; as a result, several revisions have been made to improve and clarify the material……Thanks, whoever you are. Thanks to a young design professional, Liyan Wan, has been of unusual help in reviewing and suggesting revisions to the space planning Skill Development Exercises. Over a period of more than a year, a young professional in Philadelphia, Kathryn Hunchar, and I have worked together to create the stair design illustrations. To help refine those illustrations and ready them for publication, Mia Kang, a professional designer in New York (and a former graduate student of mine), was of great help. Finally, special thanks to Paul Drougas, my editor at Wiley, who has been a consistent supporter throughout the entire process.

Again, my hope is that the resulting book is of significant value to students in mastering space planning and stair design skills.

Introduction: How to Read and Use This Book

This book is an instructional tool designed to develop interior space planning skills for typical building uses in spaces up to 4,000 square feet in size. Although this book may be used by an individual learner, it is geared for use in a conventional studio classroom setting. Its contents are threefold:

1. Explanatory text
2. Descriptive graphic examples
3. Recommended practice exercises

Space planning is an inherently complex process. For this reason, a series of planning exercises, starting with very small spaces and building to larger spaces with more complex program requirements, are provided as the primary technique in the development of space planning skills. In addition, basic information about space planning, the use of planning rules of thumb, guidelines for appropriate drawing techniques, and recommended reading and reference sources are included.

As an introduction to space planning, this book is primarily directed to intermediate-level (sophomore and junior levels in a baccalaureate or first-professional-degree program) interior design students. To be more specific, it is assumed that its users possess adequate drafting skills (defined here as basic experience with drafting tools and architectural scales) and ease in understanding and preparing orthographic projections (plans and elevations). In addition, users are expected to be competent in planning conventional furniture arrangements within fixed rooms, not including large-scale arrangements of office systems furniture, which is a basic space planning process in itself. Ideally, some background in design program development has been previously gained, but that is not necessary for a successful learning experience. Background in the planning of undivided or "raw" space is not required. Although specific direction to prepare for the National Council for Interior Design Qualification (NCIDQ) examination is not an intended purpose here, the basic space planning skills learned are applicable to the practicum portions of that exam.

Space planning is not a simple process involving a single category of information; rather, it is a complex dovetailing of several processes involving many categories of information related to the organization and construction of buildings. Such processes range from program analysis and use of building code principles to environmental control techniques and the development of desired spatial qualities. Even with space planning problems of relatively small size (a few thousand square feet) and relatively simple programmatic requirements, it is impossible to completely avoid these complexities of process and information. For this reason, such issues will be dealt with in enough depth to provide a realistic context for design problems, while maintaining focus on the central issues of space planning. Over a long period, the experienced space planner will gain in-depth knowledge of all these complexities, but it would be counterproductive to attempt to deal with them here except in the simplest manner.

The great majority of professional space planning work lies within existing structures, rather than in the interior planning of new buildings still on the drawing board. For this reason, the greatest emphasis in this book is on spaces within existing structures. Interior space planning for buildings still on the drawing board is an endeavor that requires some experience in the design of structures and building shells and therefore demands additional knowledge and skill on the part of the space planner. Those additional areas of professional involvement lie beyond the intent of this text and will be discussed in a general manner in Chapter 8.

Finally, this textbook is meant not only to be read, but also to be worked with as a hands-on guide in the development of a creative skill. Space planning skills grow from consistently repeated practice and experience; consequently, learners are encouraged to apply sufficient hours of concentrated effort at the drawing board to gain professional-quality technique. The quality of space planning solutions, particularly at the beginning of one's experience, is difficult to assess. Unlike some other forms of problem solving, space planning problems usually have many "right" answers. Rarely are there "perfect" answers. Space planning solutions involve satisfying program criteria on a priority basis where the issues at the top of the list must be solved, but where some of the issues near the bottom might only be partially solved, if at all. In its simplest terms, space planning almost always involves compromises, when one looks for good and workable solutions rather than "correct" or "perfect" solutions. Identifying and satisfying high-priority or major planning criteria is part of the learning experience presented here, but the best tools to assess quality in space planning solutions are personal exchange and critique with others. Classroom discussions, both formal and informal, are of great value. Seeking out the opinion of fellow students, as well as offering criticism of others' work, will help immeasurably to develop strong critical skills. Taking advantage of classroom pinups and critiques, particularly with the expert view of the classroom teacher available (and possibly that of a guest critic), is essential in this growth process. In time, as consistent evaluation of one's own work and the work of others continues, skills in criticism improve, and one becomes a better judge of one's own work. Despite this, at every level of professional growth, value exists in seeing another approach and in hearing objective criticism.

The step-by-step process of space planning described in this text is deliberately geared to the learning of a complex skill. It should be understood that many worthwhile and productive planning processes are used by professionals in the field; one process is not superior to the others. This is true because of the creative element involved in space planning. As one's skills grow beyond the learner's level. it is assumed that each designer will develop variations in the planning process geared to his or her individual thinking patterns, and will ultimately create a complete and personalized design methodology.

Note should be made of the issue of terminology. This text contains many words and phrases that must be considered as professional jargon; they are unavoidable. They are also not universal in their use. Words and phrases such as "criteria matrix," "prototypical plan sketches," "relationship diagram," "bubble diagram," "block plan," "barrier-free," "suite," "rough floor plan," "speculative office building," and so on are used by some professionals and not by others. The use of the same word or phrase by different individuals may convey varying connotations. Do not allow this lack of universality in terminology to become a stumbling block in the learning process presented here.

