1

Planning Methodology

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; identifying important sustainability factors; 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 are clients with considerable experience in space planning, and who may also have an in-house facilities manager or staff. They may present the designer or architect with 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, you are relieved of the responsibility of data gathering, organization, and analysis. Obviously, the designer must fully absorb and understand the design problem or program that is presented, and may need to perform some tasks of program interpretation. These issues are discussed later in this chapter.

There is a wide 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 the discussion. 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 a real client or program situation 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. Although useful as a learning tool for students, these exercises lack the dynamics of personal interchange with a client and also ignore such real problems as internal conflicts in the client's organization, corporate mergers or takeovers, changes in management personnel, budget constraints, green rating systems, and dealings with building code administrators—all of which exist in professional 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. Even with these simulations, 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 add unexpected and challenging elements to the space planning process when students 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 you (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, no unified terminology is used universally or accepted by professionals in the field. 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 generally have been learned in a mentorship mode, at the drawing board or the 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. The text presents a simple and workable method succinctly so as to move on quickly to the physical planning phase. You 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 you will face as a professional. 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 are defined thoroughly, and potential conflicts with other terminology common to the field are identified.

THE SYNTHESIS GAP

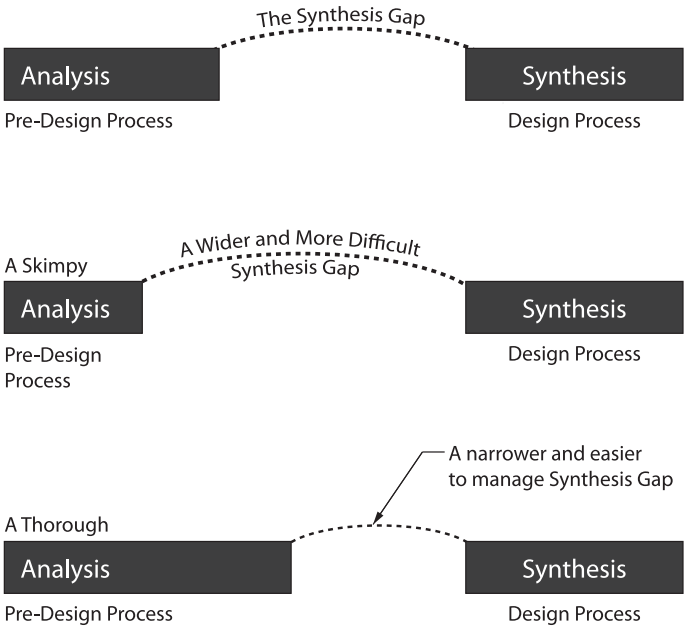
Among professionals working in the field, a generally accepted process or sequence of tasks occurs from the point at which the planner begins to work on a project to the point at which project analysis is complete and the physical planning process begins. Despite many variations in technique or terminology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

1. Interview
   - **a.** Executive level (organizational overview)
   - **b.** Managerial level (departmental function)
   - **c.** Operations 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 environmental and code constraints
   d. Complete basic site inventory (sun angles, breeze directions, and rainfall amounts)
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 (furniture, fixtures and equipment) 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, environmental, structural, mechanical, sustainability, 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 image/esthetic, and sustainability goals)
   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 to serve as the designer's manual for space planning

The analytical process just described 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 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 pre-design 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 the first physical plan solution is the most difficult single step in the process. If the pre-design process is very thorough, it may bring you, 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 is referred to as the "synthesis gap," and it might best be visualized graphically, as shown in Illustration 1–1.



Illus. 1–1 Synthesis gap

From a practical, professional setting viewpoint, you need 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 a completely impractical approach. You need a well-established design methodology 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 the 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 be 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 facing 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 clients' or the users' needs for a given project. In addition, most design programs are accompanied by adjacency or relationship diagrams that often express physical planning relationships more articulately than verbal descriptions. Although 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 your first attempts. After repeated experience, the skills required for interviewing, observation, research, analysis, and documentation become well honed, and then you will be 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 and/or addition without interviewing family members 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 often is dictated by the client and not left to the designer's discretion.

It is essential to be prepared with an organized and consistent set of questions—winging it just does not 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 you and the 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 acquisition and development 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 you 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. Although the instructive literature concerning this

observational technique is limited, enough exists to assist 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 you are 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 is discussed further in the section titled "Research the Unknowns" later in this chapter.

The observation process also allows you to see how the existing spaces relate to the surrounding environment. For example, do high levels of glare or heat gain in some spaces make workers feel uncomfortable? Do some people feel cold quite often? Are employees opening the windows?

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.

Establishing Environmental and Architectural Parameters

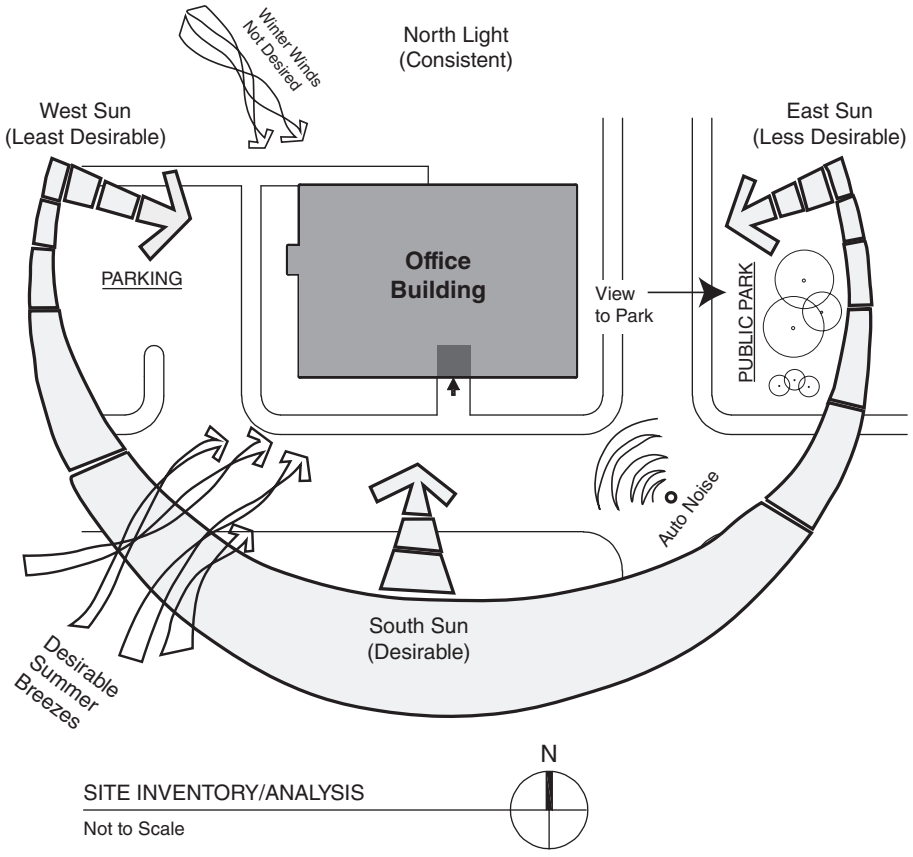
Ideally, the basic architectural constraints and parameters of a given project should be established during the programming phase so that you can consider the relationships between client needs and the qualities of physical space from the outset. Highly detailed information about the physical setting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

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; heating, ventilating, and air-conditioning; heating, ventilation, and air-conditioning (HVAC) delivery systems, and primary electrical access points are known
2. Contextual data concerning the basics of architectural, historical, and social factors and of environmental factors, such as sun angles, directional breezes and rainwater amounts
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, 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.

In many cases, a simple site analysis drawing, such as the one shown in Illustration 1–2, is completed early in the process to serve as a reminder of some of the environmental and contextual factors that will shape the design. For example, the southern orientation is considered favorable, as shown in the illustration. Indication of the direction of summer/winter breezes, favorable or unfavorable views, and existing natural conditions, such as large trees or bodies of water, is also recommended.



Illus. 1–2 Site inventory and analysis

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 you know all the necessary project information 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 important, this process 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 are discussed in the section titled "Analyze the Data," later in this chapter.

Research the Unknowns

At this point in the process, attempt to fill the gaps in program data, from planning nuance to hard dimensional information. 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. You must draw a line between what you need to analyze the project and what you will need later to design the project. Some case study research is usually 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 realistic comparison guidelines for the project at hand. For example, enough common factors exist among law offices, medical clinics, and day-care centers to make such information useful. During this process, it is often valuable to include information on cost/budget and time frame factors in case study explorations. Additional case study research is also useful during the planning and design phases of the project, but do not overlook its value during the pre-design phase. When looking at sustainability considerations, it is useful to identify effective sustainable design strategies that could be used in the project.

Analyze the Data

With all the informational material now at hand, you must make a comprehensive analysis of the project's planning factors. 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. Articulate spatial adjacencies.
2. Identify working relationships, both inter- and intradepartmental, including traffic flow of personnel, visitors, and materials.
3. Identify public and private functions and zones.
4. Define special acoustic requirements.
5. Evaluate needs for natural light, air, and view (more simply, windows) for each function and area.
6. Identify groupings of facilities requiring plumbing connections.
7. Determine which sustainability factors are of greatest importance and recommend specific strategies, particularly those related to budget and timeline concerns.

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 that 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 flexible and/or operable 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, record your thoughts on planning and design ideas. Data and ideas can be itemized in a conventional prose paragraph style or in bulleted lists. Develop and record categories of data and ideas in related groupings. Develop charts or matrixes 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)

A fine line often exists between analysis and interpretation as they relate to programming. Despite the similarities in the meaning of these terms, value is derived in making a distinction between them. "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 subsequently are 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 a client's organizational structure.

Although significant new perspectives cannot be guaranteed, they are not uncommon, since you, the designer, comes to the problem from a fresh, outsider's impartial point of view, unfettered by the history of the client's circumstances, and are asked to see the organization as a whole. From this unique vantage point, you 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 many terms are used to 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 create a

realistic design solution. Particularly with larger-scale projects, diagrams often are drawn of both the entire organizational structure and various segments of departments within the organization. Often a series of diagrams accompanies the written program to provide a comprehensive graphic translation of the verbal documentation. As every designer knows, the graphic view can say precisely what words may leave unclear. Later in this chapter, a graphic technique, the Relationship Diagram, is described and recommended as an integral part of the pre-design process.

