Lesson 1

Communicating with the System

Lesson Overview

The AS/400 is not a simple machine; its operating system, OS/400, is one of the most sophisticated on the market today. To a new user, the apparent complexity may seem like a huge jigsaw puzzle waiting to be solved. What we hope to provide with this first lesson is simply a place to start collecting critical pieces of the puzzle.

This lesson provides initial exposure to several topics necessary for a basic understanding of how to communicate with the AS/400 using the different types of screens it displays. The lesson also introduces concepts related to system organization and a few basic work management ideas (e.g., how jobs enter, run in, and leave the system).

As in any other technical field, there is a certain amount of new vocabulary here that you will need to master to be successful. Although the AS/400 itself will provide much help in your learning, you are strongly encouraged to ask questions of your instructor or mentor.

Objectives

Students will be able to

- sign on to the AS/400, properly entering a user name and password
- explain the difference between system and subsystem
- describe the two most common types of jobs
- list several attributes of a user profile
- list several features of the AS/400 operating system
- explain the function of AS/400 Control Language (CL) and enter a CL command on a command line using proper syntax
- explain the purpose of system values and how to check them
- describe four types of displays, their use, and their components
- explain the relationship between CL commands and AS/400 menu paths

The System

The AS/400 is a **multiuser**, **multitasking** system (a system on which two or more people can perform two or more tasks concurrently) optimized for the efficient execution of business applications. The basic unit of work on the AS/400 is a **job**. On the AS/400, the term "job" refers generally to a unit of work, including all programs, files, and instructions necessary to perform that work. Examples of jobs running on an AS/400 would be an interactive user session for updating a customer master file or a program compilation running unobtrusively in the background.

All jobs on the AS/400 are run in **subsystems**. A subsystem, defined by a **subsystem description**, is where the system brings together the resources needed to process work. The components of the subsystem description determine how the system uses resources to process jobs within the subsystem.

When the base operating system is installed, the AS/400 has several different subsystems already defined and active, each one having a separate subsystem description.

Some attributes of subsystems whose actual values are defined in the subsystem description include the subsystem name (e.g., QINTER for the interactive subsystem, QBATCH for the batch subsystem), how many jobs can run in the subsystem at one time, which storage pools the subsystem will use (main storage on the AS/400 is divided into a number of different storage pools), and which job queues the subsystem will work from. It is necessary to have different subsystems because there are many different types of jobs with different characteristics and often conflicting needs. If all of these various jobs were thrown together and treated equally, the overall performance of the system would suffer. The system administrator can change the existing subsystem descriptions and create new subsystems when necessary. In this way, the system administrator can tailor subsystems to efficiently handle the needs of different jobs — for example, to ensure that long-running jobs requiring no user interaction but significant CPU time don't interfere with high-priority interactive jobs needing fast response time. Within subsystems, individual jobs can be prioritized to begin execution sooner or later and, after they begin execution, can be given a higher or lower runtime priority.

Types of Jobs

AS/400 jobs can originate from several sources and are classified by how they originate on the system. In this course, and in general, you will deal mostly with two types of jobs: interactive and batch.

An **interactive job** begins when a user signs on to an AS/400, and it terminates when the user signs off the AS/400 or the job is ended. Interactive jobs run in conversational mode, which means there is a dialogue of sorts between the user and the program, utility, or operating-system function. Because of this conversational, back-and-forth nature of interactive jobs, any CPU- or I/O-intensive request a user makes could lock up the workstation keyboard until the request is completed. Therefore, it is often advisable to direct such requests to a subsystem designed to handle them — that is, to submit them as **batch jobs**.

Batch jobs can execute without user intervention; they do not require data or controlling values to be input through the workstation once they have started. Batch jobs are sent to a **job queue** until they can begin execution. A job queue is a staging area, managed by the subsystem in which the job will run, where batch jobs wait in line for their turn at processing. Each batch subsystem can execute only a limited number of batch jobs concurrently. If no other higher-priority jobs are waiting, a batch job can start right away; otherwise, it must wait its turn.

Typically, you would submit as a batch job a report program that reads many records from a database file and performs standard calculations written into the logic of the program. Once such a program started, it would require no input from the operator or requester of the report. If such a program were run interactively, the DASD (Direct Access Storage Device, or hard disk) access time required for the large file, which could be substantial, together with the processing steps for each record, could cause the program to run for a long time, tying up the workstation until program execution was completed.

Also, to minimize disruption of work flow, certain tasks encountered during a normal interactive session can be packed up and sent off as batch jobs. Consider a programmer in the midst of an interactive session who needs to compile a large program for testing. If the programmer runs the compile as part of an interactive job, he or she will be locked out of the system during the several minutes it may take to complete the compilation. If other tasks on the computer need attention, the programmer could submit the compilation as a batch job from within the interactive job. Then, while the compilation runs in a batch subsystem, the programmer could go on to other tasks.

OS/400

OS/400, the AS/400's operating system, is a complex and rich set of programs that not only controls traditional functions such as data access, storage, and task management but also incorporates features that normally would require separate software components on other systems — features such as communications support, database management, security, and interactive support.

All AS/400s are shipped with basic OS/400 support, which includes predefined system settings for work management functions that allow interactive and batch jobs to run without need for a customized installation. Later, subsystems can be created and system resources allocated to optimize workload distribution and throughput according to the special needs of a particular business.

OS/400 is an object-based operating system. An **object** is anything on the system that has a name and takes up space in storage. A large number of objects are supplied by IBM through OS/400 and the licensed program products. These objects typically have names beginning with Q. Programmers and operators create other objects and name them, usually according to shop naming convention.

The system can locate an object by its name, and once located, the object can further identify itself to the system by functional attributes that are a part of the object. Objects are grouped into types. An **object type** determines how the object is used on the system (i.e., the actions that can be taken when using the object). Common object types include programs, files, and commands. Object types also include user-profile objects, which contain information about users, and subsystem-description objects, which contain the characteristics of subsystems. Object type is always assigned by the system and is determined by the command used to create the object. We continue to explore this concept of objects throughout this book.

Control Language

For all its complexity, one of the more remarkable things about OS/400 is that it provides a single, consistent user interface to its various functions through **Control Language (CL)** commands. OS/400 CL is flexible and powerful and allows direct access to OS/400 functions. More than 1,500 individual CL commands are available. Each individual command is an object on the AS/400. Most CL commands consist of a command name and one or more **command parameters**. A command parameter is a value, specified along with a command, that controls and limits the operation of the command and names the files, programs, or other objects the command will work on. Individual commands can be entered on a **command line** (a line beginning with the symbol ===> that appears near the bottom of certain types of display screens), or they can be grouped together into a **CL program** to perform a specific task. Such a program can then be compiled and run from a command line or from within a high-level language (HLL) program (e.g., RPG, Cobol, or C).

You don't need to memorize a large number of CL commands because you can access most OS/400 functions available to interactive jobs through the **menu interface** of the AS/400. As you choose a series of menu selections, the system determines the CL commands to be run to satisfy your request.

