

Chapter 2 THE FIRST PLANNING STEPS

Bubble Diagrams and Block Diagrams

To this point, efforts to solve a space-planning problem have been carried out through methods of data gathering, analysis of user needs, and first attempts to establish a general concept or approach to the project. Although some physical planning has taken place, in drawing prototypical plan sketches of specific functions or rooms and abstract relationship diagrams of the organization as a whole, the overall plan has not yet been approached from a realistic planning viewpoint.

The initial leap from these pre-design steps to the more creative development of a floor plan that solves the practical and esthetic problems of the users is the most difficult and critical element in the space planning process. Programming is essentially a process of analysis; planning (and design) is essentially a process of synthesis. Transition from the analytical mode of programming to the creative mode of planning will never be easy—a gap will always exist. Ideally, one makes the gap as small and manageable as possible. This "synthesis gap" will be narrow to the degree that one's programming results are complete and thorough.

The narrowness of the gap is the reward of good programming. But the gap will always be there, and a creative synthesis spanning it is required to bring together all the divergent elements of the space planning problem.

BUBBLE DIAGRAMMING

With the programming phase completed, one could simply begin by sketching or drafting a floor plan. However, with a problem involving more than a few spaces or functions, the likelihood of developing a good plan the first time around is slim. It's not very likely that a good plan would emerge after the first few attempts, and each of these attempts would be relatively time-consuming, since floor plans involve partitions, door swings, the placement of plumbing fixtures and equipment, and so on. Furthermore, when a good plan has emerged, it is difficult to know whether a significantly better plan (or plans) can be developed. Surely a better or more efficient approach to solving the problem exists than this trial-and-error development of full-blown floor plans. To eliminate this time-consuming approach, the technique used

most by experienced space planners is the bubble diagram. Simply stated, it is a trial-and-error method to quickly explore all the planning options, both good and bad, of a given space planning problem. Although its purpose and results are primarily two-dimensional, some basic three-dimensional issues can also be dealt with in the process of arriving at a floor plan solution.

The tools required are simple. Obviously, a base floor plan of the building is needed. In addition, the planner needs lots of tracing paper, an architectural scale, and soft or flowing media with which to draw. Most typically, rolls of inexpensive yellow tracing paper (sometimes called "trace," "yellow trace," or "bumwad") are used, although any reasonably transparent tracing paper, yellow or white, can be used. Almost any drawing medium can be used, but markers or soft wax colored pencils are among the best, since they flow on the paper easily and make a bold mark without effort.

Despite the fact that the great majority of architectural drawing is computer-generated, a freehand approach has advantages for this initial phase of space planning. The immediate creative connection between hand and thought process, without the intervention of the computer's digital rules and processes, more easily permits the designer's intuitive processes to take over and react spontaneously to spur-of-the moment thoughts.

If one has a computer-connected stylus and digital drawing pad, computer-generated bubble diagrams can be accomplished in the same manner as those hand-drawn on paper. The drawing tools are then of little consequence. The block plan, an often-used alternative to the bubble diagram, is much more compatible with typical computer-drawn techniques and is discussed in detail further on in this chapter.

Regardless of the drawing tool employed, the general approach and attitude should be free and intuitive, roughly to scale, and (at least at the outset) essentially non-judgmental. In this context, "non-judgmental" can be defined as "uncritical" or "without evaluation." The purpose is simple: to efficiently explore and record all the basic planning options of the problem.

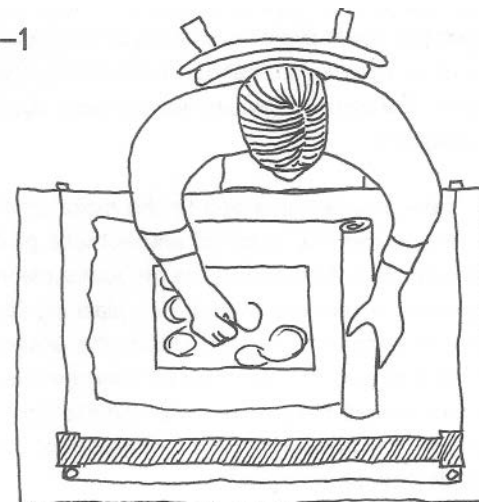
Just as the design program must be read and analyzed before one starts the planning process, the floor plan of the existing space must be "read" and analyzed before the physical planning process begins. It is important to study the existing space to understand its configuration, geometry, and structural framework or elements; the location, type, and quantity of windows; unique architectural elements (such as a fireplace or monumental stair); HVAC system; plumbing supply and waste lines; and so on. To some degree, a full

understanding of the relative importance of each factor will slowly develop as the bubble diagramming process continues. Despite this, it is useful to take some time (exactly how much depends on the size of the space and the time pressures of the circumstance) before the bubble diagramming process begins in order to (with architectural scale in hand) study, analyze, and understand the nature of the space within which you are working.

First, tape the floor plan of the building shell to the drawing board. If the reflected ceiling plan contains graphic information that might have a bearing on the planning solution (such as low ductwork, significant changes in ceiling height, skylights, etc.), it is a good idea to place this under the floor plan so that those influencing factors can also be seen. (If the floor plan is not on translucent paper, you can lightly sketch the influencing information on the floor plan.) As shown in Illustration 2-1, roll out the tracing paper over the floor plan, hold the roll in your non-drawing hand (each diagram is drawn too quickly to bother with taping down the tracing paper), and begin to draw.

With the completed criteria matrix in front of you, try all the planning options that come to mind. From one viewpoint, the correct process would be to methodically try each room or function in each location where it could fit (except for fruitless possibilities such as trying to place plumbing fixtures too far, codewise, from a plumbing chase). However, much of the intuitive potential of bubble diagramming would be lost with so rigid a process. Conversely, if one were to be exclusively intuitive, without any planned order or approach to the process, it would be difficult to know if all the possibilities had been

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explored. Some middle ground between being laboriously systematic and erratically spontaneous should be found; it simply takes some experience with the process to find a personally comfortable track between these extremes.