Summarize the Data (Finished Document)

You must summarize and document the programming effort 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, which is not seen or used by others. In most cases, however, particularly in a formal designer-client relationship, the program is presented in a formal bound document for client approval before beginning 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, you should now be 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 your 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 your thoughts concerning the project.

It 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, furniture, and equipment needs as a first indication of project budget factors

When the entire programming process is complete, you have accomplished a great deal. Most important, you have 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 to the client both broad conceptual issues and the detailed planning concerns of the project. 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 should not be followed

rigidly; 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 your best evaluation tool for measuring the success of the solution. In other words, you use the program to assess whether the design solution has met the carefully programmed needs or requirements.

Project budget/cost and length of time for construction, although not included in the programming process presented in this textbook, are critical factors in the overall pre-design process. Ideally, the interior design component of any building project is undertaken early, in collaboration with everyone from technical and design consultants and estimators, to contractors and construction managers. It is this kind of rigorous collaboration that ensures a successful end result.

CRITERIA MATRIX

Whether you have personally compiled the program or the client presents it to you in a completed form, it is typically a multipage 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 written description of a space planning problem, including square footage numbers that are difficult to translate immediately into space planning terms. You need 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 and numbers 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; this format is sometimes referred to as 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 either tight or open time frames or deadlines. When time permits, the matrix can include all of the project's design criteria; when time is tight, the format can be condensed to identify only the most critical planning considerations.

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." 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, the matrix 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 ("S" stands for "sample"; see Appendix B, page 193) is shown in Illustration 1–3, indicating

CRITERIA MATRIX UNIVERSITY CAREER COUNSELING CENTER	SQ. FOOTAGE	ADJACENCIES	PUBLIC ACCESS	DAYLIGHT	PRIVACY	PLUMBING	SPECIAL EQUIPMENT	SPECIAL CONSIDERATNS	SUSTAINABLE FACTORS
① RECEPTION									
② INTERVIEW									
③ DIRECTOR									
④ STAFF									
⑤ SEMINAR									
⑥ RESTROOMS									
⑦ WORK AREA									
⑧ COFFEE									
⑨ GUEST SUITE									
⑩ MECHANICAL									

Illus. 1–3 Blank criteria matrix.

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, (8) sustainability factors, and (9) special considerations. Now read Design Program 2S in order to fully understand the structure of the criteria matrix and the many references to this design program 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 your interest permit, you can expand the criteria matrix to include a broader range of factors, including furnishings, environmental concerns, HVAC requirements, lighting design, color, materials and finishes, and future planning needs. When appropriate, you can split the privacy factor into two columns, one for "visual privacy" and the other for "acoustic privacy." When project size requires it, you can group or cluster rooms or spaces (or functions) in departments or divisions. Later in this chapter is a demonstration of how the criteria matrix can be used with larger and more complex planning and design problems (see pages XXX–XXX).

The degree of complexity or completeness of the criteria matrix can be adjusted to the size and scope of the project as well as to 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; time availability and the size and complexity of the design problem are contributing factors to this decision. To be more specific, if you will come to reasonably quick decisions, a completed short form criteria matrix (either hand drawn or digital) for Design

CRITERIA MATRIX UNIVERSITY CAREER COUNSELING CENTER	SQ. FOOTAGE	ADJACENCIES	PUBLIC ACCESS	DAYLIGHT	PRIVACY	PLUMBING	SPECIAL EQUIPMENT	SPECIAL CONSIDERATIONS	SUSTAINABLE FACTORS
① RECEPTION		② ⑤	H	Y	N	N	N	TRAFFIC HUB ADJ. TO ENTRY	LT. COLOR SURFACES REFLECT DAYLIGHT
② INTERVIEW		① ④	M	I	L	N	N	FEEL LIKE A TEAM OF 9	LT. COLOR SURFACES REFLECT DAYLIGHT
③ DIRECTOR		④	M	Y	H	N	N	HIGHEST IMAGE PRIVATE/REAR EXIT	
④ STAFF		③	M	Y	M	N	N		
⑤ SEMINAR		① ⑥ ⑦	H	I	H	N	Y	A/V USE CLOSE TO ENTRY	DIMMABLE LED LTG.
⑥ RESTROOMS		CENTRAL	M	N	H	Y	N		LOW FLOW PLUMB'G MOTION SENSORS
⑦ WORK AREA		② ④ CENTRAL	L	N	M	Y	Y	ADD PLANTS TO CLEAN AIR	
⑧ COFFEE		CENTRAL	H	Y	N	Y	Y	CONVENIENT FOR EVERYONE	RECYCLING BIN
⑨ GUEST SUITE		REMOTE	L	Y	H	Y	N	RESIDENTIAL CHARACTER	ENERGY STAR REFRIGERATOR
⑩ MECHANICAL		REMOTE	N	Y	Y	Y	Y		SOUND ATTENUATION

Illus. 1–4 Criteria matrix by hand

Program 2S could be accomplished within a half hour, particularly if you develop a legend of letters and/or symbols, as shown in Illustration 1–4. Note that the square footage column has been left blank.

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 you get further into the space planning process, it becomes 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, 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.

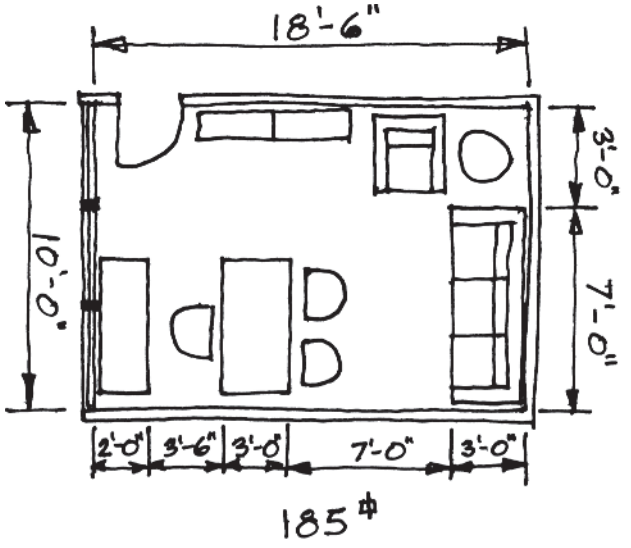
For certain kinds of spaces, you can fill in the square footage column of the matrix with relative ease and speed. For example, if you have considerable experience in

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 with a great variety of rooms and functions. But spaces with unique requirements 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, the square footage for many typical rooms or spaces can be difficult to estimate.

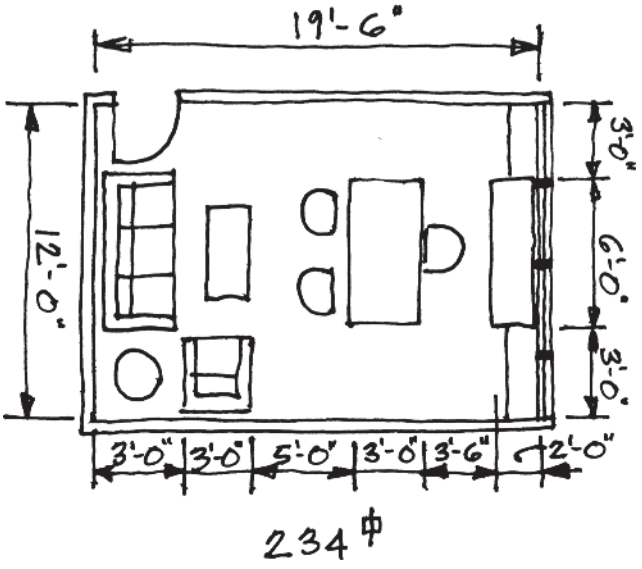
When past experience will not help, prototypical plan sketches usually provide the needed information. The word "prototypical" is synonymous with "generalized" or "abstracted," and "sketch" is defined as a quick drawing done for informational purposes only. For example, a design program may call for 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 your professional experience provides a quick and certain square footage figure for this room, it is best to take a few minutes to sketch at least two or three floor plans to establish approximate size needs, as shown in Illustration 1–5. Keep in mind that these quickly drawn sketch plans are not intended to be incorporated directly in the floor plan but are meant primarily to serve as generators of square footage requirements. The recommendation to sketch two or three room plans is to provide a range of sizes needed to satisfy program requirements for the space in question. Typically these square foot numbers are averaged, and the resulting value is then used in the Square Footage Needs column of the criteria matrix.

If the plan sketches are drawn by hand, you can use almost any kind of paper and drawing tool (probably a roll of sketch tracing paper and a medium-weight pencil are best (H or HB recommended), 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 not even necessary to work in a particular scale, as long as you keep track of the dimensional factors. If the sketch is computer drawn, as shown in Illustration 1–6, 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, you 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 designers work outside of their accustomed area of expertise, familiarization with

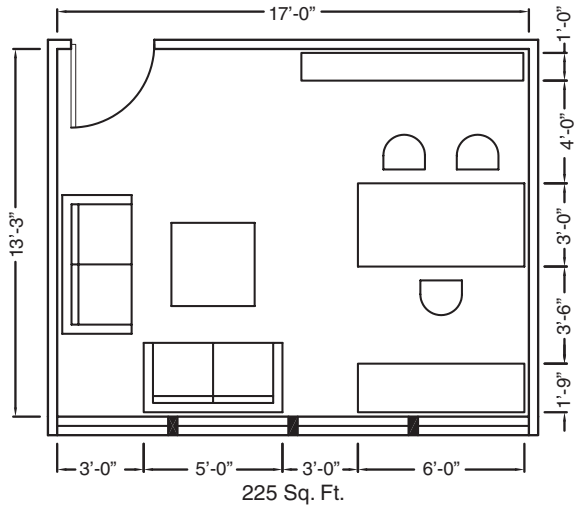


(a)