System Values

System values are control and configuration attributes that let you customize certain operating-system functions. They define critical aspects of the environment and the general rules that all jobs on the system must follow. System values are not objects, but they describe characteristics of the system that can be displayed or, in many cases, changed with CL commands. Many system values come preset with

the operating system; others need to be set when the system software is installed. The categories of system values include the following:

- *Allocation values* — These values let you control the number of active jobs and how much main storage will be used for different functions needed to run jobs.
- *Date and time values* — These values let you set and change the date and time kept by the system and made available to application programs and utilities.
- *Editing values* — These values control how dates, decimal values, and numbers involving currency symbols are formatted.
- *Library-list values* — These values define the system library list and initial user library list. A **library list** is an ordered group of libraries used by a job to search for objects it needs for processing. A **library** is a directory of related objects on the AS/400.
- *Message and logging values* — These values control how the system handles and records certain types of messages.
- *Security values* — These values control certain aspects of security on the AS/400, such as the maximum number of invalid sign-on attempts allowed.
- *Storage-system values* — These values define the minimum size and activity level (number of active jobs) of the base storage pool.
- *System-control values* — These values let you define or obtain certain controlling values of your system, such as operator console name, user assistance level, and date and time to automatically **IPL** the system. (An IPL, or **Initial Program Load**, is the AS/400 version of a "boot" process, which loads the operating system when the power is turned on.)

Most users can display current system values, and, when necessary, authorized users can change these values. This capability to customize system values for a particular job environment can lead to a more efficiently running system. In the lab for this lesson, you learn how to examine system values.

Licensed Programs

Besides the operating system, which must be present on all AS/400s, several software components available from IBM extend the functions and capabilities of the system and let installations tailor the system to the type of work and the communications environment they need. These software components are **licensed program products**. A few licensed program products are shipped with all AS/400s at no additional cost, but for the most part, licensed program products are chargeable, the actual cost usually being determined by the size of the system and the number of users having access to the product. Most of the licensed program products fall into one of several categories:

- *Application development tools* — This group of programmer utilities greatly expedites the application development process. The tools include an all-purpose smart editor called Source Entry Utility (SEU), Screen Design Aid (SDA), an interactive file-update utility called Data File Utility (DFU), and a programmer's workbench suite called Programming Development Manager (PDM).
- *Communications support* — This category consists of the many Client Access (formerly known as PC Support) programs that let the AS/400 connect programmable workstations (PCs) through various PC operating systems, including Windows and OS/2.
- *OfficeVision* — This integrated family of utilities provides daily, weekly, and monthly calendars for both individuals and groups; mail and message handling; creation and updating of documents and folders; and word processing.

- *Programming languages* — Traditionally, the AS/400 has supported a number of programming languages by making compilers available as licensed programs. In the past, Basic, Fortran, Pascal, and PL/I were supported, but current and future compiler support will be targeted at RPG, C, C++, Cobol, and Java. In addition, Structured Query Language (SQL) is available through the DB2 Query Manager and SQL Development Kit.

Some other licensed program products that don't clearly fall into any of the above categories provide services such as automatic routing and database access for incoming customer calls (CallPath/400), mainframe-style interactive screen support (CICS/400), and double-byte character support for ideographic languages such as Chinese, Japanese, and Korean. In fact, there are many more such products designed to extend the versatility and usefulness of the AS/400.

You can see which licensed programs are installed on your AS/400 by going through the Work with Licensed Programs (LICPGM) menu. You learn how to get there in the lab.

User Profile

When we refer to a **user**, we mean any person who is signed on to the system. This may include students, programmers, data-entry personnel, operators, and administrators. To perform work on the AS/400, a user needs to be known to the system. A user becomes known to the system when a security officer or administrator creates a **user profile** object for that user. A user profile not only identifies a user but also describes the user's authority and is the source of several operational characteristics of that user's job. (At the lowest level of system security, it is possible to sign on to the AS/400 without having a predefined user profile, but most installations operate at a security level that requires a user profile for each user.)

Later, we examine user profiles in more detail and see that they contain information defining, for example, a user's

- *class*, such as casual user, programmer, operator, or security officer
- *special authorities*, such as job control, the capability to save system software, or the capability to create or change user profiles
- *initial program*, or the program to be run when sign-on is completed
- *group profile*, which assigns a user to a group of users with similar authorities and restrictions

At this time, you need only be aware of the two user-profile values necessary to sign on: *user name* (or user ID) and *password*.

Sign-On

Figure 1.1 shows a normal AS/400 **sign-on screen**. The upper-right corner of the sign-on screen displays information that identifies the system, subsystem, and **display device** (or display station). A display device is the workstation hardware (monitor and keyboard) that you use to communicate with the system.

Note
As will be the case with many of the figures used in this text, certain values shown in Figure 1.1, such as the System value and the display device name, will differ for your AS/400. Although more than half a million AS/400s are now installed worldwide, it is a safe bet that no two are exactly the same, so screens dealing with configuration values or individual users can certainly vary widely from place to place.

Figure 1.1

Typical Sign-On Screen

```
                         Sign On
                                      System . . . :   S1Ø31BGM
                                      Subsystem . . :   QINTER
                                      Display . . . :   PCSTAFFS1

                      User  . . . . . . . . .        _____
                      Password  . . . . . . .        _____
                      Program/procedure . . .        _____
                      Menu  . . . . . . . . .        _____
                      Current library . . . .        _____
```

To sign on and start an interactive job, a user must type his or her user name and password. A user name is one to 10 characters long; the security administrator determines its value according to the standards of the installation. The user name may be a simple first initial and last name combination, such as JSMITH. Or it may be a more symbolic code, perhaps indicating the user's location or department; for example, JMS05DM could mean a user with the initials JMS of department 05 in Des Moines.

For a sign-on attempt to succeed, the user name entered must match the name of the user-profile object created by the system security officer or administrator. If a nonexistent user-profile name is entered, the system displays an appropriate error message. An error also occurs if the user name is valid but the password entered at the sign-on screen does not match the current password stored in the corresponding user profile. In either case, the sign-on attempt fails.

When a user enters proper values on the sign-on screen for User and Password, the system proceeds to collect attributes to define the interactive job. Most attributes are taken from a special or default **job description**, but some attributes come from the user profile or from system values.

When sign-on is completed, the interactive job is directed to the subsystem shown on the display (e.g., QINTER in Figure 1.1). Jobs from all physical display devices may run in the same subsystem, or different display devices may direct their jobs to different subsystems. A system administrator knowledgeable in **work management** and performance tuning makes these decisions.

User Interface

Unless system defaults are changed, most AS/400 interactive jobs begin by displaying the AS/400 Main menu, shown in Figure 1.2.

In a hierarchy of menus, the Main menu is the highest-level task-oriented menu on the AS/400, and it can be the starting point to define a menu path to accomplish a specific request. Menus are connected in such a way that a menu choice at a higher level can take you to a lower-level menu. You move through the menu hierarchy until the task is defined to the system. For example, if you wanted to create a library on an AS/400, you would follow the menu path shown in Figure 1.3, starting with the Main menu. We step through this process in the next section.