As your space planning skills grow and achieve professional quality, you will probably find that these new elements in your repertoire also sensitize and sharpen other, related design skills and bring you several steps closer to the status of the "compleat" professional.

Recommended Reading

The bibliography at the end of this book is kept brief. It is worth taking a few minutes to read the introductory paragraphs to that list of books. The recommended reading that relates to this introduction has been selected for its introductory qualities. The following numbers refer to books listed in the bibliography.

6*, 8*, 12*, 27*, 30

Books marked with an asterisk are also included in the recommended reading for other chapters.

SPACE PLANNING BASICS

Chapter 1 PLANNING METHODOLOGY

The space planning process begins when a person, or a group of people, decides to put a building, or a portion of a building, to a new and practical use, running the gamut from small residential or work spaces to vast, complex business and institutional facilities. Except in the simplest space, such as a small apartment or office, making efficient and functionally satisfying use of space is a complex task that is far beyond the capabilities of most building users; this is when and why the space planning specialist, interior designer, or architect, is called in to solve the problem.

Space planners are presented with their task in a great variety of ways. Most users or clients are inexperienced in working with planning professionals and present their space planning problems without significantly prepared data. It is not uncommon for a business owner or manager to come to an interior designer and say, in effect, "Our staff has grown by 60 percent over the past few years, and we are still growing at a very fast rate. Our space is terribly overcrowded; what should we do?" In cases of this kind, the designer must begin with the basic tasks of charting organizational structure; identifying personnel, their tasks, and necessary equipment; analyzing the operational process; and gaining an understanding of the human and cultural qualities of the organization. In effect, the planning professional must take full responsibility for organizing, analyzing, and interpreting the problem at hand.

At the other extreme, with clients who have had considerable experience in planning their spaces and who may have an in-house facilities manager or staff, the designer or architect may be presented with a bound volume of extensive data on the number and types of personnel (including their equipment and square footage needs), spatial adjacency studies, and the desired human and esthetic qualities of the completed project—in effect, a complete space planning program. In such cases, the planning professional is relieved of the responsibility of data gathering, organization, and analysis. Obviously, the design problem or program that is presented must be fully

absorbed and understood by the designer, and some tasks of program interpretation may need to be performed. These issues will be discussed later in this chapter.

There is a full range of client or program situations between the two extremes presented above. Most clients have given some thoughtful consideration and analysis to their spatial needs before engaging professional services but do not have the in-house expertise to make a complete analysis of their problem and present it in terms easily translated into a planning solution. It is this middle ground into which most professionals step when presented with a space planning problem.

Regardless of a client's experience with planning professionals, the issues of design sensitivity and insight play a major role in their discussions. Some space planning programs that are prepared by in-house facilities management personnel deal only with hard data and are of little use in understanding the subtleties of organizational dynamics or the detailed requirements of lighting or acoustics. What at first glance may appear to be a complete and professional program may still require a great deal of organization, analysis, and interpretation on the part of the designer. Conversely, some clients who are completely inexperienced in space planning matters will bring invaluable design sensitivity and insight to the project, despite their lack of categorized data.

It is very difficult to simulate real client or program situations in the classroom. Typically, students are presented with a written program that defines all the detailed requirements of a project, along with floor plans (and possibly additional drawings) of a real or imagined space. A space planning solution is drawn from this data. Though good and useful for the student's learning process, these exercises lack the dynamics of personal interchange with a client, ignoring as well such real problems as internal conflicts in the client's organization, corporate mergers or takeovers, changes in management personnel, budget constraints, and dealings with building code administrators—all of which exist in actual practice situations. Bringing real or role-playing clients to classroom assignments can be helpful, just as using actual spaces that students can walk into and survey has value in making the space planning problem realistic. Despite these simulations of reality, students should be aware that dealing with a broad variety of personalities, unusual time frames (from projects with tight deadlines to those that extend over years), and stringent budget requirements will add unexpected and challenging elements to the space planning process when they move from the classroom to the professional setting.

DEFINING TERMS AND INTENT

The title of this chapter, "Planning Methodology," is a phrase used throughout this text to describe the phase of the space planning process that begins when the planning problem is presented to the planner (with or without a program) and ends when physical planning commences, usually with bubble diagrams or block plans. In some professional circles, this is called the pre-design process—meaning all the necessary steps of data gathering, research, analysis, and interpretation before actual planning. For many in the design fields, "planning methodology" and "programming" are synonymous, although some would argue that the charting and diagramming described here as part of planning methodology fall outside the bounds of programming and are part of the design process.

A great deal has been written about the general area of planning methodology. Books and articles are available about the interview process, questionnaires, observation techniques, idea generation, spatial analysis and theory, programming, design methods, problem solving, graphic thinking, and so on. As noted in the Introduction, a unified terminology universally used or accepted by professionals in the field does not exist. Despite this lack, comprehensive reading in this subject area will reveal a body of knowledge that provides a broad variety of useful approaches to the pre-design process.