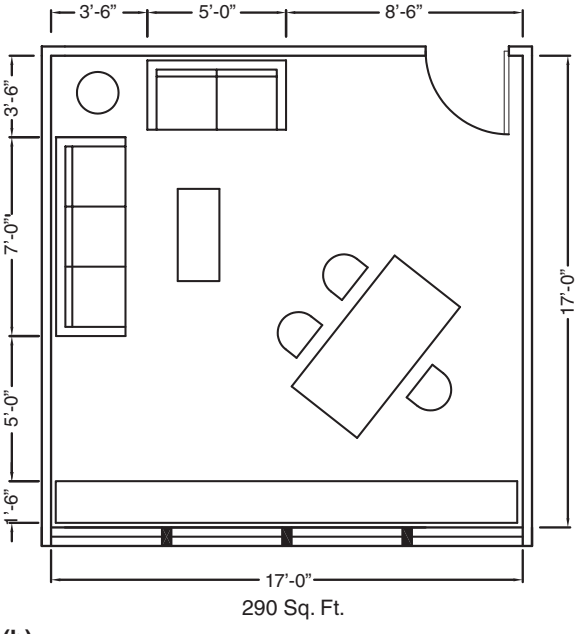


(b)

Illus. 1-5 Prototypical plan sketches of office drawn by hand



(a)



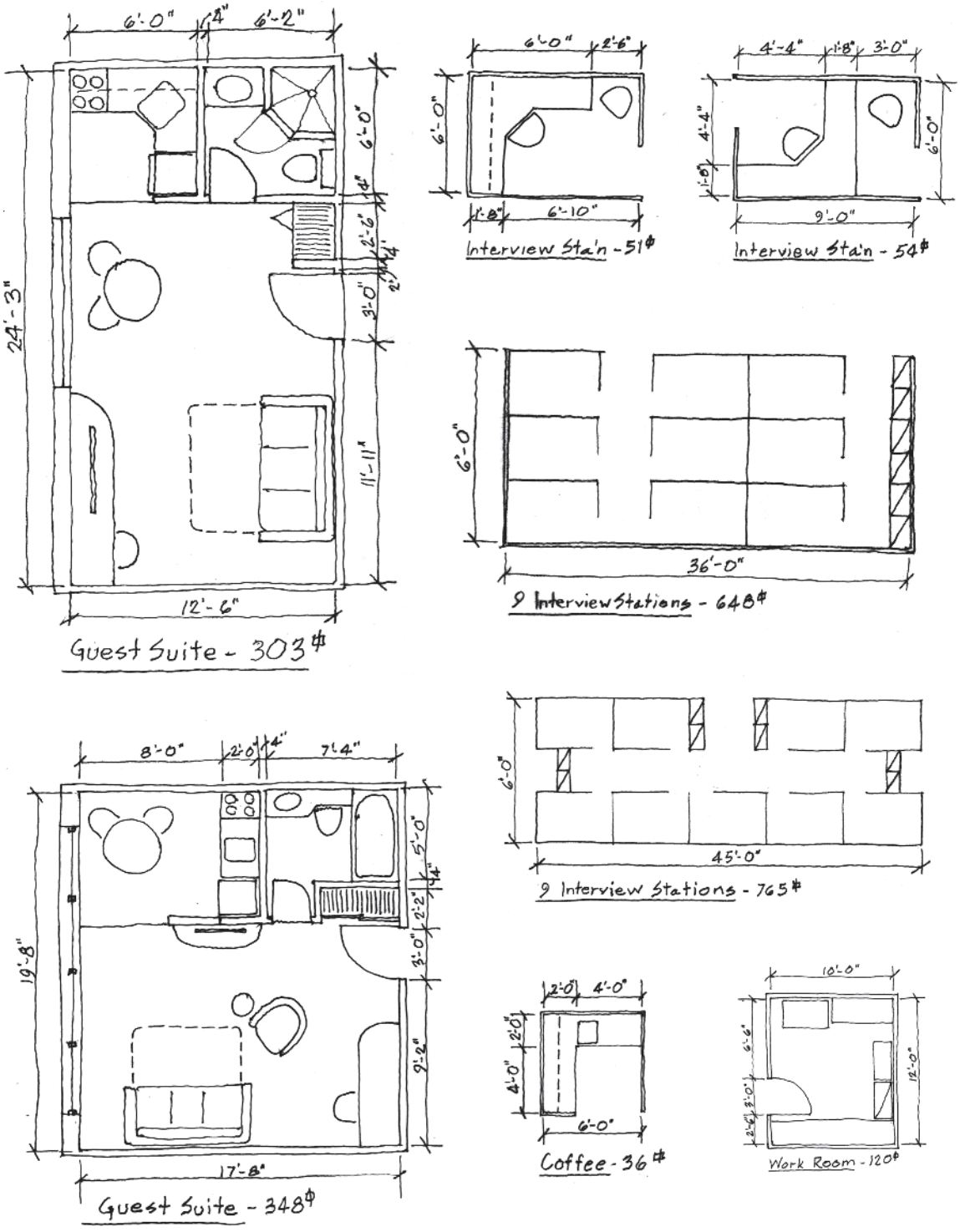
(b)

Illus. 1-6 Prototypical plan sketches of office drawn by CAD

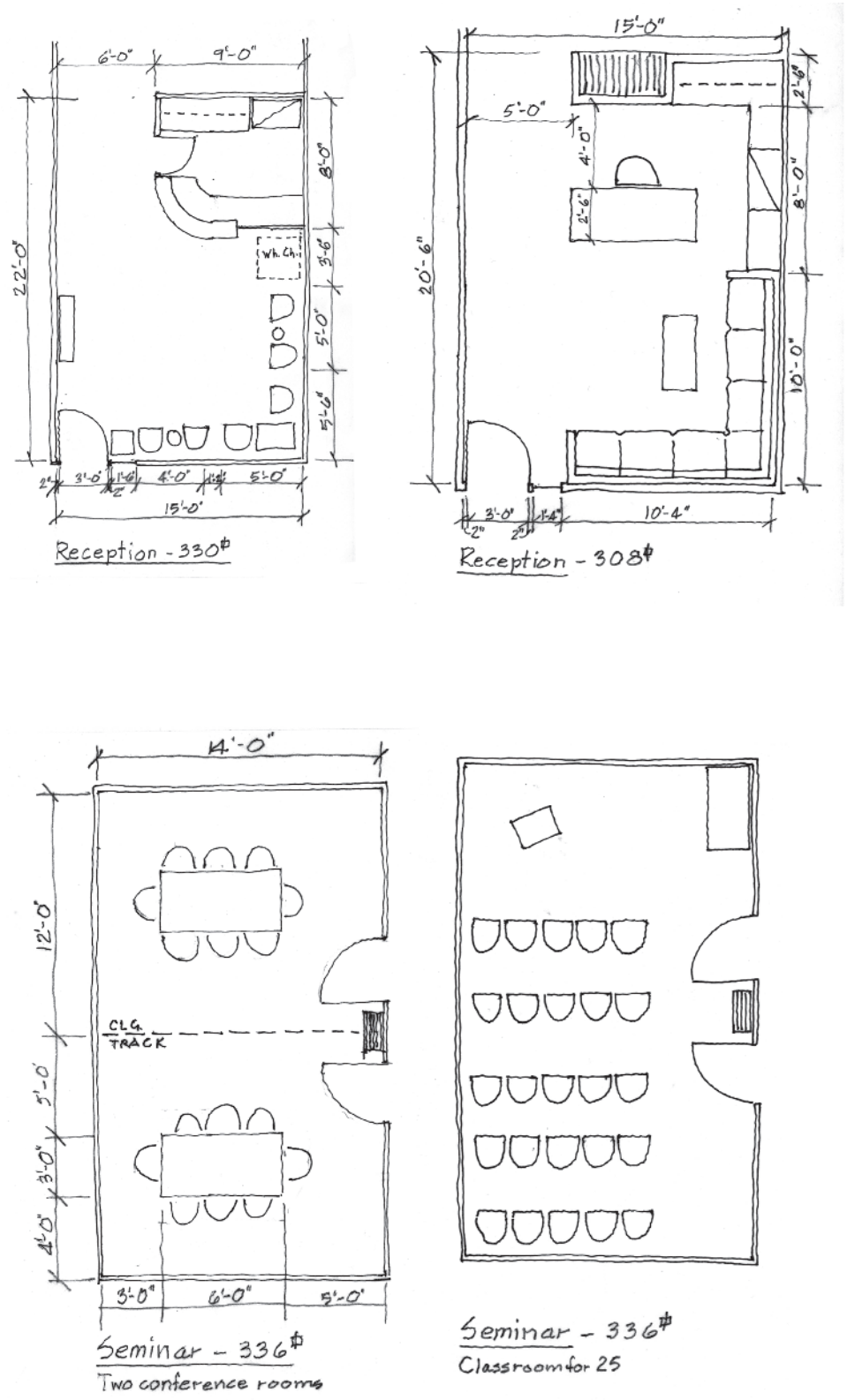
a new set of furniture standards may be necessary. Certainly for students, whose knowledge base is less complete, regular referral to standard reference sources and furniture catalogs will be required. Specific exercises given in Chapter 6 are designed to bolster those skills.

To demonstrate the use of the prototypical plan sketch technique, Illustrations 1–7 through 10, 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.

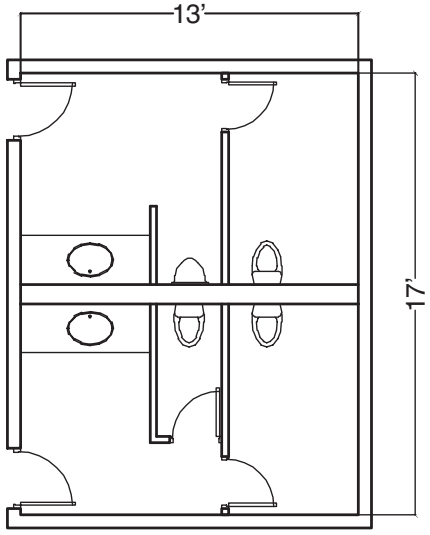
An additional advantage that derives from producing prototypical plan sketches during the pre-design phase of a project, beyond the value of approximating square footage needs, is the development of an intuitive sense of the specific needs of each space. This sense will give you a feel for better room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