Figure 1.2
AS/400 Main Menu


```
 A ──   MAIN                          AS/400 Main Menu
                                                       System:   S1031BGM
         Select one of the following:

              1. User tasks
              2. Office tasks
              3. General system tasks
              4. Files, libraries, and folders
              5. Programming
 B ──         6. Communications
              7. Define or change the system
              8. Problem handling
              9. Display a menu
             10. Information Assistant options
             11. Client Access/400 tasks

             90. Sign off

         Selection or command
 C ──    ===>_____

 D ──   F3=Exit    F4=Prompt    F9=Retrieve    F12=Cancel    F13=Information Assistant
        F23=Set initial menu
        (C) COPYRIGHT IBM CORP. 1980, 1998.
```

Figure 1.3
AS/400 Menu Path for Creating a Library
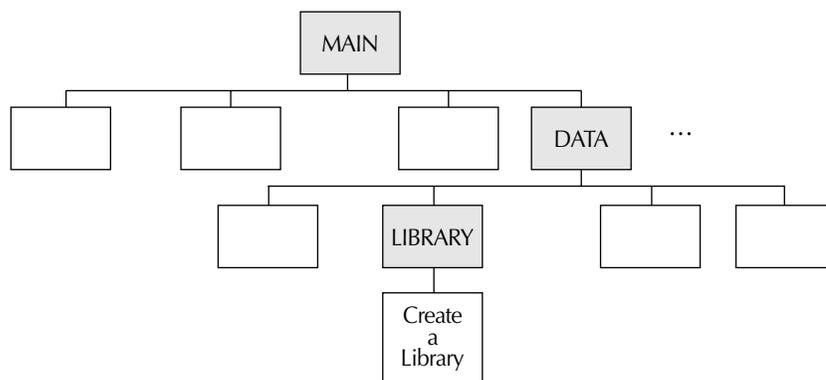
Menu Screens

Let's begin our discussion of AS/400 display screens by examining the menu screen format. A **menu screen** has four primary sections, as indicated in Figure 1.2:

A. the **screen header**, including

- the menu ID, in the upper-left corner
- the menu description, centered on the first line
- the system name, in the upper-right corner

B. the numbered list of **menu options**

C. the Selection or command line, indicated by ===> (here, you can type the number of a menu selection or enter a CL command to be executed)

D. the list of active **function keys**

Below the two-line list of active function keys is a message line (in Figure 1.2, this is the line showing the IBM copyright notice) and a status line showing cursor coordinates, whether a message is waiting to be displayed, and the status of the keyboard. (The status line does not appear in the figures.)

All menu screens have this general appearance. The header information and list of menu options, of course, change, depending the menu. The menu ID in the upper-left corner is the menu object name, the formal name by which the menu is known to the operating system. The list of enabled function keys also changes slightly from menu to menu.

Now that you're familiar with the format of a menu screen, let's look again at the Main menu in Figure 1.2. You can take several possible actions from a menu display:

- You can type and enter a menu choice and go on to the next screen.
- You can ask for Help.
- You can type a CL command and either prompt for parameters or run the command.
- You can use a function key.

Although most system functions can be invoked directly by using CL commands, it is generally easier for novice users to take menu paths to describe the task to perform and then let the system choose the appropriate command. For example, let's use the menu path to create a library — a task you will be performing soon. If you entered a 4 (for Files, libraries, and folders) on the command line of the Main menu and pressed Enter, you would see the DATA menu shown in Figure 1.4. (Although the description of this menu is "Files, Libraries, and Folders," to the operating system its proper object name is "DATA.")

Figure 1.4
Files, Libraries, and Folders Menu (DATA)

```
 DATA                       Files, Libraries, and Folders
                                                         System:   S1Ø31BGM
 Select one of the following:

      1. Files
      2. Libraries
      3. Folders
      4. Client Access tasks
      5. Integrated File System




 Selection or command
 ===>_____
 _____
 F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel   F13=Information Assistant
 F16=AS/4ØØ Main menu
```

Notice the similarity in format between the Main menu and the DATA menu. From the DATA menu, you can take choice 2 (Libraries) by typing a 2 on the command line and then pressing the Enter key. Doing so takes you to the LIBRARY menu, shown in Figure 1.5.

Figure 1.5
Libraries Menu (LIBRARY)

```
 LIBRARY                         Libraries
                                                     System:   S1031BGM
 Select one of the following:

      1. Work with libraries
      2. Create a library
      3. Save a library
      4. Restore a library

     50. Save library members in System/36 format
     51. Restore library members from System/36 format

     70. Related commands




 Selection or command
 ===>_____

 F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel   F13=Information Assistant
 F16=AS/400 Main menu
```

The description of option 2, "Create a library," on the LIBRARY menu suggests that, after three menus, you have just about pinned down what it is you want to do. When you select option 2 from the LIBRARY menu, the system displays the screen shown in Figure 1.6. The system uses this type of screen, generically referred to as an **entry screen**, to request information from a user.

Figure 1.6
Create Library (CRTLIB) Command Prompt Screen

```
                         Create Library (CRTLIB)

 Type choices, press Enter.

 Library  . . . . . . . . . . . .   _____     Name
 Library type . . . . . . . . . .   *PROD          *PROD, *TEST
 Text 'description' . . . . . . .   *BLANK_____
 _____




                                                              Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
 F13=How to use this display       F24=More keys
```

Entry/Command Prompt Screens

Let's take a moment to study the screen shown in Figure 1.6. You can see clearly that it differs from a menu screen. First, notice that the heading is different. Rather than the name of a menu, the heading, "Create Library (CRTLIB)," is the name of a CL command in English followed by its AS/400 abbreviation in parentheses. Also in contrast to a menu screen, this screen does not identify the system, and instead of a numbered list of menu choices, you see a list of command parameters. The screen does display a list of active function keys but no Selection or command line.

This type of screen is considered an entry screen because the system is waiting for you to enter the value or values it needs to process your request. In this case, you enter parameter values for the CRTLIB (Create Library) CL command, which the system must execute to create a library. The cursor, as indicated in Figure 1.6, is positioned at the first character of the entry field for the Library parameter. Because the system is prompting you for a parameter value that it needs to run a command, we refer to such a screen as a **command prompt screen**. A command prompt screen is one kind of entry screen. Although we reached this particular CRTLIB command prompt screen via a menu path, if you already knew the command name, you could reach the same screen by typing CRTLIB on any command line and pressing the Prompt key, F4.

Look at Figure 1.6 again. Note that you can request additional parameters by pressing function key F10. When you press F10, the screen shown in Figure 1.7 appears.

Figure 1.7
Create Library (CRTLIB) Command Prompt Screen with Additional Parameters

```
                         Create Library (CRTLIB)

   Type choices, press Enter.

   Library . . . . . . . . . . . .   _____        Name
   Library type . . . . . . . . . .   *PROD             *PROD, *TEST
   Text 'description' . . . . . . .   *BLANK_____
   _____

                            Additional Parameters
   Authority  . . . . . . . . . . .   *LIBCRTAUT    Name, *LIBCRTAUT, *CHANGE...
   Auxiliary storage pool ID  . . .   1_            1-16
   Create authority . . . . . . . .   *SYSVAL       Name, *SYSVAL, *CHANGE...
   Create object auditing . . . . .   *SYSVAL       Character value, *SYSVAL




                                                                    Bottom
   F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
   F24=More keys
```

So that you can see more easily the elements that make up a command prompt screen, Figure 1.8 shows the CRTLIB command prompt screen divided into three columns. Notice that for each parameter, the prompt screen provides a description (**A**), an entry field showing the parameter's current value (if any; **B**), and (for most parameters) a list of valid values (**C**). If the full list of valid values cannot be displayed, ellipsis points (…) indicate additional choices. You can view the entire list of valid values by positioning the cursor anywhere on the line containing the parameter in question and pressing the Prompt function key, F4.

Figure 1.8

Create Library (CRTLIB) Command Prompt Screen Divided into Three Columns

```
                        Create Library (CRTLIB)

 Type choices, press Enter.

 Library  . . . . . . . . . . . .   _____      Name
 Library type . . . . . . . . . .   *PROD           *PROD, *TEST
 Text 'description' . . . . . . .   *BLANK_____
 ____

                           Additional Parameters
 Authority  . . . . . . . . . . .   *LIBCRTAUT      Name, *LIBCRTAUT, *CHANGE...
 Auxiliary storage pool ID  . . .   1_              1-16
 Create authority . . . . . . . .   *SYSVAL         Name, *SYSVAL, *CHANGE...
 Create object auditing . . . . .   *SYSVAL         Character value, *SYSVAL

                                                                          Bottom
 F3=Exit   F4=Prompt   F5=Refresh   F12=Cancel   F13=How to use this display
 F24=More keys
```

Ⓐ   Ⓑ   Ⓒ

To run a command, you must provide a value for any **required parameters** (i.e., those whose values must be specified for the AS/400 to execute the command). Required parameters always appear as empty input fields at the top of the command prompt parameter list. In the case of the CRTLIB command, the Library parameter is a required parameter. An attempt to run the command without a value for the Library parameter would result in an error. For other parameters in this example, you can use the **default values** provided, or you can type over any default value you need to change. Later lessons cover command prompting in more detail; for now, it is important only that you can identify a command prompt screen, that you know how to access such a screen, and that you know the reason for using it.