Very little has been written about space planning techniques, particularly from an instructional viewpoint. Space planning skills have generally been learned in a mentorship mode, at the drawing board or workstation, in the studio classroom and/or the professional design firm. The primary intent of this book is to provide a written foundation for the space planning process. Although a planning methodology is described and recommended here, it is dealt with in a concise manner so as to give full attention to the more elusive planning- and design-related parts of the process. This should not be construed as minimizing the value of the pre-design process; to the contrary, good space planning cannot be accomplished without the professionally thorough pre-design analysis generally defined here. A simple and workable method will be succinctly presented so as to move on quickly to the physical planning phase. Students are strongly encouraged to read about and acquire skills in a broad range of pre-design techniques, both verbal and graphic, in order to gain many analytical tools to apply to the problem-solving challenges they will ultimately face as professionals. The recommended reading at the end of this chapter provides direction for expanding that knowledge and those skills.

Another brief note on terminology: Several steps in the space planning process described and recommended throughout the text are identified by words or phrases unique to the text, such as "criteria matrix" and "relationship diagram." In each case, these words or phrases will be defined thoroughly, and potential conflicts with other terminology common to the field will be identified.

THE SYNTHESIS GAP

Among professionals working in the field, a generally accepted process or sequence of tasks occurs from the point at which the planner begins to work on a project to the point at which project analysis is complete and the physical planning process begins. Despite many variations in technique or terminology that planners may apply, the basic process of creating a design program consists of the following steps, presented here in an extremely abbreviated form:

1. Interview

a. Executive level (organizational overview)
b. Managerial level (departmental function)
c. Operational level (process and equipment detail)

2. Observe (existing or similar facilities)

a. Assisted observation
b. Unobtrusive observation
c. Inventory of existing furniture and equipment (when it is to be reused)

3. Establish architectural parameters

a. Acquire complete base plan data (including mechanical and electrical services)
b. Compile contextual data (architectural, historical, social)
c. Research code constraints

4. Organize collected data (the first-phase program)

a. Place data in sequential format most useful for planning
b. Summarize confirmed quantitative factors (square footage, FF+E count, equipment sizes, etc.)
c. Record first thoughts on conceptual planning approach

5. Research the unknowns

a. Gather detailed information on process and equipment
b. Gather case study information on similar facilities
c. Integrate researched data with first-phase program

6. Analyze the data

a. Discover planning affinities (working interrelationships, public/private zoning, special acoustic needs, etc.)
b. Discover scheduling affinities (maximize use of space)
c. Identify planning or architectural relationships (site, structural, mechanical, and electrical conditions)

7. Interpret and diagram the data (the complete program)

a. Define the functional problems in planning terms
b. Establish a basic conceptual approach (in terms of human/social and image/esthetic objectives)
c. Prepare relationship or adjacency diagrams (for client and designer visualization)

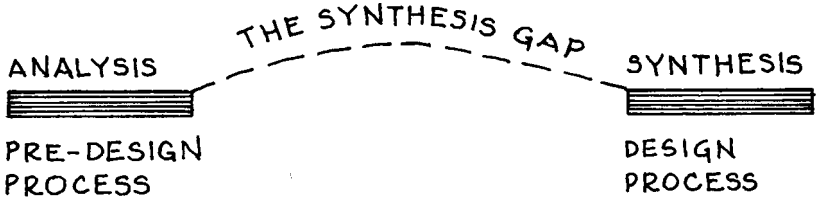
8. Summarize the data (the finished document)

a. Finalize project concepts—STATE THE PROBLEM
b. Outline and tally basic budget issues
c. Prepare a package for client approval and to serve as the designer's manual for space planning

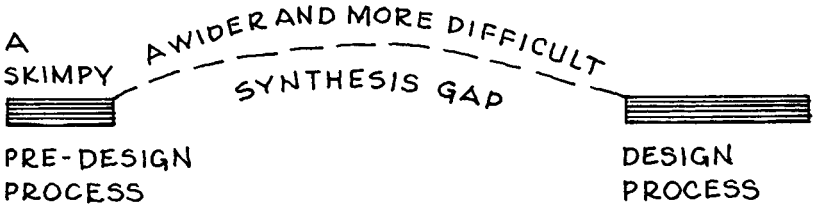
The analytical process described above will never produce a space planning solution. Regardless of how thorough the process may be, creating a physical solution requires that analysis be put aside and a process of synthesis begun. That synthesis requires a creative understanding of all elements of the analysis, to place the programmatic elements in a physical juxtaposition that will satisfy the users' needs. The word "creative," in this context, must be seen in its broadest sense, in which functional, esthetic, and technical issues must be addressed and resolved. The heart of the problem-solving task in space planning occurs in making the transition from the analytical predesign phase of the project to the creative design solution phase.

The entire design process is one of synthesis, in which many disparate factors are integrated into a useful whole, but the initial mental or creative leap from the analytical phase to recording or drawing on paper the first physical

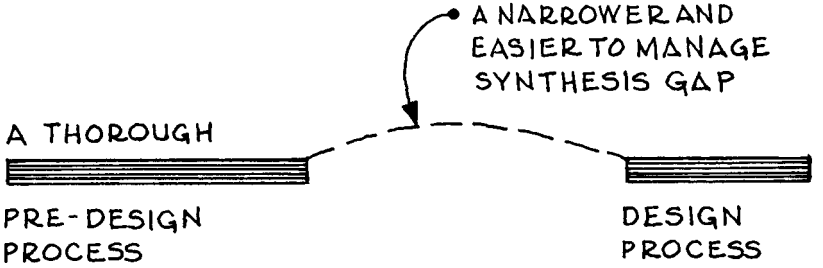
solution is the most difficult single step in the process. If the pre-design process is very thorough, it may bring the planner several steps closer to a physical solution or may make the creative leap a shorter, easier one. For the purposes of this text, the void between the completed design program and the planning solution will be referred to as the "synthesis gap," and it might best be visualized graphically:



If the pre-design process has been skimpy or inadequate, the synthesis gap will be wider and more difficult to manage:



If the pre-design process has been thorough and insightful, the synthesis gap will be narrower and easier to manage:



From a practical, professional setting viewpoint, the planner needs an efficient and reliable process to turn to each time a space planning project is encountered. Gathering a few basic facts and then staring at a blank floor plan waiting for inspiration to strike is an utterly impractical approach. A well-established design methodology is needed to meet the typical time pressures of the profession and to solve space planning problems in a manner that fully satisfies the needs of the client and user.

When space planning problems become both large in scale and complex in function, solutions become elusive or less obvious and the problem-solving process can feel intimidating. A basic principle, fundamental to all design methodologies and helpful to remember when projects loom too large and difficult, is this: Break down problems to their smallest and most manageable elements. Rather than be confronted by a maze of complex and seemingly unrelated factors, take the problem apart and reassemble it. View the elements as smaller, more controllable components, and then reorganize them in a sequence or in groupings that relate to the space planning problem. This is all part of the process to narrow the synthesis gap.

THE DESIGN PROGRAM

In space planning terms, design programs are written documents that qualify and quantify the client's or users' needs for a given project. In addition, most programs are accompanied by adjacency or relationship diagrams that often express physical planning relationships more articulately than verbal descriptions do. While the basic skills required to prepare a program are not unusual or complex, do not expect to be able to prepare a professional-quality program in the first attempts. After repeated experience, the skills required for interviewing, observation, research, analysis, and documentation become well honed, and one is then prepared to accomplish the real goal of programming—setting the stage for the planning and design process.

Interviews

When planning projects are small and groups are tightly managed, it may be necessary to interview only one person: a proprietor, manager, or director. As projects increase in size and/or complexity, the number of people who must be interviewed increases correspondingly. Size and complexity are quite different issues. Even though the project may be small in size, it would be unusual to plan a typical residential renovation without interviewing both wife and husband, or both partners of a small law firm when planning new office facilities for the firm. When size or complexity demands interviewing

several people, selecting the most appropriate people for those interviews is a skill unto itself. That selection is often dictated by the client and not left up to the designer's discretion.

It is essential that the interviewer be prepared with an organized and consistent set of questions—winging it just doesn't work. Generally, it is advisable to give the set of questions to the interviewees in advance of the interview, to better prepare them to respond in an organized manner and (when employees are involved) to lessen their chance of approaching the interview session with apprehension or anxiety. Rather than use a recording device, most experienced planners take interview notes, because recorders can be an intimidating intrusion on the easy rapport desired between programmer and interviewee. Except to gather dimensional and other quantitative data, questionnaires are not in widespread use; personal exchange is necessary to get beyond the superficial issues and to uncover the subtleties of space planning requirements. A great deal of informational and instructional literature exists concerning the acquiring and developing of interview skills valuable in approaching the interviewing task from a knowledgeable and professional perspective.

Observation

Observing existing facilities to see and understand operational and equipment-related processes is often an integral part of the interview process. Typically, a manager, senior partner, or department head will take the interviewer on a tour of the entire facility, or the portion of the facility for which he or she is responsible. In many cases, this kind of guided walk-through is adequate to the situation. But particularly when complex interpersonal relationships are involved, a walk-through may not be sufficient. The fact that people act differently from the norm when they know they are being observed is well known. Some special situations warrant the use of unobtrusive observation, in which the observer is not seen, or at least not noticed—the proverbial fly on the wall. While the instructive literature concerning this observational technique is limited, enough exists to direct the learner in acquiring appropriate skills.

It is not unusual to plan a project in which a facility or operation for observation does not exist. In this case, it is advisable to visit and observe facilities having similar functions or operations. Even if the facility being planned does not involve unusual processes, as might be the case in a conventional business or legal firm, unless one is especially knowledgeable about the day-to-day functions, observing similar facilities is time well spent. This observation falls into the category of case studies and will be discussed further in "Research the Unknowns," later in this chapter.

Many space planning projects require the complete or partial reuse of existing furniture and equipment. Inventorying and dimensioning great quantities of existing furniture and equipment is usually a tedious but necessary procedure.

Establish Architectural Parameters

Ideally, the basic architectural constraints and parameters of a given project should be established during the programming phase so that the relationships between client needs and the qualities of physical space can be considered from the outset. Highly detailed information about the physical setting is not necessary at this early phase of project involvement; too much detail might even get in the way at this point. The basics here are:

1. A base floor plan(s), at a scale large enough to be useful, and accompanied by enough data about mechanical and electrical services so that plumbing constraints, HVAC delivery systems, and primary electrical access points are known
2. Contextual data concerning the basics of architectural, historical, and social factors
3. Building and zoning code requirements in enough detail to avoid basic code violations in general space allocations

Most of the detailed architectural data are not needed until the physical planning and design phases of the project have begun. In some cases, the contextual factors, particularly those related to the human and social environment, will play a major role in determining the conceptual approach to a project. In these instances, significant data gathering and research of the critical contextual factors should become part of the programming process.