An existing main entrance door or primary elevators may automatically locate an entrance area or reception room. Often, one large or major space requires accommodation and will fit well in only two or three locations in the existing space; each of these locations can become the generator for more bubble diagrams. Plumbing accessibility is usually a significant planning limitation; placing rooms with plumbing fixtures (kitchens, baths, public rest-rooms, etc.) within the maximum distances to existing plumbing chases permitted by the prevailing plumbing code presents another basic starting point from which a series of diagrams may be generated. Some rooms or functions demand immediate access to light and air (windows), while others are often better placed in the deep interior regions of the available space. All these factors can become the initiator for a whole series of diagrams.

Acoustic considerations, such as the segregation of quiet and noisy functions, may be a significant planning factor. Leaving space for circulation (corridors, stairs, aisles, etc.) is a must in the development of workable bubble diagrams. If these travel paths are not incorporated within the bubble diagrams, the results will be of little value when it is time to translate the diagrams into floor plans. Circulation issues are often important enough to require a series of diagrams of their own, in which travel paths and patterns are studied independently, as seen later in Illustration 6-3. It is common for space planning problems to present unique factors that demand the location of an important function in one area only—for example, the specific location of major computer equipment due to the unreasonable cost of relocating the electrical wiring throughout an entire building. Chapters 3, 4, and 5 will elaborate on the important influences on the space planning process.

Each bubble diagram should take only a few minutes to draw. Do not belabor any individual diagram; rather, move on to the next variation on a fresh section of tracing paper (certainly an eraser should not be anywhere in sight). Try all the variations that come to mind, even if they don't appear to be particularly promising; they could generate other ideas that otherwise might not have come forth. The non-judgmental approach is utilized here—don't be too tough or self-critical in evaluating the bubble diagram results while they are still in process. One good and basic approach to generate many possibilities is to take each of the generating conditions, such as entrance points, plumbing chases, a very large space, need for light and air, and so on, and, utilizing the limited number of planning positions permitted by that condition, draw as

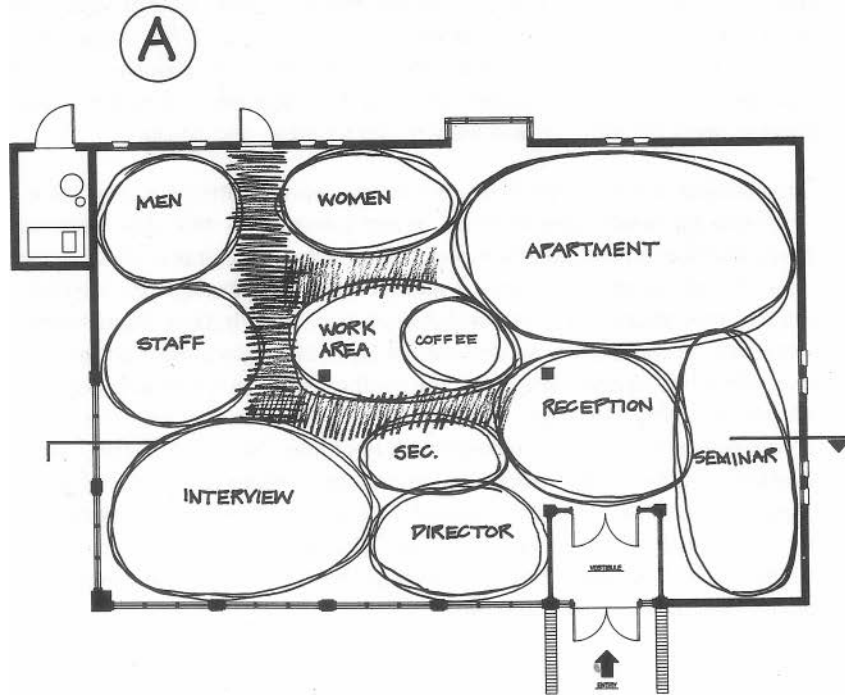
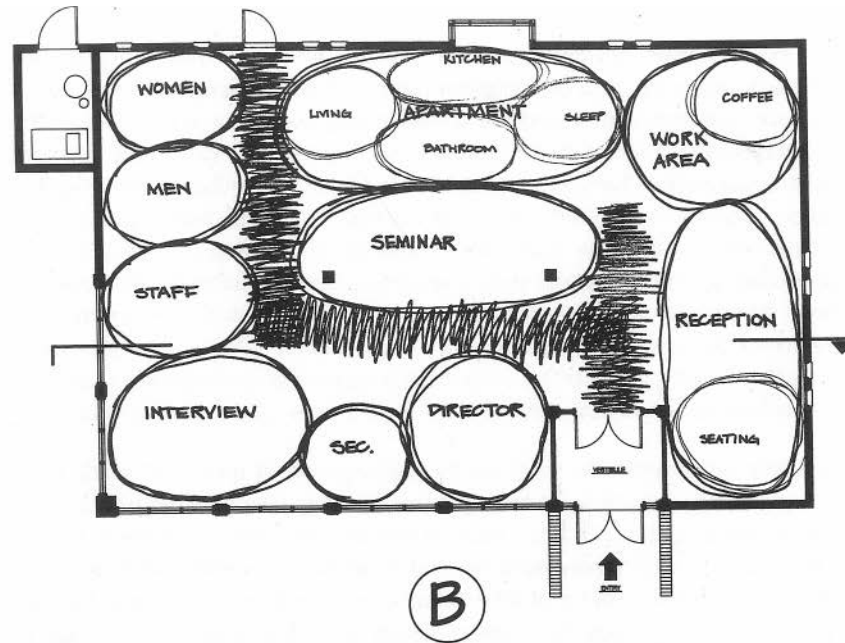
many diagrams as are reasonable on that basis. As an example, suppose that architectural constraints and plumbing stack locations will permit only two solutions to public restroom locations; then generate as many reasonable diagrams as you can (and possibly a few unreasonable ones), starting with each of those two placement solutions. This process can be repeated with each of the determining existing conditions. It is impossible to draw too many bubble diagrams; exhaust all the possibilities to ensure that all planning options have been explored. Even for a relatively small space, such as the one shown in Building Shell 2S (used throughout for demonstration purposes), it would not be unusual to generate 20 to 30 bubble diagrams.