Using Help

Let's now consider a third type of screen, an **information screen**. Information screens do not give you menu choices to select from or prompt fields to fill in. They simply provide information that you request and give you a way back to where you were when you asked for the information.

A common type of information screen is the Help screen. You can get Help information on the AS/400 from almost any kind of display. Suppose you were creating a library and weren't sure what the parameter "Library type" meant. You could place the cursor anywhere on the line for that parameter (the cursor doesn't have to be on the input field) and then press the **Help key**, F1.

Field or Context-Sensitive Help

When you request information about a particular area on a screen, such as the Library type parameter, you are requesting what is referred to as **field Help** or **context-sensitive Help**. To continue with our example, if you placed the cursor on the Library type field of the CRTLIB command prompt screen and pressed the F1 Help key, a window would appear on the screen (Figure 1.9) that contains information about that parameter.

Figure 1.9

Field Help Text for Library Type Parameter of CRTLIB Command

```
                        Create Library (CRTLIB)

 Type choices, press Enter.

 Library . . . . . . . . . . . .  _____       Name
 Library type . . . . . . . . . .  *PROD          *PROD, *TEST
 Text 'descrip ..................................................................
 _____     :              Library type (TYPE) - Help               :
              :                                                        :
              : Specifies the type of library being created.          :
              :                                                        :
 Authority  . : *PROD                                                  :
 Auxiliary sto: This is a production library.  Database files in       :
 Create author:    production libraries cannot be opened for updating if:
 Create object:    a user is in debug mode and he requested that       :
              :    production libraries be protected.  A user can protect:
              :    all database files in production libraries by        :
              :    specifying UPDPROD(*NO) on the Start Debug (STRDBG)  :
              :    command to begin testing.  However, this protection  :
              :                                                  More...:
              : F2=Extended help   F10=Move to top   F11=InfoSeeker     :
 F3=Exit   F4=: F12=Cancel         F20=Enlarge       F24=More keys      :
 F24=More keys:..................................................................
```

Notice that the window appears just below (or sometimes just above) the field for which you requested Help and that it has its own list of active function keys. You can enlarge the window, so that it fills up the entire screen, by pressing function key F20. To cancel the Help request and return to the previous screen, you press function key F12.

Extended Help

If you were looking at a field Help window and wanted more information about the screen in general, you would press function key F2 for **extended Help**. In our continuing example, pressing F2 from the "Library type" Help would give you general information about the CRTLIB command. This extended Help would then list and describe all the command's parameters, as well as their possible values. For a screen other than a command prompt screen, extended Help describes the parts of the screen and any entry fields or options available on the screen.

If you press function key F2 (for extended Help) from the field Help screen shown in Figure 1.9, the system displays the screen shown in Figure 1.10. Notice that extended Help begins by explaining what the command (CRTLIB in this case) does. Then it lists and explains any restrictions to the use of the command. Next, it lists the error messages for the command. Last, "More…" in the lower-right corner of the screen tells you that more screens of information are available. To see these additional screens, you would press the Page down (Shift+Roll up) key.

You can get extended Help by pressing function key F2 from a field Help screen, as we did just now, or you can get it directly by pressing the Help key when the cursor is not in a context-sensitive area of a screen. On a command prompt screen, if the cursor is anywhere on the several lines above the first parameter line — including the screen header — or on a blank line below, pressing function key F1 should take you directly to extended Help.

Figure 1.10

Extended Help for the CRTLIB Command

```
                       Create Library (CRTLIB)
:......................................................................:
:                      Create Library - Help                          :
:                                                                     :
:    The Create Library (CRTLIB) command adds a new library to the    :
:    system.  Before any objects are placed into a library, the library :
:    must have been created.  When the library is created, it is actually :
:    stored as part of the internal system.  However, although it is a :
:    separate library, it appears as though it exists in the QSYS     :
:    (system) library.                                                :
:                                                                     :
:    Restriction:  You must have *AUDIT special authority to specify a :
:    value other than *SYSVAL on the CRTOBJAUD parameter.             :
:                                                                     :
:       Note:  Do not precede an entry with an asterisk unless that   :
:       entry is a "special value" that is shown (on the display or in :
:       the help information) with an asterisk.                       :
:                                                                     :
: Error messages for CRTLIB                                           :
:                                                           More...   :
:  F3=Exit help   F10=Move to top    F11=InfoSeeker    F12=Cancel     :
:  F13=Information Assistant          F14=Print help                  :
:                                                                     :
:......................................................................:
```

The AS/400 has thousands of Help screens, and you should not hesitate to use them when you have a question about how a certain screen can be used or about what the possibilities are for responding to a prompt. We rely heavily on Help screens in the lab for this lesson and in subsequent labs.

InfoSeeker

Before we leave our discussion of AS/400 Help, we should examine briefly some additional information-retrieval features of Help. On versions of OS/400 earlier than V3R1/V3R6, pressing F11 from an extended Help screen started a function called **search index**. (From Help screens within some licensed programs, such as application development tools, F11 may still invoke the search index function.) Basically, search index lets you enter a search word that the system tries to find in its internal index of topics. If the system finds topics in the index related to the search word, it returns a list of those topics. For each topic listed, you can choose to display or print the related text. We examine the function of search index later in this lesson.

For most Help screens from V3R1/V3R6 on, the search index feature has been replaced by **InfoSeeker**. InfoSeeker is the access to the AS/400 Softcopy Library — all the manuals related to the operating system and licensed program products — online. This information is available through a hierarchy of "bookshelves" that contain "books." Bookshelves are essentially collections of technical manuals related to a specific topic. InfoSeeker comes with a large number of bookshelves already built and loaded with books, but the system administrator can change the content of these bookshelves or eliminate them entirely if desired. In addition, new bookshelves can be built and populated with the appropriate books.

The softcopy library can be installed on PCs or a PC network and accessed through IBM's Book-Manager Library Reader program, part of the AS/400 Information Center in recent releases. But if InfoSeeker is installed on the AS/400, it may require substantial disk storage, especially if the manuals themselves are stored on the system's hard drive, so not all installations may choose to use InfoSeeker.

Furthermore, even if your installation has InfoSeeker running on the AS/400, individual users must have a system directory entry to access the InfoSeeker data.

You can find out whether you have InfoSeeker access by pressing F11 from a Help screen that shows F11=InfoSeeker as enabled. Or, you can enter the CL command STRINFSKR (Start InfoSeeker) from any command line. If a screen labeled "InfoSeeker" appears but the message "There are no bookshelves or books to display" is shown, it is likely you are not enrolled in the system directory. (The exact reason can be determined by examining the job log, a topic covered later.) However, if a screen similar to Figure 1.11 appears, you probably have access to the bookshelves displayed there.