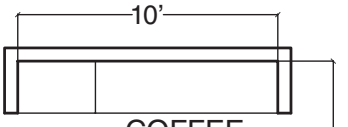
Illus. 1-7 Hand prototypicals sheet 1



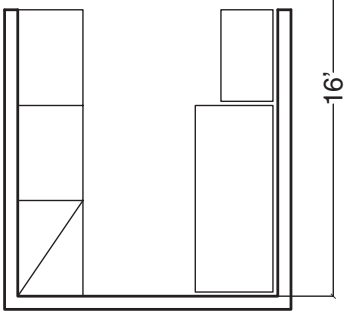
Illus. 1-8 Hand prototypicals sheet 2



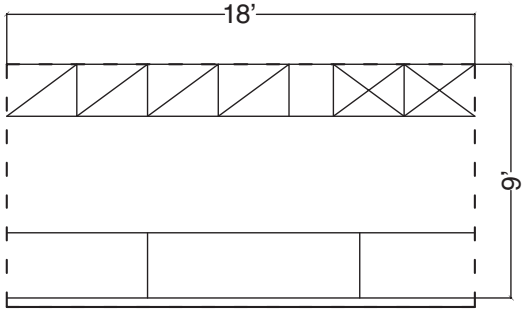
RESTROOM 220 sq.ft



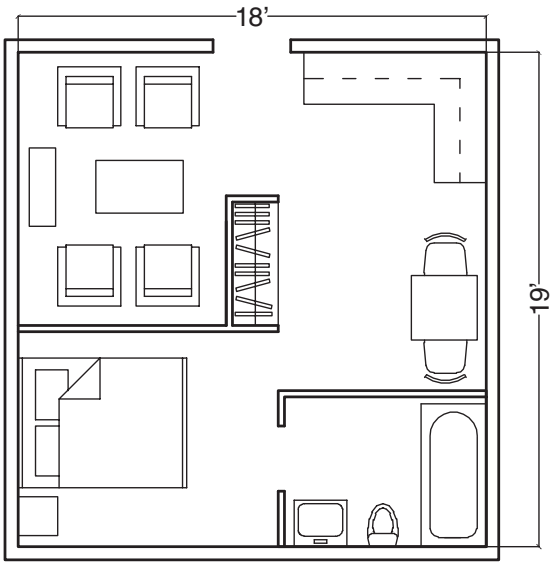
COFFEE



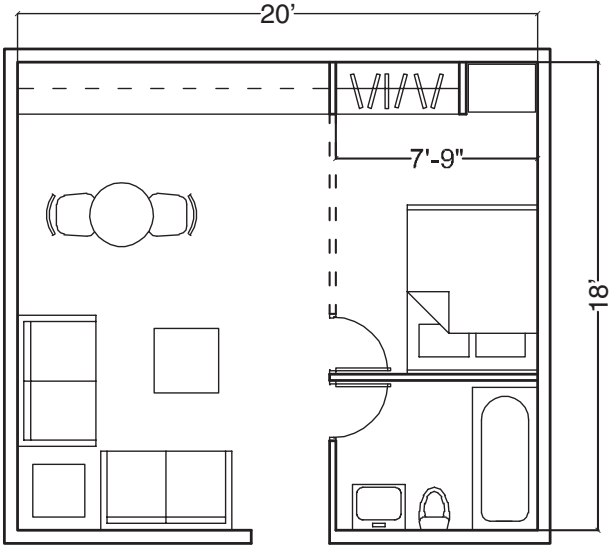
WORK AREA + COFFEE
160 sq.ft



WORK AREA + COFFEE
162 sq.ft

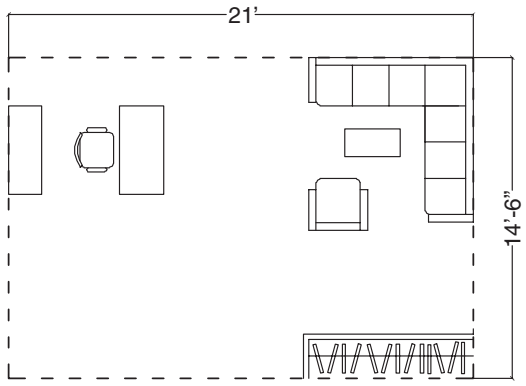


GUEST SUITE 340 sq.ft

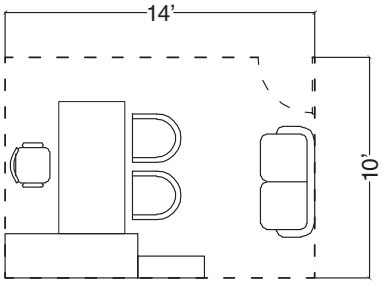


GUEST SUITE 360 sq.ft

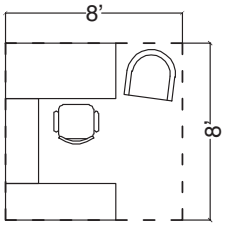
Illus. 1-9 CAD prototypicals sheet 1



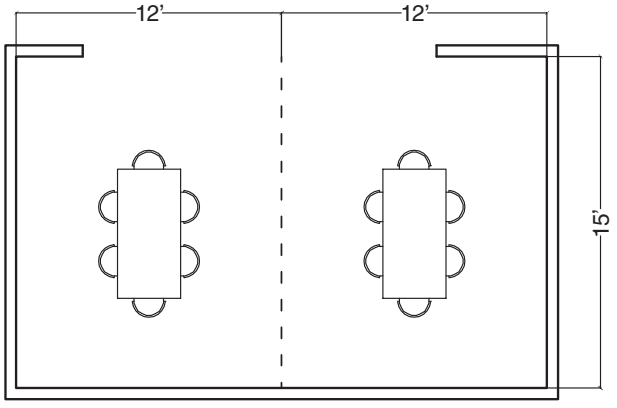
RECEPTION 305 sq.ft



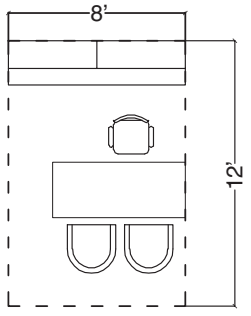
DIRECTOR 140 sq.ft



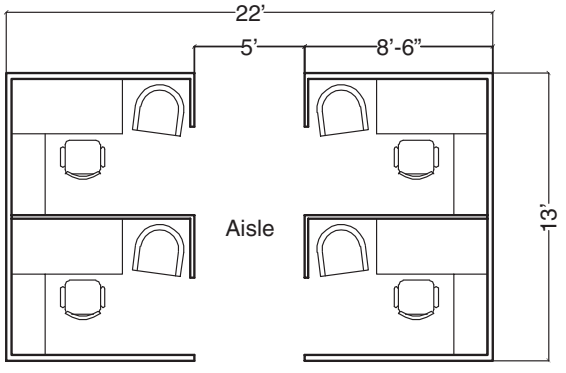
ADMIN ASS'T 64 sq.ft

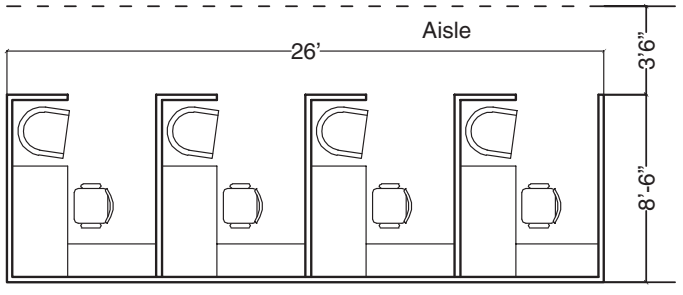


SEMINAR 360 sq.ft



ASST. DIRECTOR 96 sq.ft





Illus. 1-10 CAD prototypicals sheet 2

To work quickly and efficiently with this pre-design technique takes considerable practice. Under conventional professional conditions, prototypical plan sketches are accomplished quickly, since they are generally left as an unfinished product developed for informational purposes only. On some occasions sketches may be refined and then serve as corporate or institutional standards for a particular organization, but studies of that kind are usually full-blown projects of their own.

If you are working digitally, a "library" of typical furniture types, including their dimensions, in CAD format is included in the Digital Supplement of this textbook.

The furniture library is provided so that you may select furniture images and incorporate them in your prototypical plan sketches.

EXERCISE 1–1

Using the design programs provided in the appendix and the digital matrix blank form provided in the digital supplement, develop a criteria matrix for at least one or two of the 1500-square-foot and 2500-square-foot problems, including the square footage column and any prototypical plan sketches required. Create these matrixes in an unhurried manner so that the exercise provides a meaningful learning experience. Save these matrixes for use in other exercises recommended later in this chapter as well as in chapters 2, 6, and 7.

COMPLETING THE CRITERIA MATRIX

With the prototypical plan sketches completed, it is time to go back to the criteria matrix and fill in the square footage column for those spaces where you were unable to estimate size based on previous planning and design experience. But even with this accomplished, an element is still missing in the square footage figures—the space needed for circulation (halls, corridors, vestibules, etc.) and partition thickness.

For most nonresidential interior facilities, a factor of 25 to 33 percent of the square footage total for all required spaces will be a reasonably accurate estimate of the space needed for circulation and partitions. An absolutely reliable factor for this element does not exist: It will vary from project to project, depending on the configuration and construction of the building shell and the nature of the functions to be performed in the space. In general terms, when building or space configurations are complex, structural spans are short (with interiors having closely spaced columns or bearing walls); when functional planning requirements demand a lot of separate spaces (such as offices, examining rooms, or lab booths), it is likely that the circulation or partition factor will be higher than normal. Only extensive experience in space planning will permit a designer to make an educated guess at what the factor might be for any specific user or building situation. The definition of "space" for interior planning purposes can take many forms, particularly in the real estate industry. Terms such as "gross," "usable," and several others must be defined when working in these contexts. For the purposes of this book, a simple square foot number measured inside exterior and demising walls is used, with the circulation factor as part of the total. A 25 percent factor is practical for most space planning problems because it permits you to err on the side of safety; it is recommended for use with the space planning exercises accompanying this text.

Until this point in the pre-design process, it has not been necessary to know the size of the available space. With the criteria matrix now complete, it is time to use an architectural scale and measure and calculate the usable interior square footage available within the building shell. After you have determined the available square footage, calculate 75 percent of the available square footage; that result should be approximately equal to the total square footage of all the spaces listed in the criteria matrix. Another approach to this calculation that will bring the same result is to divide the total square footage of all the spaces in the criteria matrix by 3 and add

the result to the square footage total (or 1.33 × total square footage); this result should approximately equal the usable square footage available within the building shell. A demonstration of these alternate methods is included in the digital supplement. An allowance or tolerance of approximately 5 percent in either direction is usually workable; however, an adjustment in the square footage column figures (up or down) likely will be required to attain a fairly close match between space needed and space available. Your first attempts at "juggling" the square footage numbers may seem difficult and tedious; as with all aspects of the space planning process, experience will permit you to accomplish this awkward trial-and-error numbers game easily and quickly. The matching of required and available square footage is an essential part of the process, since a significant mismatch between the estimated amount of space required and the actual amount of space available will make the physical planning process very difficult. Using the square footage numbers arrived at in the prototypical plan sketches shown in Illustrations 1–5 and 1–6, the square footage column in the criteria matrix for Design Program 2S has been completed in Illustration 1–11. With a 25 percent circulation factor added, the square footage total (3,245 square feet) compares favorably with the square footage available in Building Shell 2S (3,250 square feet). The use of program/building shell combination 2S for illustrative demonstrations will continue throughout the text.