While the bubble diagrams are in process, it's a good idea to record thoughts about many special factors. This becomes a personalized notation system in which one develops a group of graphic symbols to quickly express planning needs and ideas. As explained earlier, some indication of traffic flow and circulation spaces is important. Interior door and window locations, new plumbing chases (if possible), acoustic barriers, barrier-free accessibility, and so on should all become part of the notation system. Even esthetic and spatial issues, such as notations about ceiling heights, interior vistas, and visual rhythm or sequencing, are worthy of recording at this stage. Some planners like to use several colors while diagramming, to visually color-code important factors such as public versus private spaces; acoustic and visual privacy; need for light, air, and view to the exterior; and so on.

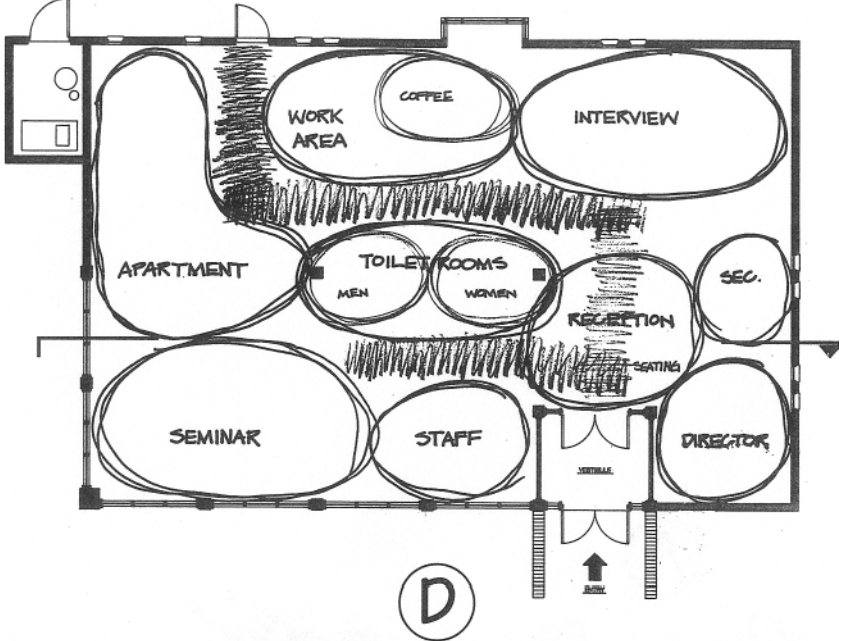
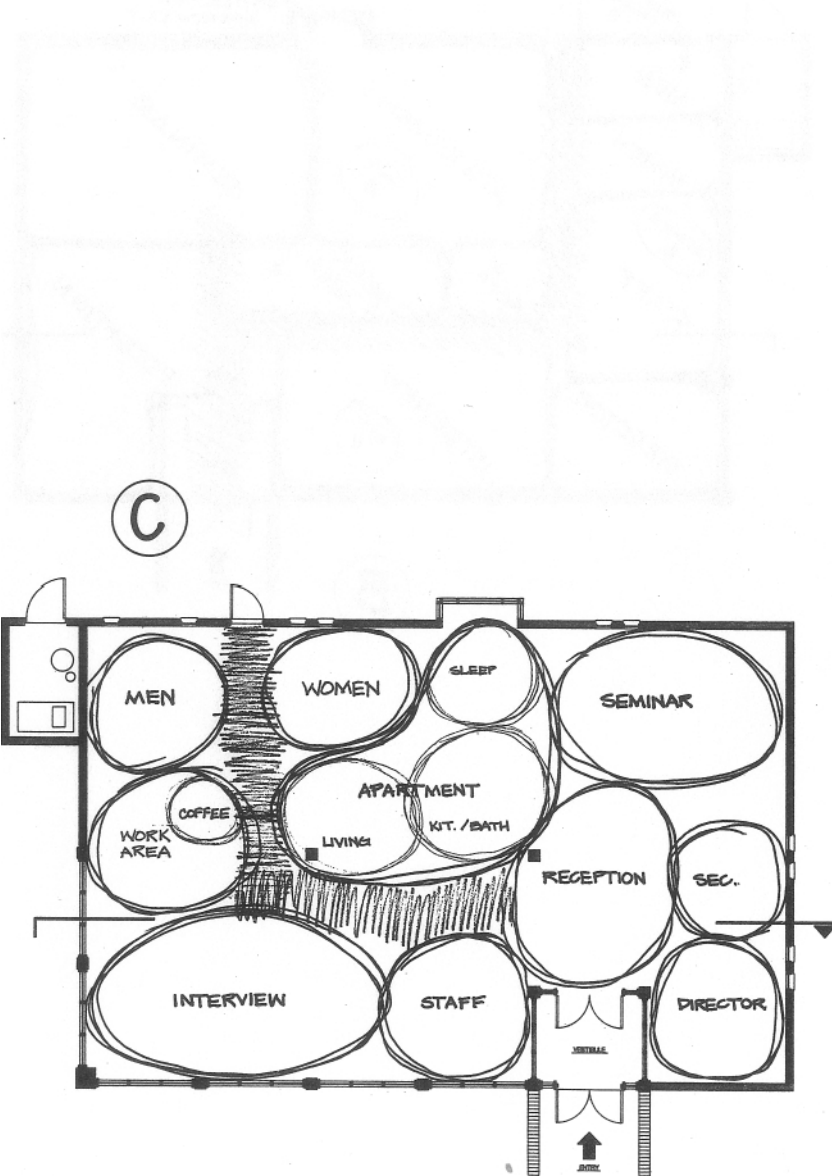
This process is not limited in its use to one type of interior space, such as office spaces, health care facilities, or restaurants; it is relatively universal in its applications and should be thought of as a first-step space planning technique for all types and sizes of interior spaces. Although the described process may sound like a by-the-numbers approach, bubble diagramming is a complex, creative process and cannot be confined to a mechanical procedure. Negotiating one's way over the synthesis gap is a creative leap. Each planner invariably develops a personalized method to deal with the number of variables at hand and to record his or her ideas. No one "correct" way to develop or draw bubble diagrams exists, nor is there an accepted professional standard for the final product of the process. The graphic result is usually a personal notation system that the planner uses to go on to the next planning step (the development of a rough floor plan), and the diagrams are usually not seen or used by others.