Figure 1.11
InfoSeeker Bookshelf Display

```
                              InfoSeeker

      Type options, press Enter.
        1=Open   2=Search   4=Remove from view   8=Display description
        9=Put in shelf

      Opt     Description
        _     (S) **New** — AS/400 Information Center — Start Here!
        _     (S) Online Library Reference Bookshelf
        _     (S) Control Language Programming
        _     (S) ADTS CS for AS/400 (Windows) V3R2.1 Bookshelf
        _     (S) Client Access for Windows 95/NT Online Product Library
        _     (S) OS/400 V4R3 Commonly Used Books Bookshelf
        _     (S) AS/400 V4R3 Softcopy Library (Readme) Bookshelf
        _     (S) Network Computing and Groupware Bookshelf
        _     (S) Release and Information Overview Bookshelf
        _     (S) Client Integration and Server Support Bookshelf
        _     (S) Day-to-Day Operations Bookshelf
        _     (S) Host Communications Bookshelf
        _     (S) AD, Languages, and Tools Bookshelf
                                                              More...
      F3=Exit    F5=Refresh   F6=Change list   F11=Display data   F12=Cancel
      F13=Sort   F14=Clear markers
```

You can "open" a bookshelf (get to the list of books contained in the bookshelf) by selecting option 1. From the entry to InfoSeeker, most, if not all, list items will be preceded by the letter S in parentheses. This means the entry is a bookshelf. (It's possible that the entry screen could show individual books as well; these would be preceded by a B in parentheses.)

When you select the Open option on a bookshelf, InfoSeeker expands the bookshelf for you, displaying all the books in the bookshelf and letting you open or search individual books. Opening a book is much like opening a hardcopy manual — you start with the table of contents, and from there you link to the text portion of the manual for a certain topic.

InfoSeeker Tour

For a quick tour of InfoSeeker, let's say you wanted more information about subsystems on the AS/400 — how they are used, subsystem descriptions, and so on. In the InfoSeeker bookshelf list shown in Figure 1.11, you would look for a bookshelf description that might include information about subsystems. There are at least a couple of possibilities here, but concepts related to the overall system, as opposed to programming languages, utilities, and other licensed program products, are quite likely to be found in the Commonly Used Books bookshelf, so you might start looking there.

Entering a 1 in the option field for that bookshelf lists all the manuals contained in the bookshelf, as shown in Figure 1.12.

Figure 1.12

List of Manuals in Commonly Used Books Bookshelf

```
           Bookshelf-OS/400 V4R3 Commonly Used Books Bookshelf

   Type options, press Enter.
     1=Open   2=Search   4=Remove from shelf   8=Display description
     9=Put in shelf

   Opt     Description
    _       AS/400 System Operation V3R6
    _       System Upgrade Road Map (RISC to RISC) V4R3
    _       Getting Your AS/400 Working for You V4R2
    _       AS/400 Basic System Operation, Administration, and Problem Handling V4
    _       Security - Basic V4R1
    _       OS/400 Security - Reference V4R3
    _       OS/400 Backup and Recovery V4R3
    2       OS/400 Work Management V4R3
    _       OS/400 Communications Configuration V4R1
    _       AS/400 Programming Reference Summary V4R3
    _       AS/400 Software Installation V4R3
    _       AS/400 Local Device Configuration V4R1
    _       AS/400 Road Map for Changing to PowerPC Technology V4R3
                                                                      Bottom
   F3=Exit    F5=Refresh   F6=Search all   F11=Display data   F12=Cancel
   F13=Sort   F14=Clear markers
```

As you can see, one of the manuals is *OS/400 Work Management*. Remembering that subsystem is a work management concept, you can try searching that manual.

Entering a 2 (Search) in the option field for a book brings you to the search screen, shown in Figure 1.13.

Figure 1.13

InfoSeeker Search Prompt Screen

```
                              Search

   Type search request, press Enter.

   Match type . . . . . . . . .  3      1=Fuzzy
                                        2=Exact, any case
                                        3=Exact, case sensitive


   Search for:
     Subsystems_____

   _____




   Phrase separator . . . . . .  ,
   Wildcard . . . . . . . . . .  *



   F3=Exit    F6=List searches   F9=Retrieve   F10=Change search options
   F11=View search results       F12=Cancel    F13=Word check
   (C) COPYRIGHT IBM CORP. 1980, 1998.
```

Because "subsystem" is a commonly used term in work management, we try to avoid a large number of search hits by entering the term as "Subsystems" and requesting an exact, case-sensitive match, as

illustrated. Even so, we might get a warning that a large number of search matches were found. If we disregard the warning and forge ahead, a screen similar to the one shown in Figure 1.14 should next appear.

Figure 1.14

Search Results of Work Management Manual for Search Word "Subsystems"

```
                        Search Results- Subsystems
                                                   Lines 1 to 8 of 8
    To view topic, tab to topic heading, press Enter.
    To expand or compress lines, tab to + or -, press Enter.

    █ + 4.0  Chapter 4.  Subsystems
      + 4.1.10  Active and Inactive Subsystems
      + 4.8.1  Relationship between Job Queues and Subsystems
      + 4.2.8  Pool Numbering Schemes
      + 4.1  Subsystem Introduction
      + FRONT 1  Summary of Changes to Work Management
      + 4.2.9  How to Number Pools
      + E.0  Appendix E.  Work Management APIs and Exit Programs




                                     Bottom of List of search matches
    F3=Exit      F5=Show topics only    F6=Show first matches    F11=Go to
    F12=Cancel   F13=Show all matches for a topic    F24=More keys
```

Judging from the list of search matches, a whole chapter of the *OS/400 Work Management* manual is devoted to subsystems. To get to the beginning of the chapter, use the Tab key to move the cursor to the chapter heading, and then press Enter to jump into the manual at that location. Doing so from the screen in Figure 1.14 takes you right to the selected topic, as shown in Figure 1.15.

Figure 1.15

Beginning Text of Work Management Manual, Chapter 4, Subsystems

```
                    Book-OS/400 Work Management V4R3
                      4.0  Chapter 4.  Subsystems
                                           Topic lines 1 to 17 of 17
    █


       4.0  Chapter 4.  Subsystems


        4.1 Subsystem Introduction
        4.2 Storage Pools
        4.3 Activity Levels of Storage Pools
        4.4 Controlling Levels of System Activity
        4.5 Work Entries
        4.6 Routing Entries
        4.7 Workstation Device Allocation
        4.8 Job Queue Allocation
        4.9 Communications Devices and Mode Allocation
        4.10 The Controlling Subsystem

                                                    Bottom of 4.0
    F2=Set 2     F3=Exit book    F6=Search    F10=Move to top    F11=Go to
    F12=Cancel   F13=Services    F14=Go to next match            F24=More keys
```

The beginning of the chapter lists the subtopics within the chapter, each of which is a **hypertext link** (displayed in yellow on color monitors or in high intensity and underlined on monochrome monitors). You can position the cursor on any hypertext link and either press Enter or double-click to jump directly to that subtopic within the chapter.

From there, you can page down to read through the topic, page up to see what precedes it, or use other hypertext links to jump to other topics. All the entries in the search-results list shown in Figure 1.14 are hypertext links.

To sum up, InfoSeeker lets you search a book (or bookshelf) for a certain word or phrase, display related information, and print topics from the text when required. Overall, InfoSeeker provides a fast, efficient way to look up information in AS/400 manuals and is most useful to programmers, operators, and technical users. We don't require InfoSeeker access in this text because many beginning students probably do not have it, but you should be aware of InfoSeeker, and if you need it, you should talk to your system administrator about enrollment in the system directory.