CRITERIA MATRIX: DESIGN PROGRAM 2S
(WITH SQ.FOOTAGE NEEDS)

DESIGN PROGRAM 2S

CRITERIA MATRIX FOR: UNIVERSITY CAREER COUNSELING CENTER	SQ. FOOTAGE NEEDS	ADJACENCIES	PUBLIC ACCESS	DAYLIGHT AND/OR VIEWS	PRIVACY	PLUMBING	SPECIAL EQUIPMENT	SPECIAL CONSIDERATIONS	SUSTAINABLE FACTORS
① RECEPTION	330	② ⑤	H	Y	N	N	N	TRAFFIC HUB ADJ. TO MAIN ENTRANCE	USE LIGHT COLORED SURFACES TO REFLECT DAYLIGHT
② INTERVIEW ST. (9)	600	① ④	M	I	L	N	N	FEEL LIKE A TEAM OF NINE	USE LIGHT COLORED SURFACES TO REFLECT DAYLIGHT
③ DIRECTOR	110	④	M	Y	H	N	N	HIGHEST IMAGE ACCESS TO REAR DR FOR PRIVATE EXIT	
④ STAFF	160	③	M	Y	M	N	N		
⑤ SEMINAR RM.	330	① ⑥ ⑦	H	I	H	N	Y	A/V USE IMPORTANT CLOSE TO ENTRANCE	DIMMABLE LED LIGHTING
⑥ RESTROOM (2)	210	CENTRAL	M	N	H	Y	N		LOW FLOW FIXTURES MOTION SENSORS FOR LIGHTS
⑦ WORK AREA	120	② ④ CENTRAL	L	N	M	Y	Y		ADD PLANTS TO HELP CLEAN THE INDOOR AIR
⑧ COFFEE STATION	30	CENTRAL	H	Y	N	Y	Y	CONVENIENT FOR EVERYONE	ADD RECYCLING BIN
⑨ GUEST SUITE	300	REMOTE	L	Y	H	Y	N	RESIDENTIAL CHARACTER	ENERGY STAR REFRIGERATOR
⑩ MECHANICAL EQUIPMENT	180	REMOTE	N	Y	Y	Y	Y		SOUND ATTENUATION

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

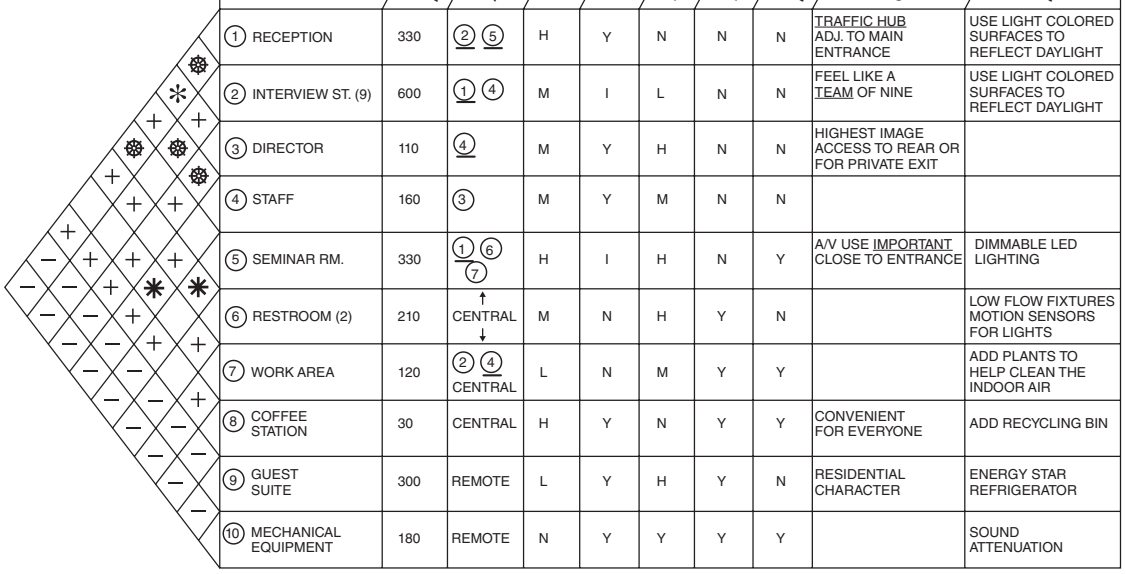
TOTAL NEEDED = 2370 S.F.
3250 S.F. - 815 S.F. = 2435 S.F.

TOTAL AVAILABLE = 3250 S.F.
LESS 25% FOR CIRCULATION = 815 S.F.

NOTE: IN "ADJACENCIES" COLUMN (X) - INDICATES ADJACENCY IMPORTANCE
(X) - INDICATES MAJOR ADJACENCY IMPORTANCE

Illus. 1–11 Criteria matrix with square feet.

COMPLETED CRITERIA MATRIX WITH ADDED ADJACENCY MATRIX
DESIGN PROGRAM 2S



CRITERIA MATRIX
FOR:
UNIVERSITY CAREER
COUNSELING CENTER

	SQ. FOOTAGE NEEDS	ADJACENCIES	PUBLIC ACCESS	DAYLIGHT AND/OR VIEWS	PRIVACY	PLUMBING	SPECIAL EQUIPMENT	SPECIAL CONSIDERATIONS	SUSTAINABLE FACTORS
1 RECEPTION	330	2 5	H	Y	N	N	N	TRAFFIC HUB ADJ. TO MAIN ENTRANCE	USE LIGHT COLORED SURFACES TO REFLECT DAYLIGHT
2 INTERVIEW ST. (9)	600	1 4	M	I	L	N	N	FEEL LIKE A TEAM OF NINE	USE LIGHT COLORED SURFACES TO REFLECT DAYLIGHT
3 DIRECTOR	110	4	M	Y	H	N	N	HIGHEST IMAGE ACCESS TO REAR OR FOR PRIVATE EXIT	
4 STAFF	160	3	M	Y	M	N	N		
5 SEMINAR RM.	330	1 6 7	H	I	H	N	Y	A/V USE IMPORTANT CLOSE TO ENTRANCE	DIMMABLE LED LIGHTING
6 RESTROOM (2)	210	CENTRAL	M	N	H	Y	N		LOW FLOW FIXTURES MOTION SENSORS FOR LIGHTS
7 WORK AREA	120	2 4 CENTRAL	L	N	M	Y	Y		ADD PLANTS TO HELP CLEAN THE INDOOR AIR
8 COFFEE STATION	30	CENTRAL	H	Y	N	Y	Y	CONVENIENT FOR EVERYONE	ADD RECYCLING BIN
9 GUEST SUITE	300	REMOTE	L	Y	H	Y	N	RESIDENTIAL CHARACTER	ENERGY STAR REFRIGERATOR
10 MECHANICAL EQUIPMENT	180	REMOTE	N	Y	Y	Y	Y		SOUND ATTENUATION

LEGEND:
H = HIGH
M = MEDIUM
L = LOW
Y = YES
N = NO/NONE
I = IMPORTANT BUT NOT REQUIRED
❁ = IMMEDIATELY ADJACENT
✱ = IMPORTANT ADJACENCY
+ = REASONABLY CONVENIENT
– = REMOTE

TOTAL NEEDED = 2370 S.F.
3250 S.F. – 815 S.F. = 3435 S.F.

TOTAL AVAILABLE = 3250 S.F.
LESS 25% FOR CIRCULATION = 815 S.F.

Illus. 1–12 Criteria matrix with square feet and adjacency.

A variation to the criteria matrix that some designers find useful can be made with just a little extra time. Probably the most widely used matrix technique among space planners is the adjacency matrix. Although limited to defining the adjacency aspects of the program data, its graphic qualities can be very useful. With a simple addition to the left of the criteria matrix, this graphic approach to visualize the adjacency factors of the design program can become a valuable supplement to the other factors already accounted for in the matrix. Illustration 1–12 demonstrates the ease with which this technique can be accomplished, using a very basic set of legend symbols to articulate the relative levels of adjacency importance.

To summarize the value of the criteria matrix as a space planning tool, four important elements of the process have been accomplished:

1. The basic program elements have been considered, evaluated, and organized for planning purposes.
2. This analysis has been put into a quick reference format.
3. If referenced regularly in the planning process, the matrix ensures thoroughness and attention to detail.
4. The matrix becomes an excellent evaluation tool at the completion of the space planning process to check the ability of the finished solution to fulfill the design program requirements.