To give you some ideas about what your bubble diagram results might look like, the next three double pages (Illustrations 2–2A, 2–2B, and 2–2C) contain the graphic results of three experienced designers solving Design Program

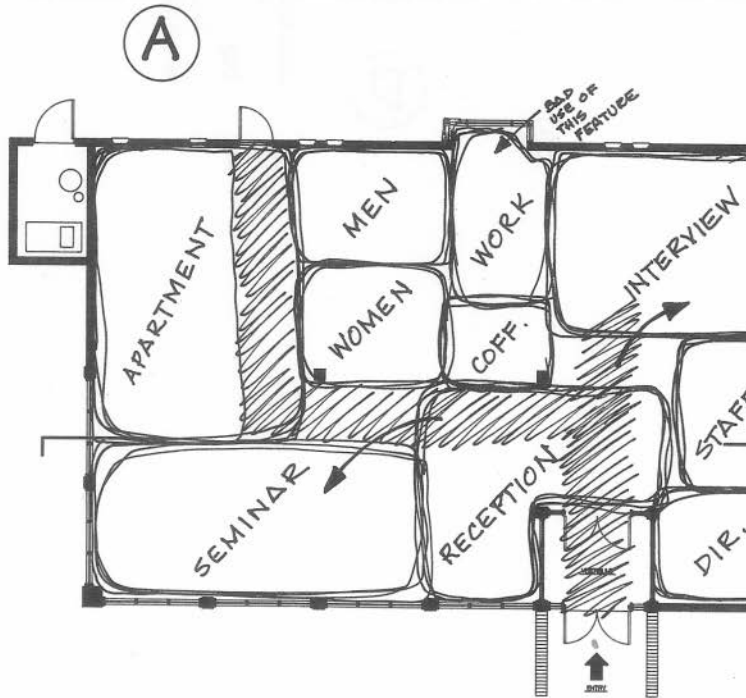
BUBBLE DIAGRAMS: DESIGN PROGRAM 2S

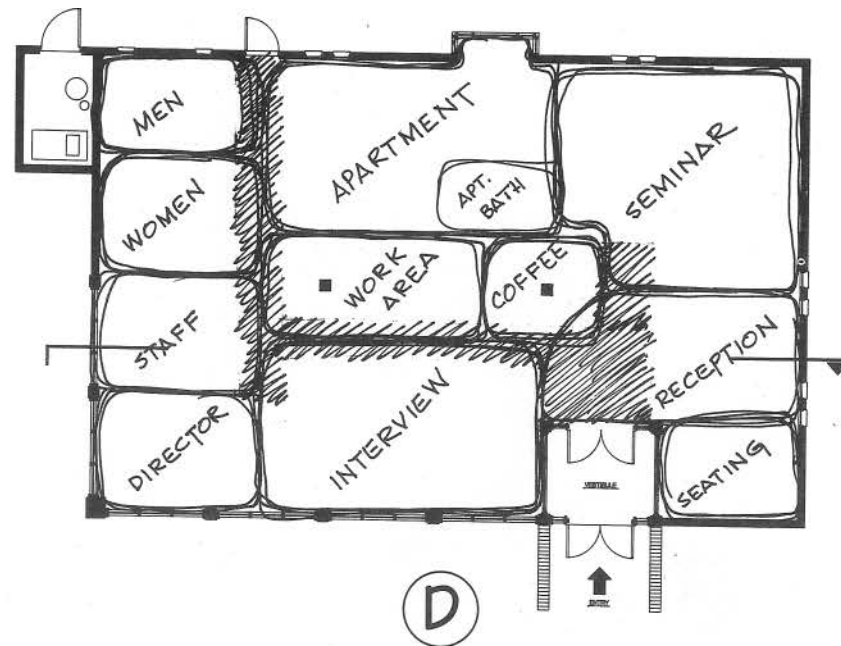
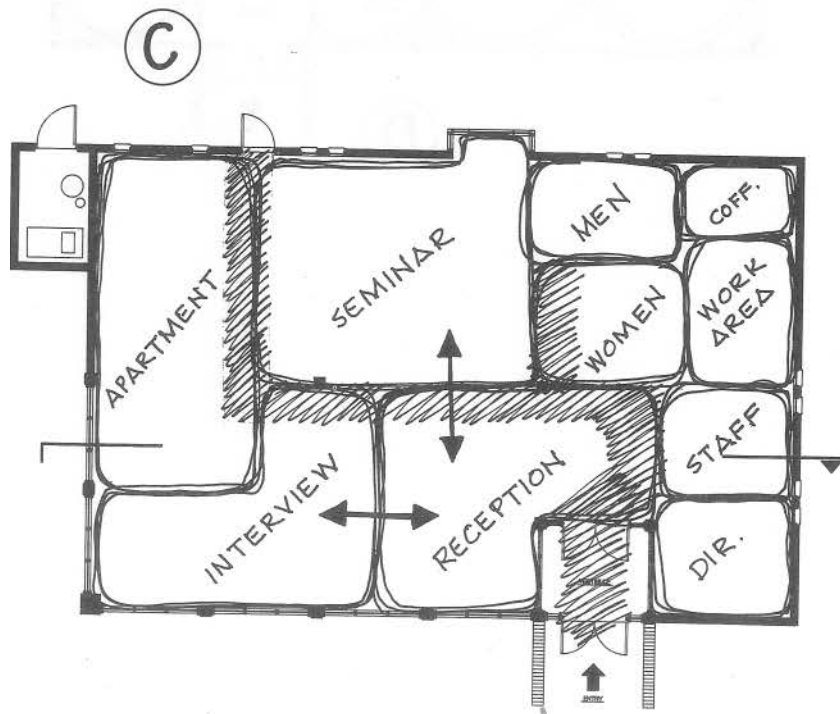