Organize Collected Data (First-Phase Program)

After the interviewing and observation tasks have been completed and the basic physical setting information has been acquired, it is time to organize the data accumulated to date. Although it is unlikely that all the necessary project information is known at this point, great value exists in organizing a first-phase program, in which the collected data are put into a useful sequential format, and quantitative factors, such as square footage and furniture

and fixture tabulations, can be easily seen and extracted. This organizational process requires a basic analysis of the client's organizational structure and the project's planning needs. Most importantly, it should identify what is still lacking. What critical information not obtained in the interview process will require additional interview time or research? What conflicts in the given data require investigation? What subtleties in interrelationships have been hinted at but not really defined? What technical equipment and processes need to be researched and more fully understood in order to plan intelligently? These and other questions will arise, requiring investigation and research. Techniques to organize the collected data will be discussed in "Analyze the Data," later in this chapter.

Research the Unknowns

From planning nuance to hard dimensional information, the kinds of gaps in program data described previously should be sought out at this point in the process. As with architectural parameters, too much detail is unnecessary and can even be a hindrance; a lot of dimensional and process data are more appropriate to research later, during the design process. The programmer must draw the line between what is needed to analyze the project and what will be needed later to design the project. Some case study research is often valuable at this stage. Again, complete case study data are unnecessary, but some basic factors on spatial organization, corporate or institutional space standards, circulation percentages, and the like for facilities of similar size and function can provide a realistic comparison and guidelines for the project at hand. For example, enough common factors exist among law offices, medical clinics, or day-care centers to make such information useful. Additional case study research is also useful during the planning and design phases of the project, but its value during the pre-design phase should not be overlooked.

Analyze the Data

With all the informational material now at hand, a comprehensive analysis of the project's planning factors must be made. When a project is large enough to require it, the analysis process might begin with making or adjusting an existing traditional organizational chart, identifying lines of authority, and grouping functions. Beyond this traditional technique, many other analyses should be made:

1. Spatial adjacencies need to be articulated.
2. Working relationships, both inter- and intradepartmental, require identification, including traffic flow of personnel, visitors, and materials.
3. Public and private functions and zones should be identified.
4. Special acoustic requirements should be defined.
5. Needs for natural light, air, and view (more simply, windows) should be evaluated for each function and area.
6. Groupings of facilities requiring plumbing connections should be identified.

These and any other factors that will bear on the space planning process should be understood fully and seen in proper perspective to the whole of the problem.

One planning factor that warrants separate analysis but which is too often overlooked, because it involves time rather than space, is scheduling the use of facilities. An analysis of how space is scheduled for use, coupled with knowledge of moveable partition construction techniques (sliding, folding, coiling, etc.), can result in significantly more efficient and economical use of space.

The format in which the data can be placed varies tremendously. In addition to the collected data, one may also wish to record planning and design thoughts and ideas. Data and ideas can be itemized in a conventional prose paragraph style or in bulleted phrases. Categories of data and ideas can be developed and recorded in related groupings. Charts or matrixes can be developed to further organize the data and ideas. This issue of format is discussed in some depth later in this chapter under the heading "Criteria Matrix."

Interpret and Diagram the Data (Complete Program)

As they relate to programming, a fine line often exists between analysis and interpretation. Despite the similarities in their meaning, value is derived in making a distinction between the terms. "Analysis" here refers to creating an understanding of the problem that is directly deduced from the gathered data, while "interpretation" refers to insights about the problem that have been gained through the unique perspective of the trained designer. Designers often have the opportunity to get to know their clients' needs in great detail and are subsequently able to make penetrating and ingenious interpretations of the programmatic information. Those interpretations are often among the most creative contributions a designer has to offer within the problem-solving process. The nature of the insights gained can range from a relatively small and internal process to a major shift in the client's organizational structure.

Although significant new perspectives cannot be guaranteed, they are not uncommon, since the designer comes to the problem from a fresh, outsider's point of view, unfettered by the history of the client's circumstances, and is asked to see the organization as a whole. From this unique vantage point, the designer can make invaluable evaluations and recommendations, since no one else is in a position to gain that special perspective.

Another form of interpretation that occurs during the programming process is in the translation of the verbal program content into diagrams. The use of this diagramming technique is well established and is a part of many design programs. A wide range of graphic styles is used, and a great deal of verbal terms identify these styles, from "adjacency diagrams" and "bubble diagrams" to "space adjacency studies" and "program analysis studies." Despite the graphic quality of these diagrams, they are still clearly part of the pre-design process, since they are a graphic abstraction of the written program and not an attempt to realistically create a design solution. Particularly with larger-scale projects, diagrams are often drawn of both the entire organizational structure and various segments or departments within the organization. Often a series of diagrams will accompany the written program to provide a comprehensive graphic translation of the verbal document. As every designer knows, the graphic view can say precisely what words may still leave unclear. Later in this chapter, a graphic technique, a relationship diagram, will be described and recommended as an integral part of the pre-design process.

Summarize the Data (Finished Document)

The programming effort must be summarized and documented before moving on to the design phase of the project. In some cases, the program material is recorded in an informal manner and is used only by the designer as an internal design tool; it is not seen or used by others. In most cases, however, particularly in a formal designer-client relationship, the program is finished in a bound document and presented for client approval before the beginning of the design phase of the project. Regardless of format or designer-client relationship, it is necessary to bring the programming process to an appropriate close.