Information Assistant

Another function key option found on Help screens from V3R1 of the operating system forward is F13=Information Assistant. Pressing F13 takes you to a menu named INFO whose description is "**Information Assistant** Options." (Because this is a menu, you can also access it from any command line by using the CL GO command — i.e., GO INFO.)

The menu has several options, as shown in Figure 1.16.

Figure 1.16

Information Assistant Options — F13 from the AS/400 Help Screen

```
 INFO                     Information Assistant Options
                                                   System:    S1Ø31BGM
To select one of the following, type its number below and press Enter:

     1.   Where do I look for information?
     2.   How can I comment on information?

    1Ø.   What's new this release?
    11.   What's coming in the next release?

    2Ø.   Start InfoSeeker (BookManager)
    21.   Start online education

    23.   Work with problems
    24.   Start search index




Type a menu option below
     __

F3=Exit   F12=Cancel
(C) COPYRIGHT IBM CORP. 198Ø, 1998.
```

Although all users should be able to reach this menu, the usefulness of some of the options depends on the way individual systems are configured and the level of authority an individual user has.

Choices 1 and 2 provide a little insight about finding information and providing feedback about the quality of information to IBM.

Choices 10 and 11 may or may not appear on your INFO menu, depending on your operating-system release. Choice 10 lists the improvements in the current installed release of the operating

system over the previous release. It provides hypertext links to several different topics, but the information provided is brief at best. For many of the topics, however, references to more in-depth coverage are provided. Choice 11 previews the upcoming operating-system release, but only if the pertinent information has been made available to the current release.

Choice 20 provides another way to start InfoSeeker, in addition to the Help screen's F11 key or the STRINFSKR command. The same restrictions apply: InfoSeeker must be installed, and you must be enrolled in the system directory.

IBM makes a number of online education courses available for a cost, and if your installation has purchased and installed these, choice 21 lets you see the courses you are enrolled in and start or continue working on a course. If choice 21 comes up empty, either no courses exist on your system or you have not been authorized to use them. See your system administrator for more information.

System operators and administrators use choice 23 to document problems encountered on the system and their resolution. Without special authority, you probably cannot use the WRKPRB (Work with Problems) command that this menu choice invokes. Choice 24 lets you start the search index function mentioned earlier in this lesson. If no indexes are currently attached to your profile, this option gives you a way to add a search index or indexes. If one or more indexes are already available, you can search those indexes for a search word and display or print whatever information is found. In a later lab, we add an index and use it to search for certain topics.

Search Index

Just to show you how the search index works, let's assume you took option 24 from the INFO menu. If you had already selected the Application Development Tools (ADT) index to use for the search index, a screen similar to the one shown in Figure 1.17 would appear.

Figure 1.17
Search Index Starting Screen with Application Development Tools Index

```
                            Search Index

Type options, press Enter.  (+ indicates an expandable topic)
  5=Display topic   6=Print topic   7=Expand topic   8=Compress topic

Opt   Topic
      Application Development Tools Information
  _      About ADT Information (ADT)
  _    + Application Development Tools (ADT)
  _    + Application Development Manager/400 (App)




                                                          Bottom
Or type search words and press Enter.  (*indicates a topic match)
_____
F3=Exit help   F5=All topics   F6=Main topics   F11=Hide structure
F12=Cancel     F13=Information Assistant   F18=More indexes   F24=More keys
```

If you tab the cursor to the command line and enter the search word "object type" (a search "word" doesn't have to be a single word), a list of related topics like the one shown in Figure 1.18 should be displayed.

Figure 1.18

Sample Search Index Related Topics List

```
                          Search Index

Type options, press Enter.  (+ indicates an expandable topic)
  5=Display topic   6=Print topic   7=Expand topic   8=Compress topic

Opt   Topic
      Application Development Tools Information
  _     + Application Development Tools (ADT)
  _       + Programming Development Manager (PDM)
  _         + Using Objects (PDM)
  _     *       Changing an Object Using DFU (PDM)
  _     *       How Objects are Organized (PDM)
  _      + Application Development Manager/400 (App)
  _     *    User-Defined Types (App)



                                                        Bottom
Or type search words and press Enter.  (*indicates a topic match)

object type_____
F3=Exit help    F5=All topics    F6=Main topics    F11=Hide structure
F12=Cancel      F13=Information Assistant    F18=More indexes    F24=More keys
```

Note that this screen differs from other screens we have discussed so far. It is not a menu or an information screen, and it's not a command prompt screen, yet its general format is very common on the AS/400.

List or Work-With Screens

The type of screen shown in Figure 1.18 is called a **list screen**, a list-processing screen, or, often, a "work-with" list screen because it so commonly results from running a "Work with" CL command. We use these list screens extensively in our labs and explain more about their power and flexibility in later lessons.

On the list screen in Figure 1.18, note that under the screen heading it says, "Type options, press Enter." Four options are provided:

5=Display topic

6=Print topic

7=Expand topic

8=Compress topic

Other list screens may offer a larger number of options; some only one. Beneath the options is the item list — in this case, a list of topics returned by the search. You can type an appropriate option in front of any topic, and the system will process your request. In fact, you can type the same or different options for several items before pressing Enter; when you press Enter, the system processes them all, from top to bottom, one after another.

To find out about the topic "How Objects are Organized (PDM)," you would type 5 on the option field for that topic. The system would then display Figure 1.19, which provides some basic information and defines some terms related to object organization.

Figure 1.19

Help Screen Providing Information About Object Organization in PDM

```
 Help                       How Objects are Organized (PDM)

     Objects are the basic unit on which commands perform operations on
     the AS/400 system.  For more information about how objects are
     organized on the AS/400 system and how they relate to PDM, refer to
     the Programming Development Manager User's Guide and Reference.

     An object is a named unit that consists of a set of features that
     describe the object.

     There are many types of objects.  For example, the object type for a
     library is *LIB, the object type for a file is *FILE, and the object
     type for a program is *PGM.

     Objects also have subtypes know as attributes.  For example, the
     attribute of an object of type *PGM could be RPG to describe the
     type of program.

     A library is a special type of object of type *LIB that is used to
     group related objects.  Therefore, a library is a directory to a
                                                                 More...
 F3=Exit help   F10=Move to top   F12=Cancel   F13=Information Assistant
 F14=Print help
```

Notice that more pages of information are available (as indicated by "More…" at the lower-right corner of the screen).

We now have briefly discussed four different types of screens that the AS/400 uses to communicate with interactive users. They are

- menu screens
- entry screens — Command prompt screens are a common type of entry screen.
- information screens — Help screens are frequently used types of information screens. Help screens include extended Help and field or context-sensitive Help.
- list screens, also known as list-processing or work-with list screens

Being familiar with these screen types and knowing how each is used can help you overcome that sense of being lost in a foreign environment that users so often have as they learn about a new system. As you work through the lab exercises, try to identify each screen you encounter — doing so will help you maintain your orientation. Think about how you got to each new screen, and if you do get lost, remember that function key F12 backs you out one screen at a time. When you successfully complete a task, use F3 to return to a common starting point, such as the Main menu.

Key Terms

batch jobs	library
CL program	library list
command line	licensed program products
command parameters	list screen
command prompt screen	menu interface
context-sensitive Help	menu options
Control Language (CL)	menu screen
default values	multitasking
display device	multiuser
entry screen	object
extended Help	object type
field Help	OS/400
function keys	required parameters
Help key	screen header
hypertext link	search index
Information Assistant	sign-on screen
information screen	subsystem description
InfoSeeker	subsystems
Initial Program Load (IPL)	system values
interactive job	user
job	user profile
job description	work management
job queue	

Lab 1

Introduction

This lab is intended to provide experience with the main topics covered in the Lesson 1 text: system values, licensed program products, and basic CL command use. We examine these topics through use of the four types of screen displays: menus, information screens, entry screens, and lists. Rather than building objects or generating output, the goal of this lab is for you to become accustomed to recognizing and using the four types of screens by having you use them to explore some important system components.