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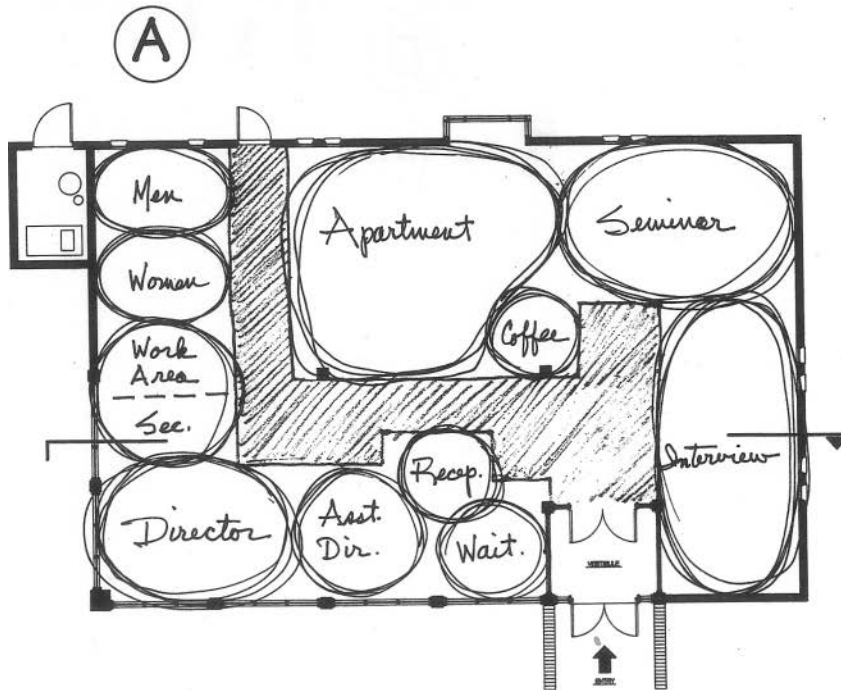
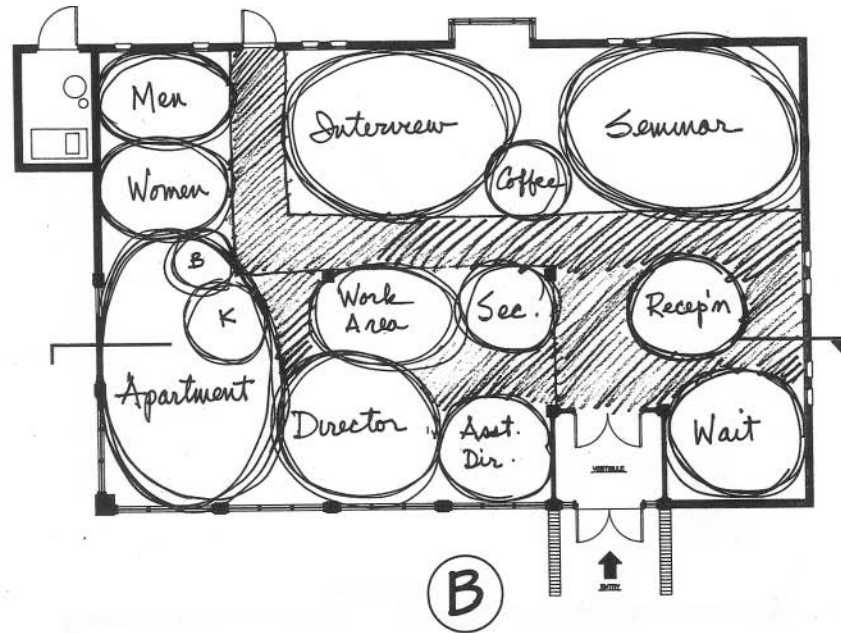
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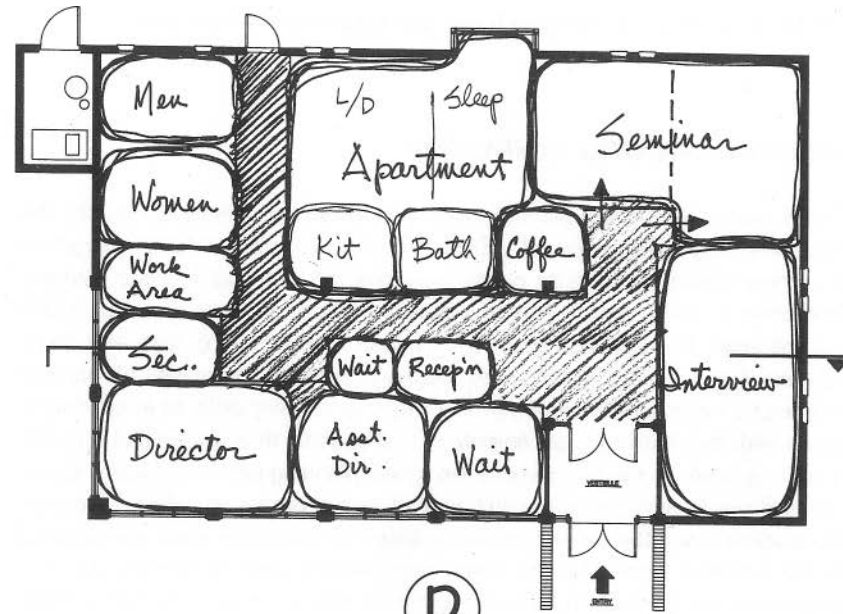