If the programming process has been thorough, the programmer has become completely immersed in or surrounded by the problem and is now able to make an overview statement about the problem as a whole. Whether this is referred to as a "concept statement" or "statement of the problem," significant value exists in crystallizing one's thoughts in a comprehensive verbal perspective of the problem that will precede the detailed program data. This statement should deal with the spirit of the problem, not its details, and represent the broad human, social, aesthetic, and philosophic aspects of the programmer's thoughts concerning the project.

In its final form, the program should be a well-integrated package containing:

1. An overview statement
2. A detailed, function-by-function written program describing all project needs and concerns
3. Diagrams that translate the planning relationships into visual terms
4. Numerical summaries of spatial and furniture and equipment needs as a first indication of project budget factors

When the entire programming process is complete, a great deal has been accomplished. Most importantly, the designer has a complete and documented understanding of the problem. It should be noted that it is not uncommon for the programmer and the designer to be different people; in those cases it is particularly important for the program's language to be clear and free of personalized idiosyncratic words and phrases. The program document is the ideal tool to communicate both broad conceptual issues and the detailed planning concerns of the project to the client. In many cases, client response to the program document may require revisions to the program before the design phase begins. Once the design process has begun, the program serves as the primary guide for space planning and design considerations. Despite this, the program cannot be slavishly followed; many new and worthwhile ideas related to planning and design are likely to emerge during the design process, and it would be foolish to ignore them just because they are not contained in the original program document. As planning and design solutions take form, the program becomes the designer's best evaluation tool for measuring the success of the solution. In other words, has the design solution met the carefully programmed needs or requirements of the program?

CRITERIA MATRIX

Whether the designer has personally compiled the program or has it presented by the client in a completed form, it is typically a multi-page document in a format that is far from ideal for space planning purposes. This is usually true in the classroom also, where students are given a lengthy ver-

bal description of a space planning problem that is difficult to immediately translate into space planning terms. The designer needs a concise and abbreviated format, with program elements organized in a practical sequence, to find information without flipping constantly through many pages of data, and where spaces, rooms, or functions are categorized and grouped in relation to the project's adjacency requirements.

The matrix format is a widely used technique for visually organizing information of a variety of factors that is sometimes referred to s a chart or table. The criteria matrix, described in the following paragraphs, is a useful technique to condense and organize the conventional written design program. It is applicable to both small and large projects and is adaptable to both tight and open time frames or deadlines. When time permits, the matrix can include all the project's design criteria; when time is tight, the format can be condensed to identify only the most critical planning considerations.

BLANK CRITERIA MATRIX ILLUS. 1–1

CRITERIA MATRIX FOR: UNIVERSITY CAREER COUNSELING CENTER	SQ FOOTAGE NEEDS	ADJACENCIES	PUBLIC ACCESS	DAYLIGHT AND/OR VIEW	PRIVACY	PLUMBING	SPECIAL EQUIPMENT	SPECIAL CONSIDERATIONS
①RECEPTION								
②INTERVIEW STA.(4)								
③ DIRECTOR								
④STAFF								
⑤SEMINAR RM								
⑥RESTROOM (2)								
⑦WORK AREA								
⑧COFFEE STATION								
⑨GUEST APARTMENT								

In this context, the word "criteria" refers to the program requirements, and the word "matrix" is best defined as a "rectangular arrangement of elements into rows and columns" (*Webster's New Collegiate Dictionary*). The criteria matrix attempts to verbally and visually organize design program requirements in as concise a form as possible, achieving an overview of the problem in an "at-a-glance" format. In its most basic form, it is a rectangular grid of notation spaces with names of rooms or spaces (or functions) listed in the column to the left, and columns for verbal and/or numerical indications of program requirements in the succeeding columns to the right. A hand-drawn, basic blank matrix for Design Program 2S (see Appendix, page 179) is shown in Illustration 1–1, indicating notation columns for the most critical space planning factors: (1) square footage needs, (2) adjacency requirements, (3) public access, (4) daylight and/or view, (5) privacy needs, (6) plumbing access, (7) special equipment, and (8) special considerations. Turn to page 179 now and read Design Program 2S ("S" stands for "sample") in order to fully understand the structure of the criteria matrix and the many references to Design Program 2S that follow. A format as abbreviated as this can be of great value in making the planning process more efficient, while avoiding the potential for overlooking critical factors.

When time and the designer's interest permit, the criteria matrix can be expanded to include a broader range of factors, including furnishings, HVAC requirements, lighting design, color, materials and finishes, and future planning needs. When appropriate, the privacy factor can be split into two columns, one for "visual privacy" and the other for "acoustic privacy." When project size requires it, rooms or spaces (or functions) can be grouped or clustered in departments or divisions. Further on in this chapter is a demonstration of how the criteria matrix can be used with larger and more complex planning and design problems.

The degree of complexity or completeness of the criteria matrix can be adjusted to meet the needs of the size and scope of the project, as well as the amount of time available. Even when time constraints are unusually tight, the matrix approach can be used as a rapid organizer of basic planning data. The matrix can be hand-drawn or computer-generated with one of many available chart-producing software programs; this is a decision in which time availability and the size and complexity of the design problem are contributing factors. To be more specific, if the designer will come to reasonably quick decisions, a completed criteria matrix for Design Program 2S could be accomplished within a half hour, particularly if the designer develops a legend of letters and/or symbols, as shown in Illustration 1–2. Note that the square footage column has been left blank.