To demonstrate how the criteria matrix can be employed effectively as a predesign tool for larger and more complex planning and design problems, including those that require departmental categorization, Illustration 1–13 shows the first

ELECTRONIC DISTRIBUTORS, INC. BUILDING & DESIGN PROGRAM

Department	Exterior					
Space	**Street Entrance**	**Parking**	**Building Exterior**	**Pedestrian Entrance**	**Loading Areas**	**Recreation**
Description of Function	Vehicular entrance to site from Hornig Rd.	For employees and visitors	Creates corporate image to employees, visitors, and passersby	Primary—for office employees and visitors. Secondary—for warehouse employees	Daily and frequent loading and unloading. Admin. plus oper. Could share same exterior area if specific dock and door areas are separated.	Break, lunch and other non-work time exterior rest plus leisure activities
Size	2-14' lanes w/spayed sides for easy turns	Now—128 employees, 20 visitors. Later—214 employees, 20 visitors.			Admin. needs 4 truck bays of varying sizes. Oper. needs 3 truck bays of varying sizes.	Accom. one-third of total staff in passive activities (conversation, chess/checkers, sunning, etc.)
Proxemics	On Hornig Rd. easy access to both office and warehouse	Convenient to Hornig Rd. entry, office reception area and pedestrian warehouse entrance	Visual outreach to Roosevelt Blvd. and Woodhaven Rd. is of secondary importance.	Primary—adjacent to main reception room. Secondary—direct access to warehouse employee locker room.	Immediately adjacent to staging areas and shipping tables within both admin. and oper. warehouses	Immediately adjacent to large group functions (lunch, mtg, training); could be next to main pedestrian entrance. Could be a major view space from office areas.
Equipment/ Furnishing	Signage—easy to read for approaching vehicles	Directional signage		Exterior seating, such as benches, sitting walls, etc., for small parklike setting.	Admin.—both med. Spaces to have dock levelors. Oper.—med. To have wedge on ramp.	Seating (benches, walls), tables (dining, games) table umbrellas (semi-protection, decorative), moderate exercise
Thermal					Deep overhang protection for loading docks, plus radiant heaters.	
Acoustics						
Lighting	Low-level lighting 2+/- above grade	Mid-level lighting 8'-10' above ground	Not required	Well-lighted with low and medium level fixtures—incorp. walls, planting, sculpture, fountains, and/or wall murals.	General driveway area, lighting and general lighting of dock areas	Decorative lighting of foliage
Color			Colorful and warm	Concentrated use of color—potentially in both building materials and fine artworks (sculptures, glazed tiles, walls, etc.)	Light, reflective surfaces	Opportunity for lots of color in furnishings, plant material, paving, adjacent wall surfaces, window awning, etc.
Materials			Use a variety of materials-natural and man-made	Most personal contact with building exterior—special attention to scale and texture of building material.	Wall material able to take regular major abuse. Dock floor material tough and smooth.	Fast-drying, easily maintained.
Environmental Qualities	Welcoming/use plants to identify.	Avoid "sea of cars" appearance—use earth berms and plants to humanize.	Present an image of professionalism and humanism—avoid monumentality	Major focal point—use sculpture and/or fountains—an extension of reception rm.	Paved area must drain off easily. Snow removal must be efficient; consider use of electrically heated paved areas.	Create a parklike setting. Utilize water and fountains; lunch, business meetings, and training sessions could move out to this area.
Future Factors	None	Future parking could be on upper deck	Future add-ins to maintain original image	Original image could be expanded	Loading areas will grow proportionally with their respective warehouse areas	Must accommodate one-third of ultimate workforce

Illus. 1–13 Expanded criteria matrix

ELECTRONIC DISTRIBUTORS, INC. BUILDING & DESIGN PROGRAM

The main entrance pont for all office employees and all visitors. The hub of all internal office circulation

RECEPTION				
Vestibule	**Reception Station**	**Waiting**	**Powder Room**	**Gallery**
Wind and temperature break between interior and exterior.	Greeting point for visitors. Check-in/check-out point for staff. Basic security checkpoint.	Visitor waiting	Toilet facility for guests	A small space for exhibiting fine artwork in a traditional gallery setting
50 sf to 100 sf	250 sf to 350 sf	6-8 guests; approximately 200 sf to 300 sf.	25 sf to 35 sf	300 sf to 400 sf
Transition area between exterior pedestrian entrance and the receptionist desk	Immediately adjacent to and direct visual contact w/ vestibule, doors. Adjacent to waiting area. Hub of internal office circulation. Easy to understand paths to entire building.	Adjacent to reception station gallery and circulation paths to major office departments	Immediately adjacent to waiting area. Visual supervision by receptionist.	Immediately adjacent to waiting area. Access from vestibule without walking through waiting area. Visual access from reception for basic security against theft/vandalism.
	Two workstations, both visible, or one screened. Parcel ledge to separate visitors from receptionist.	Upholstered lounge seating (not too low or too comfortable)-use system for easy change or additions	Toilet. Sink in vanity.	Picture hanging system for walls. Pedestal system for sculpture. Freestanding exhibit system for additional 2-D display.
Air surge for slightly exaggerated temperature change	TC-1; avoid entrance door drafts	TC-1	TC-1; high ventilation	TC-1
	A-1	A-1		A-1
Ambient. An integral part of planned lighting for admin reception spaces	Special lighting required for sculptural qualities of the reception area. Not overly dramatic. Task lighting for desk.	Ambient. Daylighting and view desired. Articulate sculptural quality of space.	Ambient	Ambient, plus track system for exhibit light. Control natural light.
Subordinate to main reception spaces	Colorful. An integral element in the planning of the main entrance space of the building.		C-2	Neutral colors to avoid conflict with exhibited works
Very durable. Glass indoors for safety; floor to absorb water and snow.	Very durable. Appropriate luxury. Consistent for entire reception area.		Durable and water-resistant	Tackable wall surfaces desirable
An integral part of the planned reception area	Spacious; express firm's success. Use of permanent fine artworks. Large environment with high ceiling.			A special space; inviting, to bring pleasure and enlightenment to employees and visitors.
None	Third workstation required; screened.	More people in future		Could expand if successful

Illus. 1–13 (*continued*)

ELECTRONIC DISTRIBUTORS, INC. BUILDING & DESIGN PROGRAM

Department	Corporate Management					
	An executive suite that is conveniently located, but a little removed from other office functions and departments. As a group, it should be immediately adjacent to the other corporate functions (Accounting, Computer, Marketing, and Personnel)					
Space	**STEVE**	**6 CORPORATE OFFICES**	**SUPPORT STAFF**	**CONFERENCE ROOM**	**FILE AND WORK ROOM**	**POWDER ROOM**
Description of Function	Executive office with conversation area	Executive offices for very active and busy people	Administrative assistance and secretarial duties directly related to the corporate management group	To serve corporate management conference needs of 5 or more people	Files for corporate management only. Aslo coats, small copier, general work space.	Corporate management group visitors only
Size	300 sf. to 350 sf.	200 sf. to 225 sf.	2 large stations now at 100 sf, 3 medium stations later at 75 sf.	Small-8 to 10 people, 225 sf. Large—20 people, 575 sf.	100 sf. to 120 sf.	25 sf. to 35 sf.
Proxemics	In a central operative position within the management team. Adjacent to a secretary shared with Murray. Adjacent to a small conference room for exclusive corporate management use.	No prioritization of placement, all 6 executives work together. Each should have easy contact with their immediate staff.	One station between Steve and Murray. One station adjacent to Joe. Three future stations adjacent to Adam and Roger.	Small is best placed between Steve and Mary. Large should be convenient for all executive offices and outside visitors.	Primarily accessible by support staff	Convenient for corporate management group visitors
Equipment/ Furnishing	Desk, credenza, desk chair, 2 guest chairs, lounge seating for 6 (personal choice for furniture selections)	Desk, credenza, desk chair, 2 guest chairs, and (A) conversation seating for 3 or 4 or (B) conference table for 4	System furniture (including wall panels when required) and operational seating. Immediately use files adjacent when and if required.	Pedestal-leg conference table, uphol. swivel chairs w/pedestal base, projection wall and marker surfaces, beverage counter, misc. storage.	Portable steel cabinets, small copier	Toilet, sink in vanity
Thermal	TC-1	TC-1	TC-1	TC-1 plus high-level air change		TC-1. High ventilation
Acoustics	A-2	A-2	A-1	A-2 - at least a 50 db. STL enclosure		
Lighting	Task/ambient, plus accent	Task/ambient, plus accent	Task/ambient	Task lighting for table. Separate switch wall washers for track and marker surfaces. Dimmer for projection.	Task/minimal ambient	Ambient
Color	Personal choice	Personal choice or corporate selection could be made	C-1 plus decorative accents of corporate management group.	Medium-level contrast, medium and light tones (avoid deep tones, except on floor).	Consistent with adjoining spaces	C-2
Materials	Personal choice		M-1	M-1. Highly customized for important image space.		Durable and water-resistant.
Environmental Qualities	Exemplify the corporate image of professionalism and humanism. Clearly a customized interior. Personal art selections. Personal coat closet.	Environment to express dynamism, not pomp. Some opportunity for personalization. Personal coat closet.	Efficient, open dynamic, professional. This area important to interior corporate image.	Important to convey corporate image of professionalism and humanism. These spaces should be distinctive and sophisticated; clearly customized.		
Future Factors	None	2 to 3 more offices	None	None	More filing needed?	

Illus. 1–13 (*continued*)

	Accounting						
	A corporate function, generally adjacent to Corporate Management and specifically adjacent to Joe's office.						
MANAGER	**STAFF ACCOUNTANT**	**CREDIT DEPARTMENT**	**BOOKKEEPING**	**PAYROLL**	**FILES**	**LIBRARY WORK ROOM**	**HUDDLE SPACE**
General supervision of the department	Concentrative and detailed work	Concentrative and detailed work. A lot of telephone activity.	Bookkeeping and general office functions. Accounts payable and receivable, secretary, clerical staff.	Confidential and concentrative work	For exclusive departmental use	Central reference and equipment room	Casual, impromptu conference space for up to 4 or 5 people
150 sf	100 sf. To 110 sf (status 1)	Staff=75 sf Manager=90 sf	6 stations and 75 sf	100 sf. To 110 sf (status 1)	200 drawers, 40 with 5 drawers each; 300 sf. to 350 sf.	120 sf	65 sf to 90 sf
Adjacent to controller's office. Positioned to supervise the department.	Adjacent to accounting manager	Adjacent to assistant controller	Physically central to the department	Easily available to accounting managers, but in a fairly remote or private location	Physically central to the accounting department, closest to bookeeepers	Physically central to the department.	Physically central to the department, but positioned for minimum acoustic distraction to others, without requiring physical enclosure
Desk, credenza, desk chair, 2 guest chairs, shelves, 10 file drawers, EDP workspace storage	F-4	F-4	F-4	F-4	5 drawer, vertical type, lockable	Shelving for reference books and manuals. Storage for EDP files. Work space for common equipment, i.e., fax machines, 2 P.C.s and small copier.	42" dia. or 36" x 60" table, 4 pull-up chairs
TC-1	TC-1	TC-1	TC-1	TC-1		TC-1. Additional airflow if required by electrical equipment.	TC-1
A-2	A-1	A-1	A-1	A-1		A-1	A-1
Task/ambient	Task/ambient	Task/ambient	Task/ambient	Ambient, plus track system for exhibit light. Control natural light.	Task lighting for file search, plus minimal ambient lighting.	Task/ambient	General
C-1	C-1	C-1	C-1	C-1	Consistent with adjoining spaces.	C-1	C-2, plus strong accent color in furnishings or on ltd. wall surface or panel
M-1. Ceiling can be non-acoustic	M-1	M-1	M-1	M-1		M-1	M-1, plus added absorbing material on walls
Appropriate for both concentrative work and informal conferencing. Personal coat closet.	EQ-1	EQ-1. A little remote because of telephone activity acoustics	Mix of concentrative work with a lot of personal interaction within the bookkeeping group, and some interaction with others	EQ-1 with added degree of visual privacy	Purely functional	EQ-1	Conducive to stimulating verbal exchange. (Good place for graphic art work.)
None	NOW = 1 LATER = 2 to 4	Grow to 3 to 4	Grow to 8 to 10	None	Not identified	Identify future needs	Not identified