Part 1

   ✓ **Goals**   Recognize the AS/400 sign-on screen
            Sign on successfully
   ✓ **Start at**   AS/400 sign-on screen
   ✓ **Procedure** Enter a valid user ID and password

1.1. Make sure the power is turned on at your workstation. If the screen shows no display, try pressing the spacebar and turning up the brightness control on your terminal. You should see the AS/400 sign-on screen, similar to Figure 1.1 (page 6).

   If you are not yet at this screen, you are probably working at a nondedicated terminal that requires you to switch sessions or "boot" to a local area network. Because many different

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possibilities exist for connecting workstations to AS/400s, your instructor/mentor should provide you with specific instructions. If you need help, ask your instructor/mentor for assistance.

1.2. The sign-on screen is a special type of entry screen. You are expected to key in and enter certain information to identify yourself to the system, but function keys and Help information are not available.

Look at the identification information in the upper-right corner of the screen.

1.2a. What values are shown for the System, Subsystem, and Display attributes of your workstation?

The Display name is the name by which your workstation is known to the system. It will also be the name of your interactive job.

Note

Before you sign on, let me warn you about keyboard mapping, or the AS/400 functions to which different PC keyboard keys are assigned. Keyboard mapping is another area where differences exist from one installation to another (or even among different types of keyboards or connections within installations). In general, the Tab key on a PC keyboard equates to the 5250 (older, nonprogrammable workstation) keyboard's Field advance key. The 5250 Field exit key, which erases everything in the current field from the cursor location and then jumps to the next input field, may be mapped on PC keyboards to either the Enter key or the right Ctrl (Control) key, depending on which 5250 emulation product was used (or whether remapping was done). Other products, such as the popular MochaSoft TN5250 for TCP/IP, map the Field exit key to the large "+" key on the numeric keypad. There are too many mapping variations to try to list here, but if you're working through a Windows client, you should see a toolbar with a keyboard button at the top of your screen (or you can try clicking Windows Help for "Keyboard Mapping" information). Clicking the keyboard button lets you find out how various system functions are mapped on your keyboard.

Begin the sign-on procedure by typing your first initial plus (without spacing) last name for the User value:

FLastname

Your user name will appear in capital letters, even if your keyboard is not shifted to upper case. (Don't worry about case.) A space character is not a valid character within a name. A user name, like most AS/400 names, has a maximum length of 10 characters. So if your whole last name won't fit, just key as many characters after your first initial as space allows, and truncate the rest. If this is not how the system administrator entered the user ID of your user profile, your instructor/mentor will provide other information.

Don't press Enter yet. If your user ID is 10 characters long, the cursor will already be in the Password input field; otherwise, use the Tab, New line, or Field exit key to move there:

TAB (or NEW LINE or FIELD EXIT)

Initially, all student profiles are created using a password that's the same as the user ID — that is, your first initial and up to nine characters of your last name. As you key in your password, remember that for security purposes the characters are not displayed on the screen, so type carefully:

FLastname

If you think you made a mistake and you haven't pressed Enter yet, backspace and type over what you've entered. If you typed too many characters the first time, press the Field exit key (after you've typed your password) to erase the rest of the input field above and to the right of the cursor.

Once you've keyed in your password, press the Enter key. (Remember that the Enter function may be mapped to the right Ctrl key on your keyboard.)

ENTER

If an error code and the message "Password not correct for user profile" appear near the bottom of the screen, try rekeying your password and then pressing the Field exit key and Enter. If the message persists, ask your instructor/mentor for assistance.

If you see a different message — "User (user name) does not exist" — your user profile cannot be found and you need to have your instructor/mentor check it out before you can go any further.

Part 2

✓ **Goals**   Recognize menu screen
                     Follow menu path to licensed programs
                     Find out which licensed programs are installed on your system
✓ **Start at**   Main menu (GO MAIN)
✓ **Procedure**   Enter choice 7 from MAIN
                     Enter choice 2 from DEFINE
                     Enter choice 10 from LICPGM

2.1. Once you have successfully signed on, you should be looking at the AS/400 Main menu, similar to Figure 1.2 (page 7). Notice the cursor located on the Selection or command line. You may either select a menu choice by typing its number here or enter a command on this line.

Let's follow a menu path to examine the installed IBM licensed programs on your system. The submenu descriptions aren't always very clear, and sometimes you may guess wrong, but licensed programs are part of the definition of the system, so choice 7, "Define or change the system," might be a good guess. Type 7 on the command line, and then press Enter.

7
ENTER

   2.1a. What is the "proper" name (as it is known to the system) of the Define or Change the System menu?

2.2. From here, option 2 is the obvious candidate for our purpose. Type 2 on the command line and press Enter.

2
ENTER

   2.2a. Which of the four screen types discussed in the text are you looking at now? (Be careful: despite its name, it has neither an options list nor input fields to select options.)

2.3. Let's take choice 10 to display installed licensed programs. Type 10, and press Enter.

10
ENTER

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The screen you are looking at now should be similar to the one shown in Figure 1.20, but the actual list of programs will differ depending on what is installed on your system.

Figure 1.20
Display Installed Licensed Programs Screen

```
               Display Installed Licensed Programs
                                          System:    S1031BGM
Licensed    Installed
Program     Status        Description
5716SS1     *COMPATIBLE   OS/400 - Library QGPL
5716SS1     *COMPATIBLE   OS/400 - Library QUSRSYS
5716SS1     *COMPATIBLE   Operating System/400
5716SS1     *COMPATIBLE   OS/400 - Extended Base Support
5716SS1     *COMPATIBLE   OS/400 - Online Information
5716SS1     *COMPATIBLE   OS/400 - Example Tools Library
5716SS1     *COMPATIBLE   OS/400 - *PRV CL Compiler Support
5716SS1     *COMPATIBLE   OS/400 - Host Servers
5716CB1     *COMPATIBLE   Integrated Language Environment COBOL/400
5716CB1     *COMPATIBLE   ILE COBOL/400 - COBOL/400
5716CL1     *COMPATIBLE   Application Dev ToolSet Client Server/400
5716CM1     *COMPATIBLE   Communications Utilities/400
5716CX1     *COMPATIBLE   ILE C/400
5716DCT     *COMPATIBLE   Language Dictionaries for OS/400
                                                       More...
Press Enter to continue.

F3=Exit   F11=Display release   F12=Cancel

(C) COPYRIGHT IBM CORP. 1980, 1998.
```

Like many displays on the AS/400, this screen has more than one format. Function key F11 lets you change the display from one format to another.

2.3a.   Press F11 to cycle through the screens. How many formats does this display have?

Display the screen that shows "Installed Release."

All program components have a Licensed Program number, a Description, and an Installed Release, which gives the Version, Release, and Modification for each component. Because IBM upgrades the operating system and most of the licensed programs approximately yearly, the Installed Release values tell you which "edition" of the software you have.

2.3b.   Of the four types of screens we discussed in the text, which type is this?

2.3c.   Which "edition" of operating-system software is your system using?

2.3d.   What is the licensed program number of Application (APP) Development (DEV) ToolSet for AS/400?

2.3e.   What is the licensed program number of Query for AS/400?

We use Application Development ToolSet and Query extensively in later labs.