CRITERIA MATRIX: DESIGN PROGRAM 2S

ILLUS. 1–2

CRITERIA MATRIX FOR: UNIVERSITY CAREER COUNSELING CENTER	SQ FOOTAGE NEEDS	ADJACENCIES	PUBLIC ACCESS	DAYLIGHT AND/OR VIEW	PRIVACY	PLUMBING	SPECIAL EQUIPMENT	SPECIAL CONSIDERATIONS
①RECEPTION		②⑤	H	Y	N	N	N	TRAFFIC HUB ADJ. TO MAIN ENTRANCE
②INTERVIEW STA.(4)		① ④	M	I	L	N	N	FEEL LIKE A TEAM OF FOUR
③ DIRECTOR		④	M	Y	H	N	N	HIGHEST IMAGE ACCESS TO REAR DR FOR PRIVATE EXIT
④STAFF		③	M	Y	M	N	N	
⑤SEMINAR RM		①⑥⑦	H	I	H	N	Y	A/V USE IMPORTANT CLOSE TO ENTRANCE
⑥RESTROOM (2)		↑ CENTRAL ↓	M	N	H	Y	N	
⑦WORK AREA		②④ CENTRAL	L	N	M	Y	Y	
⑧ COFFEE STATION		CENTRAL	H	Y	N	Y	Y	CONVENIENT FOR EVERYONE
⑨ GUEST APARTMENT		REMOTE	L	Y	H	Y	N	RESIDENTIAL CHARACTER

LEGEND
H = HIGH
M = MEDIUM
L = LOW
Y = YES
N = NO/NONE
I = IMPORTANT BUT NOT REQUIRED

NOTE: IN "ADJACENCIES" COLUMN ⊗ - INDICATES ADJACENCY IMPORTANCE
⊗ - INDICATES MAJOR ADJACENCY IMPORTANCE

The one aspect of the matrix that involves more than fundamental intellectual analysis is the development of square footage figures. The process for assigning figures to that column is a skill unto itself. Before attempting any of the suggested criteria matrix exercises, it is necessary to understand the critical importance of square footage figures and how they can be quickly approximated.

PROTOTYPICAL PLAN SKETCHES

As one gets further into the space planning process, it will become more obvious why it is important to have reasonably accurate square footage approximations for each room or space before the physical planning process begins. Without explaining any of the details here, suffice it to say that almost all space planning projects have strict budget limitations; consequently, square footage figures have a direct relationship to interior construction and furnishings costs. At this point, let us simply note that if the space-by-space square footage requirements total more than the square footage contained in the building shell, the spaces will not fit within the exterior or demising walls. Conversely, if the space-by-space total is significantly less than the square footage contained in the building shell, the building will be underutilized and is likely also to have awkward and oversized circulation spaces.

For certain kinds of spaces, the square footage column may be filled in with relative ease and speed. For example, if one has considerable experience in office planning, it may be possible to quickly respond to the program description of an executive office, counseling room, or conference room with an estimate of square footage needs. The same may be true of almost any kind of typical space, such as a reception room, kitchen, or public restroom. Generally speaking, accomplished designers can make quick (without sketches or calculations) approximations of square footage needs by using their personal store of past project experiences of a great variety of rooms and functions. But spaces with unique requirements will have to be dealt with differently, as past experience will not help in making quick approximations. And for less experienced designers, particularly at the student level, approximations for many typical rooms or spaces may be difficult.

When past experience will not help, the use of prototypical plan sketches will usually provide the needed information. The word "prototypical" is synonymous with "generalized" or "abstracted," and "sketch" is defined as a quick drawing done for informational purposes only. For example, a design program may call for a director's office with a 36" × 72" desk, a matching credenza, a desk chair, two guest pull-up chairs, lounge seating for four people, and 35 linear feet of bookshelves. Unless one's professional experience provides a quick and certain square footage figure for this room, it is best to take a few minutes to quickly sketch one or more floor plans of such a room to establish approximate size needs, as shown on the left side of Illustration 1–3. Keep in mind that these quickly drawn sketch plans are not intended to be directly incorporated in the floor plan, but are meant primarily to serve as generators of square footage requirements.

If drawn by hand, almost any kind of paper and drawing tool are acceptable for this purpose (probably a roll of sketch tracing paper and a medium-weight pencil are best), and drawing quality is not an issue. Some designers find that working over a ⅛" or ¼" grid paper background (or directly on grid paper) is helpful to keep the plan sketches quick and reasonably proportional. But don't be too careful in making these sketches, since their use is limited; it is even unnecessary to work in a particular scale, as long as one keeps track of the dimensional factors. If the sketch is computer-drawn, as shown on the right side of Illustration 1–3, the same principles related to drawing style, quality, and accuracy apply. The inherent accuracy of computer drawings can be a negative quality in this particular process, leading to unnecessary and deceptively finished-looking sketches.