Illus. 1–13 (*continued*)

two spreadsheets (of a total of five) for a (new construction) 20,000-square-foot, one-story suburban office building in Pittsburg, PA. Note the expanded number of factors, such as acoustics, lighting, color, and materials, that can be considered in the pre-design process. In the criteria matrix format, unlike the abbreviated matrix format, the "size" column typically indicates a square foot range figure rather than a single square foot number; this range figure enables you to develop a "low" and "high" square foot range for the project, including a corresponding "low" and "high" range for the circulation factor. Although this low/high range approach adds another level of complexity, it provides an additional tool for manipulating and balancing square foot needs, particularly when the available square feet are on the skimpy side in terms of optimally solving the space planning problem at hand. Note that completion of the full five-spreadsheet matrix took s more than 100 hours of professional time extended over a period of several weeks.

EXERCISE 1–2

Using Design Program 2S (page 206), as well as one or more of the design programs in the appendix, develop several groups of prototypical plan sketches in order to build skill and efficiency in this process. Try using both hand-drawing and computer-drawing techniques, including the digital furniture library mentioned earlier. Save the results of these exercises for use in further exercises presented and recommended later in this chapter, as well as in chapters 2, 6, and 7.

RELATIONSHIP DIAGRAMS

The relationship diagram is an excellent transition between the essentially verbal analysis of program development and the completely graphic techniques used in physically planning a space. As described earlier in this chapter, the relationship diagram is part of the pre-design process, because it represents a graphic abstraction or interpretation of the program information rather than a planning solution. If handled efficiently the essential values of the relationship diagramming process can be gained over a relatively short period; the expenditure of time is certainly warranted for a procedure that may reveal the essence of the interrelationships and adjacencies between and among the rooms and spaces called for in the program. As is true of all the other steps in the pre-design process, developing relationship diagrams helps you become immersed in the project's requirements and relationships.

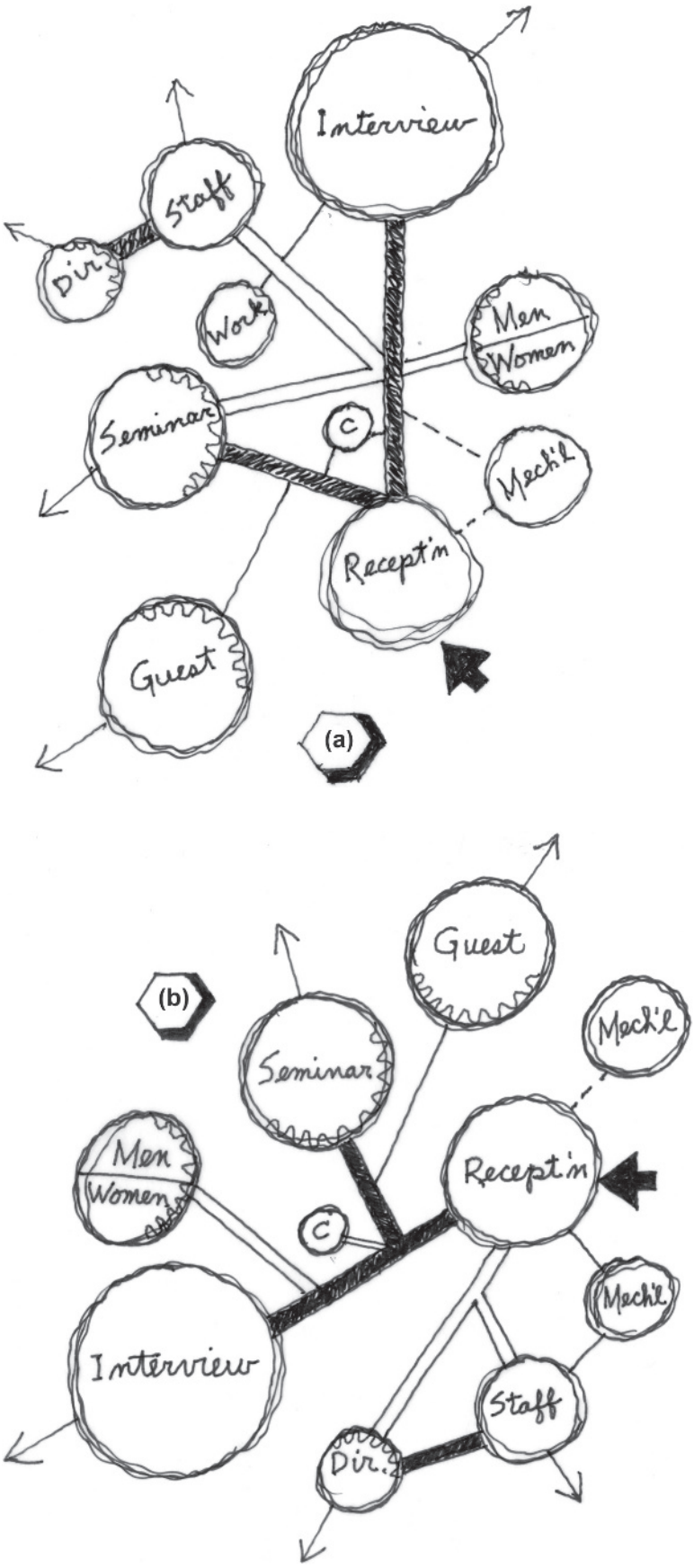
Here's how to proceed. With the criteria matrix just completed and the required rooms and spaces fresh in your mind, draw a circle for each required space so that its position on the paper represents a correct or appropriate relationship to the other spaces. Rooms or functions that should be close to one another should be dawn close together; draw at a distance from one another spaces that do not require closeness (or may even suffer from being placed in close proximity) should be drawn at a distance from one another. Use connecting lines between the circles to indicate travel or circulation patterns between spaces; those connections should be coded

by using heavy or multiple lines for important or heavily traveled connections and lighter connecting lines between spaces where circulation adjacency is less important or less traveled. The diagram should not be related to the building shell shape or configuration or to any architectural scale. It is a good idea to have the circles approximately proportional in size; ideally, a circle representing a 300-square-foot conference room should be about three times the area of the circle representing a 100-square-foot office. Attempt at least two or three diagrammatic arrangements to explore a variety of viable sets of relationships. All this should be done relatively quickly and intuitively. As with the prototypical plan sketches, drawing quality is not an issue here, since the diagrams are a design tool, not for presentation. A short roll of inexpensive tracing paper and a soft pencil or felt-tipped marker is fine for this purpose. Rather than bothering to erase in order to revise, it is usually more efficient to make changes by placing another layer of tracing paper over the original and redrawing it. To demonstrate one basic graphic approach to relationship diagrams, Illustration 1–14 provides a few examples of visually interpreting the requirements of Design Program 2S, for which a criteria matrix was prepared and shown in Illustration 1–11.

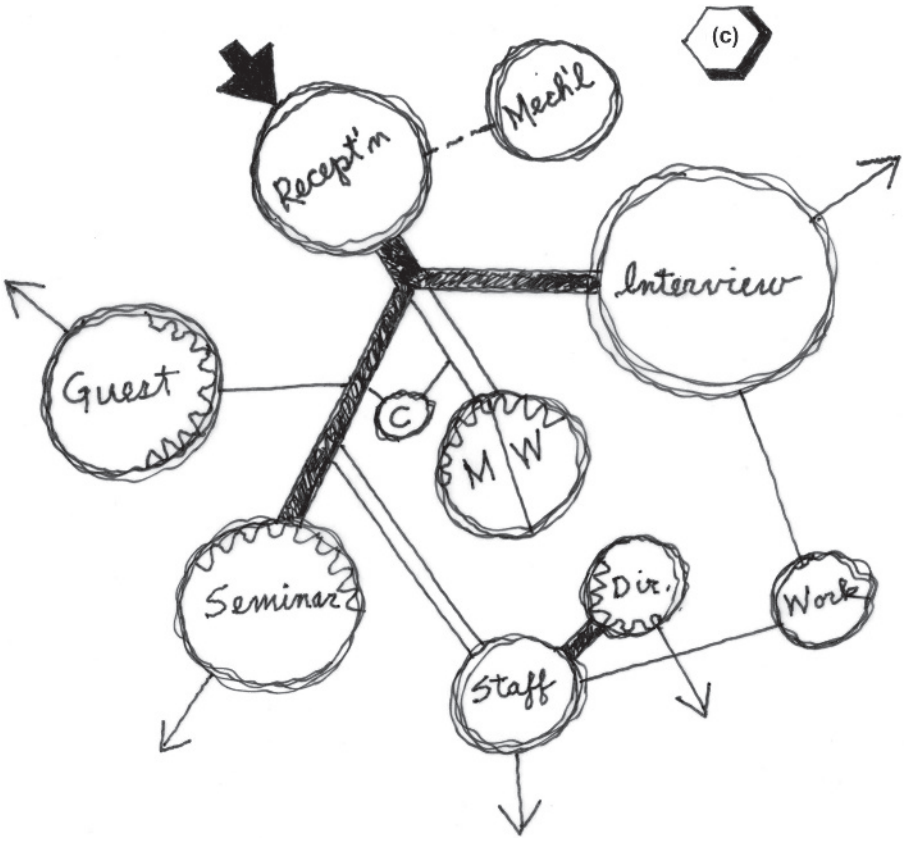
As you begin to develop skill in drawing relationship diagrams, add graphic and/or verbal notations to indicate important planning needs, such as windows, segregation of public and private areas, acoustic barriers, and so on, as shown in Illustration 1–14. Color can be used as a coding tool to identify similar functions or planning relationships, such as privacy or adjacency. Over time, designers often develop a personalized visual notation system that they can to draw on as an efficient and expressive pre-design tool.