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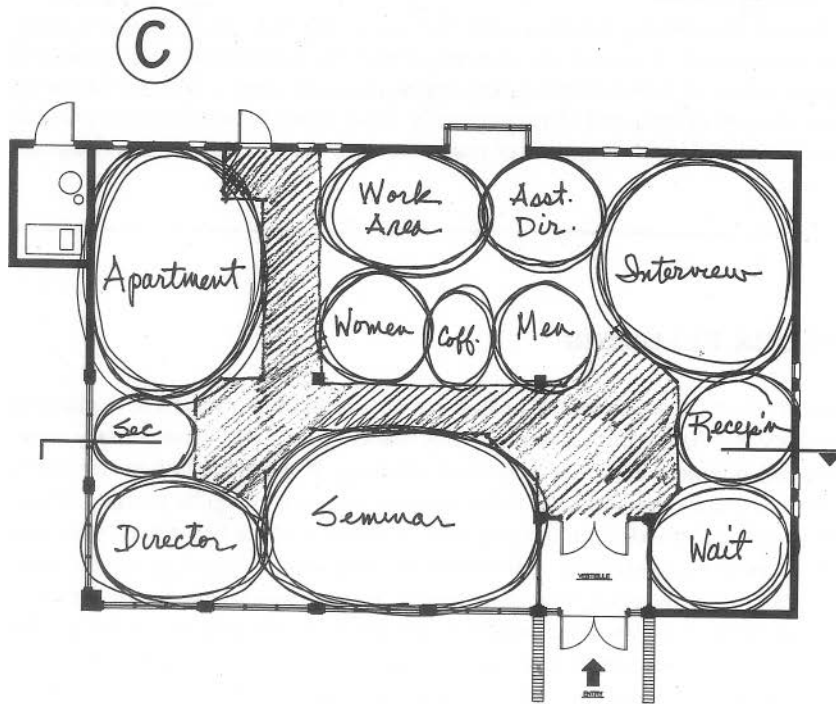
BUBBLE DIAGRAMS: DESIGN PROGRAM 2S





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2S in Building Shell 2S. (These program and shell designations are explained in the following paragraph.) It is obvious that both method to solution and graphic style vary among the designers, yet each has produced a workable result and is ready to move on to the development of a floor plan.

SPACE PLANNING EXERCISES

Three series of space planning exercise problems are provided in the Appendix, starting on page 122. Each series contains three design programs and three building shell floor plans, providing the potential for nine planning exercises in each series. The first series involves spaces of about 1,500 square feet; the second, spaces of about 2,500 square feet; the third, spaces of about 4,000 square feet. Although prepared exercises of this kind will not be helpful in the development of programming skills or in coming to terms with the detailed requirements of real spaces, they are helpful in quickly getting down to the specifics of the space planning process. Ideally, classroom projects will provide additional planning problems where program development and the detailed idiosyncrasies of existing spaces are included in the process. Note that the letter designations used to identify the programs and shell are not related; Program 3B can be used in planning Shells 3A and 3C, as well as with Shell 3B.

EXERCISE 2-1

At this point in your learning process, it would be very valuable to try your hand at bubble diagram solutions for at least two or three of the program shell combinations provided in the Appendix, starting with one or two in the 1,500-square-foot series, followed by one or two in the 2,500-square-foot series. It would be time-efficient to use the criteria matrixes and the relationship diagrams developed in Exercises 1–2 and 1–3 (in Chapter 1) as the basis for the bubble diagrams developed here.

After the diagramming possibilities of a particular planning problem have been exhausted, the results should be reviewed and the two or three best diagrams selected from the many diagrams that have been drawn. In this context, the best diagrams are those having the greatest potential for further development into a good and workable floor plan. One by one, place each of these selected diagrams over the floor plan, place a fresh section of tracing

paper over the diagram, and revise the diagram by modifying the shapes and sizes of the bubbles, more clearly identifying circulation spaces and paths, more accurately locating plumbing chases, doors, or access locations, acoustic barriers, esthetic or spatial features, and so on. One could have a second overlay diagram, in which the bubbles evolve into round-cornered rectangles (assuming rectangular rooms and spaces). This revising process moves away from the quick and spontaneous approach of the original diagrams and toward a deliberate, selective problem-solving mode. Despite its amorphous graphic quality, this is the first design step in the space planning process. Regardless of the specific drawing and refining technique, by the time the bubble diagram process is complete, a very rough or abstract floor plan should emerge. Partitions, door swings, fixtures, and other such elements are not yet identifiable, but a roughly-to-scale allocation of floor space has been established, along with several basic design and construction determinations. The results of this refining process are shown in the extreme right-hand examples in Illustrations 2–2B and 2–2C.

EXERCISE 2-2

Perform this refining process with the bubble diagrams developed in the previous exercise. It cannot be overstated that the successful development of each phase of professional-quality space planning skills is directly related to the amount of time and effort put into it. Save these bubble diagram exercises to use in the development of rough floor plans recommended in Chapters 6 and 7.