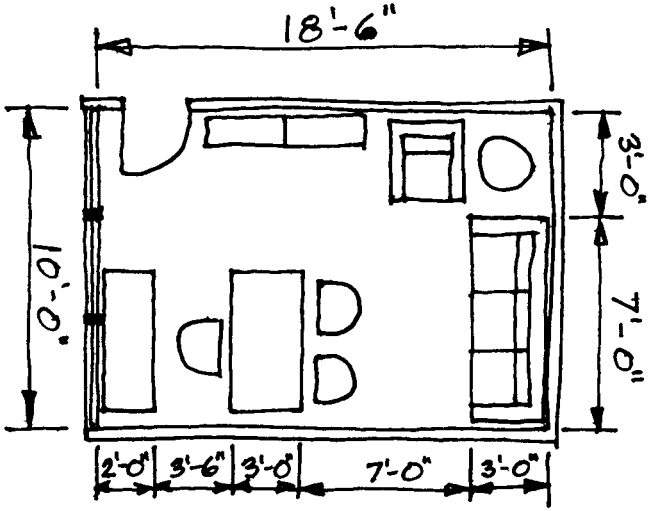
It should be obvious that a basic knowledge of typical furniture sizes, arrangements, and dimensional relationships between individual pieces of furniture is essential here; otherwise, one cannot work with appropriate speed. Many interior designers tend to work in only one aspect of the field (residential, hospitality, offices, health care, etc.); if a designer finds him- or herself working outside of his or her accustomed area of expertise, familiarization with a new set of furniture standards may be necessary. Certainly for students, whose knowledge base is less complete, regular referral to standard reference sources and furniture catalogs will be required. Specific exercises given in Chapter 6 are designed to bolster those skills.

To demonstrate the use of the prototypical plan sketch technique, Illustrations 1–4A and 1–4B, each developed by a different designer, provide several examples. These sketches are for rooms and spaces described in Design Program 2S and have been reduced from their original size so that more examples could be shown.

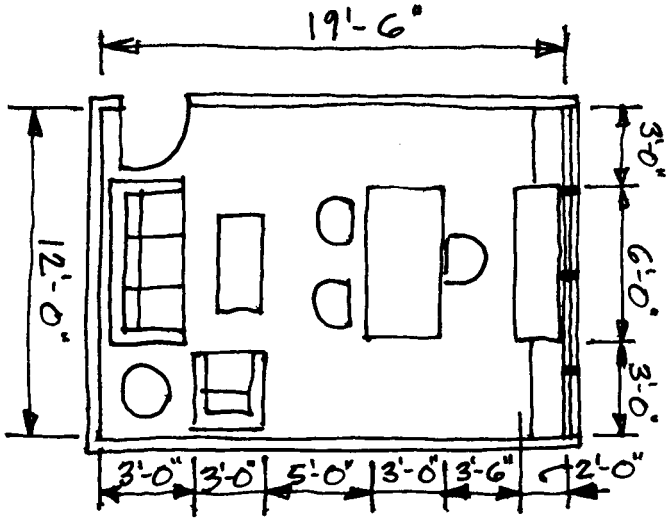
An additional advantage, beyond the value of approximating square footage needs, that derives from producing prototypical plan sketches during the pre-design phase of a project. is the development of an intuitive sense of the specific needs of each space, providing a feel for better room proportions (square, or a long and narrow rectangle), window locations, door access points, and internal furniture and equipment relationships within each space.

PROTOTYPICAL PLAN SKETCHES: DIRECTOR'S OFFICE

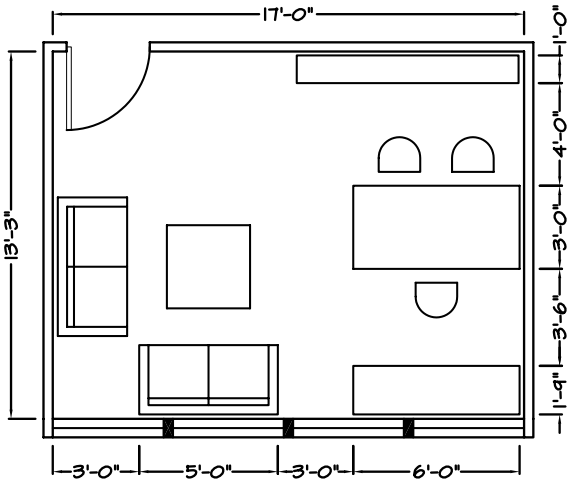
ILLUS. 1–3



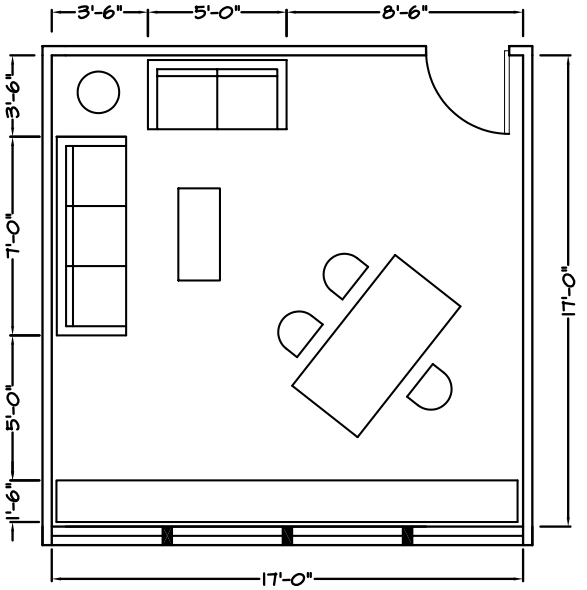
185 ф



234 ф



225 ф



290 ф