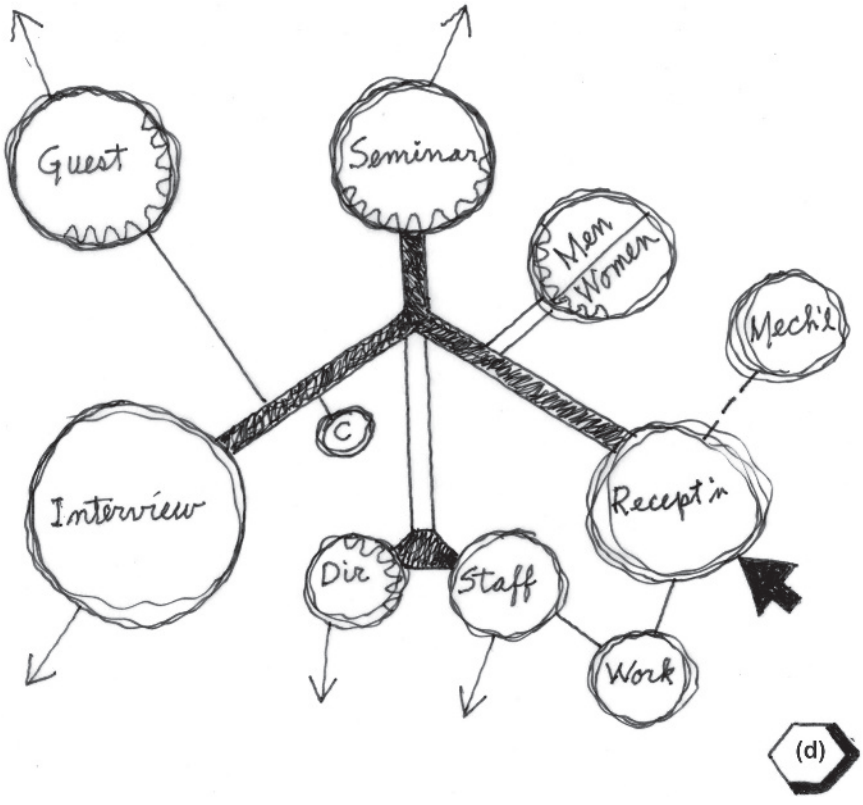
There are appropriate alternatives to the hand-drawn diagramming process just described and shown in Illustration 1–14. In several computer graphic software programs, circles (or other shapes) can be manipulated on the computer screen, and lines of varying types and visual weights can be drawn to connect them. Text notations, legends, and color coding are also easily incorporated with computer graphic techniques. Illustration 1–15 shows an example of a digital relationship diagram. Still another alternative is to use heavy paper (such as cover stock) cut into circular or rectangular labeled templates for each of the rooms or spaces and then move the templates about on a white or other neutral paper background, with lines drawn to represent the level of adjacency. In this technique, it is important to remember to record photographically or by scanning each viable diagram before shifting the templates around to create a new diagram.

As mentioned earlier, relationship diagrams, after some modest graphic refinement, are made a part of the finished design program document. Although their primary purpose is to help you gain a first visualization of program requirements, if skillfully drawn (and if the nonprofessional's limited visualization capability are kept in mind), they often can help clients and users to better understand the content of the design program. In this context, it is important to ensure that the diagrams do not resemble floor plans, so that nonprofessionals will not confuse them with actual floor plans to be developed later.

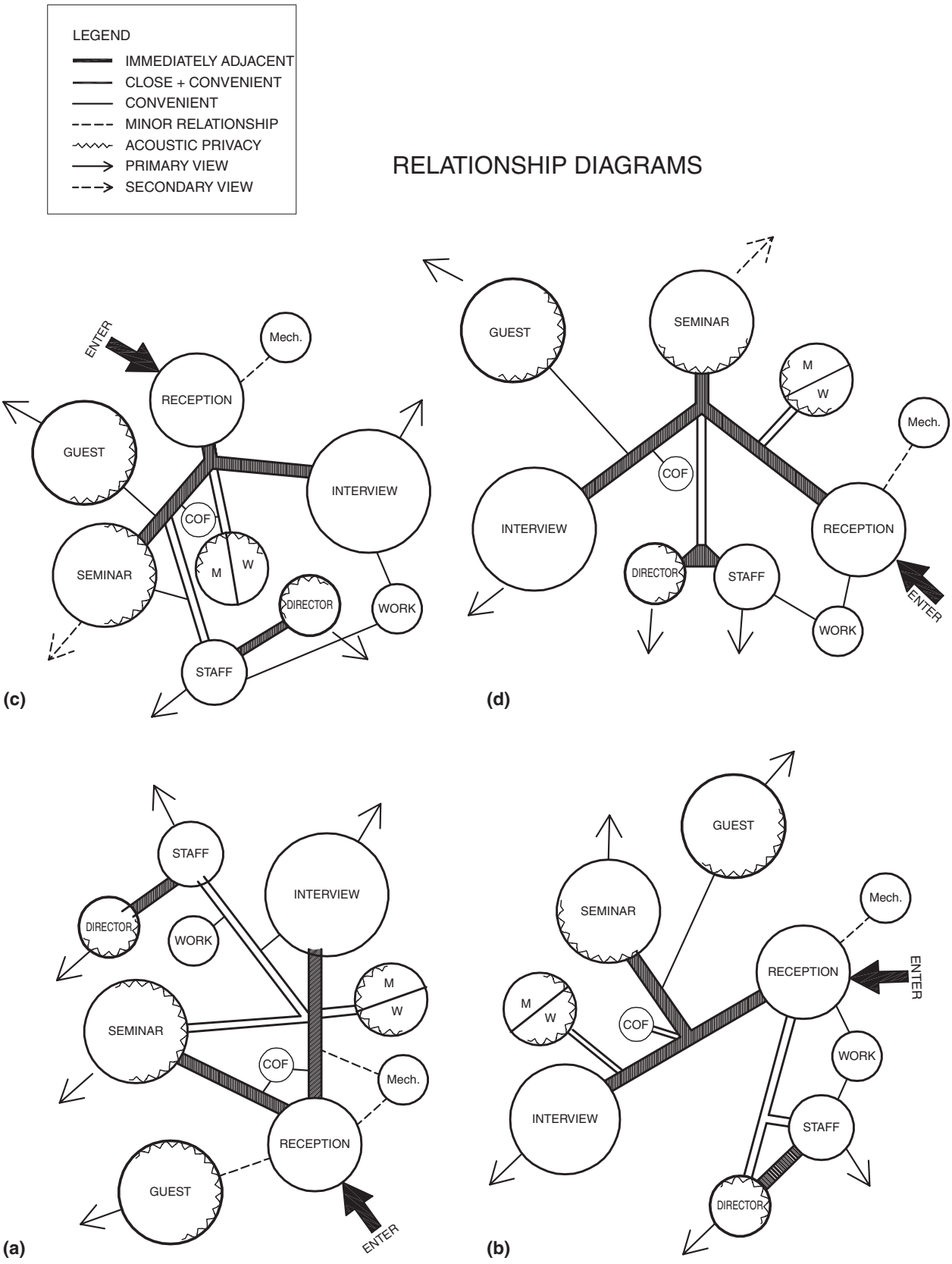


Illus. 1–14 Relationship diagrams





Illus. 1–14 (*continued*)



Illus. 1–15 Relationship diagrams by CAD.

A digital library of shapes (circles and squares) is included in the digital supplement, so that you can select the appropriate sizes with which to create relationship diagrams. They are identified with square foot sizes and can be arranged on your screen if you prefer to work digitally rather than by hand. They are marked by square feet in the following sizes: 50, 100, 200, 300, 400, 500, 600, 750, 900, 1,000, 1,200, and 1,500. You can color-code your digital diagrams and use varying weights of connecting lines to indicate the level of importance of these relationships to one another.

EXERCISE 1–3

Using the criteria matrixes developed in Exercise 1–2, draw by hand or digitally a few relationship diagrams for each matrix. As you gain experience with rrelationship diagrams, begin to create a personalized diagramming and symbol language. Again, save the results for use in continuing exercises in chapters 2, 6, and 7.

A FINAL NOTE ON PLANNING METHODOLOGY

We have concluded the discussion of programming and the pre-design process. It is time to move on to the physical planning process and the development of a floor plan, with all its broader spatial and design implications. As mentioned earlier, it is important to note that programming and its graphic products are rarely developed completely at this point. As you begin to develop bubble diagrams and rough floor plans for the project, it is natural for new concepts, functional relationships, multiple uses of space, and so on to emerge—ideas that had not surfaced in the pre-design phase. If the new ideas are an improvement on those embodied in the program, it would be irresponsible to ignore them and not revise the original program. In a professional setting, new planning factors—factors completely outside of your control—often are introduced after the initial programming phase has been completed. For example, programmatic changes could be created when new management decides to change organizational structure or when the client's landlord rescinds a lease agreement. These situations leave you, the designer, no choice but to go back to the program and make revisions. Stated most simply, design programs are rarely static documents after their original development and completion. Rather, it is common practice to revise programs as design ideas develop and outside factors evolve and change. As a space planner, you must face the problem-solving task from a position of flexibility equal to the demands of the process.

RECOMMENDED READING

Laseau, Paul. *Graphic Thinking for Architects and Designers* (3rd ed.). New York: John Wiley & Sons, 2000.

*McGowan, Maryrose. *Interior Graphic Standards: Student Edition*. Hoboken, NJ: John Wiley and Sons, 2011.

*Panero, Julius, and Martin Zelnik. *Human Dimension and Interior Space*. New York: Watson-Guptill, 1979.

Pena, W. M., and S. A. Parshall. *Problem Seeking: An Architectural Programming Primer* (4th ed.). Hoboken, NJ: John Wiley & Sons, 2001.

Pile, John F. *Interior Design* (4th ed.). Hoboken, NJ: John Wiley & Sons, 2002.

*Ramsey, Charles G., and Harold R. Sleeper. *Architectural Graphic Standards* (11th ed.). Hoboken, NJ: John Wiley and Sons, 2007.

Codes and Regulations

International Building Code, 2012, ICC

National Fire Protection Association. *2012 NFPA 101: Life Safety Code.* Quincy, MA: Author, 2011

*A reference source.