BLOCK PLANNING

Another well-established technique for this initial step into physical planning is conventionally referred to as "block planning." Its use is particularly wide-spread in large-scale retail and store planning. The process of development and the results are similar to those in bubble diagramming. Its primary advantage over bubble diagramming is that the result is more like a floor plan, and some planners feel more comfortable working with its more geometric quality. Its primary disadvantage in relation to bubble diagramming is that it lacks some of the free-flowing spontaneity and intuitiveness inherent in the bubble diagramming process; it also has a tendency to ignore curvilinear and other non-rectangular solutions. While block planning is readily accomplished with

hand-drawing and computer-drawing techniques, CAD methods are particularly applicable. Since one can repeatedly copy a new base plan image on the screen, each copy then becomes the origin for a new block plan—a plan that can be both saved and printed. With a simple line technique (or, better yet, a double-line technique to represent partition thickness), allocate room locations and identify them with a room title (or an abbreviated title, such as "Rec." for "reception" or "Apt." for "apartment"). If using hand-drawing, it is best to avoid the use of a parallel edge and triangle, because they will tend to make the process slow and rigid. Instead, place a piece of grid paper under the base plan as a drawing and scale guide and work freehand. As with bubble diagrams, try many block plans, working intuitively and non-judgmentally, exhausting all the planning possibilities, and remembering that this is a primarily trial-and-error process. To get a general idea of what block planning diagrams might look like, the computer-generated drawings of Illustration 2–3 show one designer's use of this approach in the solution of Design Program 2S in Building Shell 2S, including a refined block plan at the

EXERCISE 2–3

Using the block planning approach, solve one or more of the 1,500-square-foot and 2,500-square-foot program/shell combinations in the Appendix. Try your hand with both computer-drawing and hand-drawing techniques. As before, select two or three of the best diagrams and refine them in the same manner by which selected bubble diagrams were refined. Again, save these exercises for continued use in the exercises recommended in Chapters 6 and 7.

A variation on the block planning technique some designers find advantageous is the use of paper templates for rooms and spaces, because the templates can be moved quickly and changes in planning relationships are seen immediately. The process begins with cutting and labeling a square or rectangular piece of substantial paper (such as cover stock) for each room or space, making sure it contains approximately the correct square footage. The templates are then moved about over the floor plan, leaving appropriate circulation paths or spaces, until some sort of workable solution is achieved. Each reasonably workable solution must be recorded by a hard copy of some kind (a quick sketch, or a Polaroid or digital photo). Since the particular proportions of the cut templates may be very limiting in terms of achieving workable solutions, it is advisable to make two or three templates of varying proportions for each room, being careful to use only one template

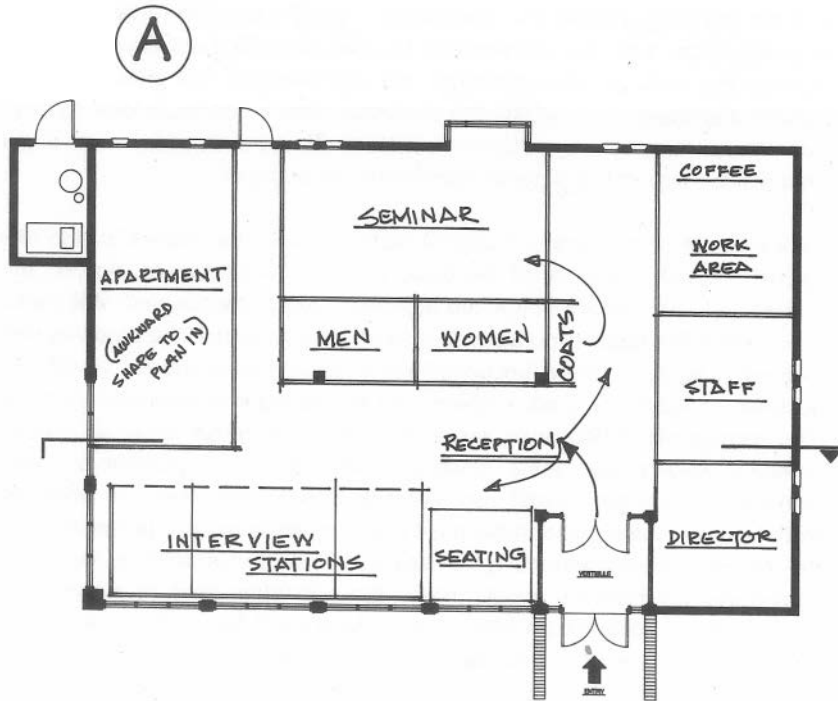
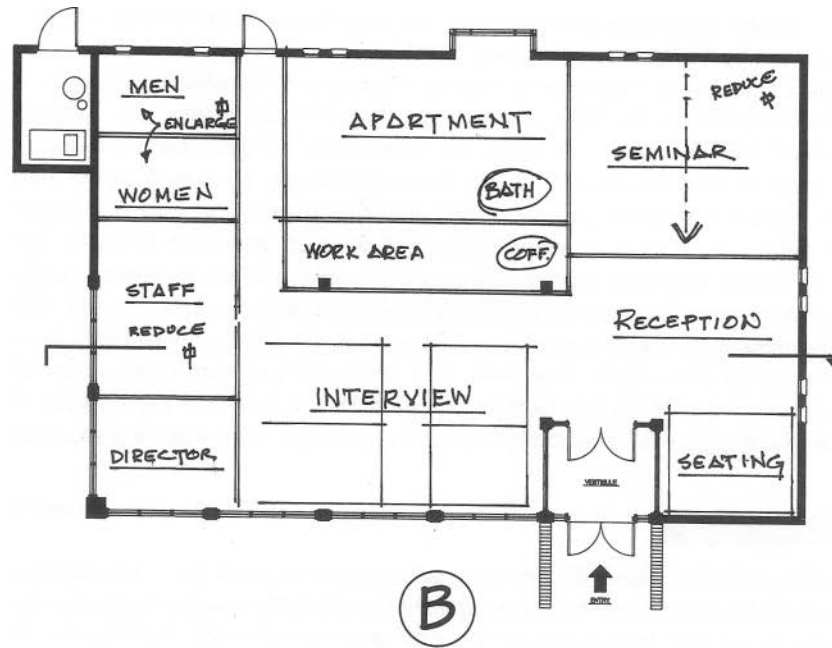
for a given room in each of the overall solutions. The approach of manipulating room-sized templates has a computer technique variation in which colored or hatched, labeled templates are created on the screen and manipulated over a copy of the base plan, with block plan solutions saved and printed. As with all these first-phase planning techniques, the process must be concluded with the refinement of the few most workable solutions into rough or abstracted floor plans.

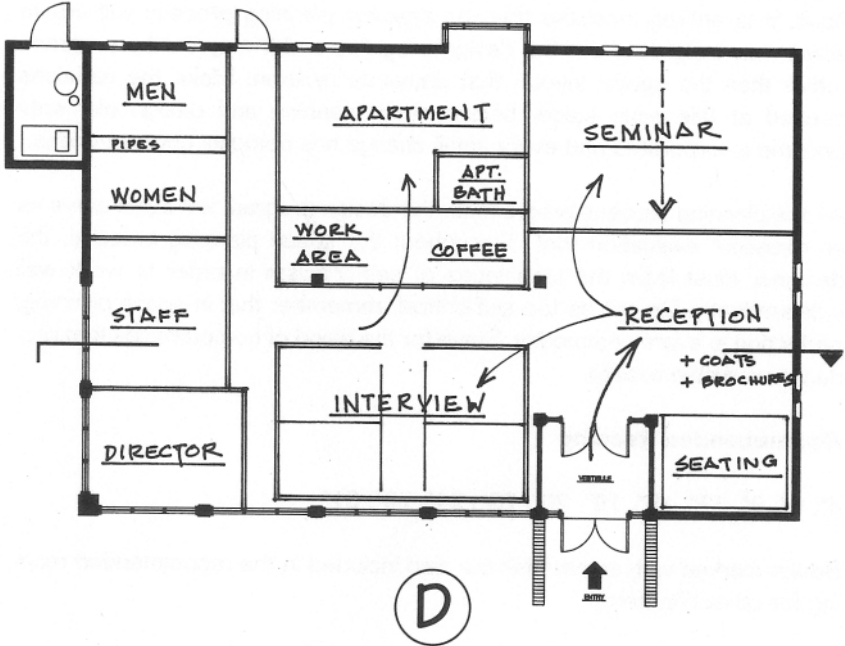
It should be obvious that no single or "best" method exists for this first phase of the space planning process. Because it is at the heart of that process, it is inherently creative and without confining definitions. Because it is creative, most designers ultimately develop a highly personalized method that is specifically tied to their thinking process. Until a planner's experience builds to this level, the approaches shown here, if given enough time and practice, should provide adequate tools to solve most space planning problems.

Critiquing one's own work in this first planning phase is difficult. Graphic qualities are not the issue here; although graphic articulateness is of value, it is the planning qualities that are critical to a good solution to the problem. In a classroom, with the direction of a teacher and with the ability to see and discuss the work of other students, the evaluation of first-phase planning solutions is easier. It is outside the classroom where one must learn to evaluate the qualities of space planning solutions. Those evaluations must begin with making use of the program document's information.

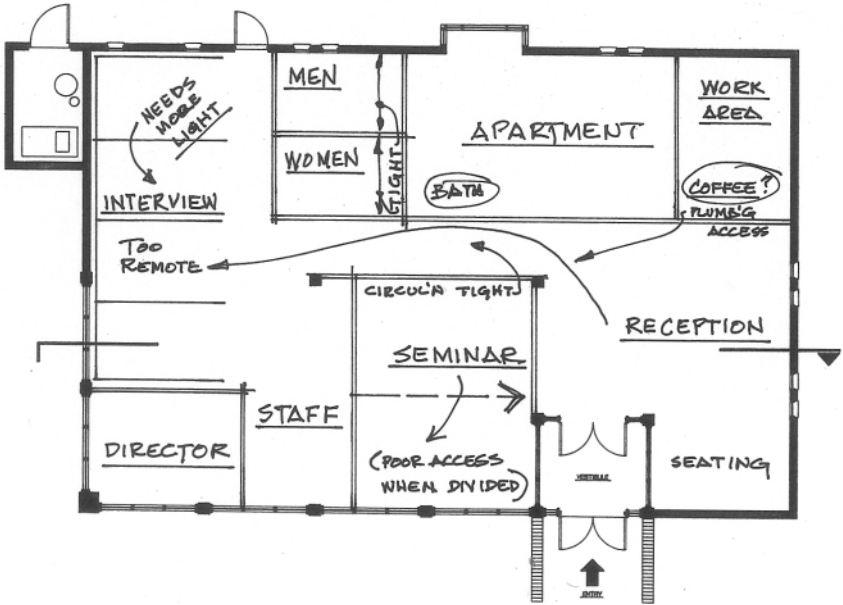
With the use of the project's criteria matrix, review the refined bubble diagrams or block plans for all the basic planning requirements. Among the questions to ask are: How well are adjacency requirements met? Will traffic flow easily? Are square footage requirements adhered to? Are windows well located in terms of daily functions? What about the needs for visual and acoustic privacy? Are basic esthetic and spatial desires attainable with the plan arrangement? Will basic equipment and furniture be easily accommodated? In very general terms, place yourself in the users' position and ask, "How do I go (or get) there?" or "What do I see?" Don't become attached to these first-phase plans; remember that they are a work in progress. Use the results of the programming process as an objective evaluation tool in critiquing the first planning results. Has a basic function been forgotten? Are some interfunctional relationships not working well? Are code requirements a problem? In general terms, place yourself in the users' positions and ask "How do I go (or get) there?" or "What do I see?" Don't become attached

BLOCK PLANS: DESIGN PROGRAM 2S





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to these first-phase plans; remember that they are a work in progress. Now is the time to make revisions, not later, when plan changes become more difficult. It is entirely possible that the physical planning process will create some new insights about the design program, and it may be the program, rather than the spatial layout, that demands revision. Make the revisions needed at this early stage, before other planning and design elements become incorporated and every small change has complex consequences.

As the planning process progresses, the design program will again serve as an excellent evaluation tool. Throughout the space planning process, the designer must learn the techniques of self-criticism in order to work well independently. Do not be too self-critical; remember that in space planning, perfection is a rare commodity. Strive for the blend of compromises that produces workable results.

Recommended Reading

4*, 6*, 9*, 13*, 15*, 18*, 20*, 23*, 24*, 26*, 31*

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