The programming languages most commonly used on the AS/400 include RPG, Cobol, and C. For now, the AS/400 also supports Pascal, Fortran, Basic, and PL/I. C++ and Java are relative newcomers to the AS/400, and you may not yet find these languages among the installed licensed programs of some traditional RPG or Cobol shops. The relational database language, SQL, is another powerful tool available for accessing and manipulating database files.

2.3f.   List the languages installed on your system.

Part 3

✓ **Goals**   Use Help to get more information about displays
✓ **Start at**   Command line: GO LICPGM
                   Enter choice 10 from LICPGM
✓ **Procedure**   Press Help key/F1 from the Display Installed Licensed Programs screen

3.1. The cursor should still be in the upper-left corner of the screen. If your display does not show the Installed Release column, press F11 to change formats until that column appears. Notice again the layout of the screen — a title, a system identifier, three columns of information, and Enter/function key information toward the bottom. Extended Help explains the purpose of the screen as well as the type of information provided. Press the Help key (F1) now to get more information about this display.

F1

You should now be looking at the extended Help for Display Installed Licensed Programs, Figure 1.21.

Figure 1.21
Display Installed Licensed Programs Help Screen

```
                Display Installed Licensed Programs
:.............................................................................:
:                          Display - Help                                    :
:                                                                            :
:    The Display Installed Licensed Programs display shows a list of         :
:    licensed programs, optional parts of the licensed programs, and         :
:    IBM-supplied user libraries installed on your system.                   :
:                                                                            :
:       Note:  New licensed programs or new optional parts of licensed       :
:       programs that are shipped independently of an operating system       :
:       release will not appear on this display until the next release       :
:       of the operating system is installed.  Use the Display Software      :
:       Resources (DSPSFWRSC) command to see a list of the new licensed      :
:       programs or optional parts of licensed programs that were            :
:       shipped independently of an operating system release.                :
:                                                                            :
:    Use F11 to see alternate views of this display.  Alternate views        :
:    display the installed status, the installed release level, and the      :
:    number associated with each part of the licensed program.               :
:                                                              More...        :
: F3=Exit help   F10-Move to top   F11=Search Index    F12=Cancel            :
: F13=Information Assistant         F14=Print help                           :
:                                                                            :
:............................................................................:
```

Extended Help explains the display in general and then gives information about specific parts of the display — in this case, the columns of information. Whenever "More…" appears at the bottom-right corner of the screen, you can use the Page down key or press Shift+Roll up to see the next screen of information.

Page down now and read the explanation of "Installed Release."

PAGE DOWN

3.1a. How can you tell when a licensed program has not been installed successfully?

Now press F12 to exit extended Help. Then press F11 to change to the screen format showing "Product Option."

F12
F11

Context-sensitive Help provides information about the field or column upon which the cursor is positioned. Move the cursor to the column header itself or anywhere below it within the Product Option column of data, and then press F1 for Help.

F1

A window should appear describing the meaning of "Product Option." Instead of "More…", the word "Bottom" should be displayed in the lower-right corner of the screen, indicating that no additional information about this topic exists. Context-sensitive Help gives you information only about the cursor-selected field, but you can learn about other areas of the screen by asking for extended Help (F2) from a context-sensitive Help screen.

3.1b. According to the "Product Option" Help display, what do all licensed programs have in common?

Part 4

✓ **Goals**	Use the Position to field to change the displayed part of a list	
	Locate and display information about specified system values	
✓ **Start at**	Main menu — use F3 to back up or GO MAIN	
✓ **Procedure**	Enter choice 7 from MAIN	
	Enter choice 8 from DEFINE	
	Use Page up/down and the Position to field to locate specified system values	

If you have just finished Part 3, press F3 from the Licensed Programs list until you have returned to the Main menu. You should always try to use F3 to back out to a starting screen when you have finished the current task.

4.1. We've mentioned system values as being control and configuration values critical to system operation. Let's use the menu path to examine some system values.

We'll start with the same second-level menu because "system values" would seem to have something to do with the Main menu's "Define or change the system" selection.

7
ENTER

4.2. From the DEFINE menu, take choice 8, Work with system values.

8
ENTER

You should now be looking at the screen in Figure 1.22.

Figure 1.22

Work with System Values Screen

```
                    Work with System Values
                                            System:   S1031BGM
Position to  . . . . ._____  Starting characters of system value
Subset by Type . . . . .*ALL___   F4 for list

Type options, press Enter.
  5=Display

         System
Option   Value       Type       Description
  _      QABNORMSW   *SYSCTL    Previous end of system indicator
  _      QACGLVL     *MSG       Accounting level
  _      QACTJOB     *ALC       Initial number of active jobs
  _      QADLACTJ    *ALC       Additional number of active jobs
  _      QADLSPLA    *ALC       Spooling control block additional storage
  _      QADLTOTJ    *ALC       Additional number of total jobs
  _      QALWOBJRST  *SEC       Allow object restore option
  _      QALWUSRDMN  *SEC       Allow user domain objects in libraries
                                                             More...
Command
===>_____
F3=Exit   F4=Prompt   F5=Refresh   F9=Retrieve   F11=Display names only
F12=Cancel
```

This is a list screen, also called a list-processing screen or a work-with list screen. The list consists of a number of similar items on which the user can perform processing options. In this case, the items are all system values, and the only option provided with a user's or programmer's authority is Display. The system security officer or another user with sufficient authority would also have a Change option. Notice that all system values begin with Q.

4.3. With the cursor on the first Option field, press the Help key (F1).

  F1

Because Option is a designated area of the screen, you get field (or context-sensitive) Help, which tells you only how to use that field. Now press function key F2 to display extended Help.

  F2

Read the general description of the Work with System Values display.

4.3a. Where can you find a listing of the shipped (as they come from IBM) system values?

Read the Help information about using the Position to field.

4.3b. What predefined value positions you to the bottom of the list?

For most list screens, it is possible to show just a subset of the list (i.e., a part of the entire list) by specifying some subset selection criterion. In the case of the Work with System Values list, the criterion would be the type of system value.

4.3c. How many different system-value types does the Help text show? Note that *ALL is not a system-value type but a keyword or special value that means "include all values."

4.4. Press F3 to return to the Work with System Values list.

  F3

4.4a. What is the current value of Subset by Type?

4.4b. Can you find, among the list items, all the different types mentioned in the Help text in this list? (You may need to page down.)

4.4c. Which system value would you display to find out the level of user assistance set for your system?

Move the cursor to the Option field next to that system value name. Type 5 to display the value, and press Enter.

5
ENTER

4.4d. To what level is your system user assistance set?

Notice that this time an option (5) taken from a list screen has brought you to an information screen. Other options from other list screens may take you to an entry screen, a command prompt, or another list screen. Still other options may run a command, leaving you at the same screen.

Also notice that there are three ways to leave this screen: Enter, F3, and F12. Each alternative takes you to the same place — back to the list screen. Press one of these keys now to return to the work screen.

ENTER (or F3 or F12)

4.5. You know from the previous Help information that on list screens with a Position to field, typing *TOP or *BOT positions the list to the very first or the very last item in the list.

Back tab (Shift+Tab) the cursor to the beginning of the Position to field. Type *BOT, and then press Enter.

SHIFT+TAB
*BOT
ENTER

4.5a. What is the last system-value name in the list?

4.6. Move the cursor back to the beginning of the Position to field.

To find out how many times you can make a mistake while trying to sign on, locate the Maximum sign-on attempts value. Perhaps you are fairly sure that the system-value name starts with the characters QMAX. If you key the beginning characters of a list item that you're searching for, the system displays that part of the list starting with the first item matching the characters you entered. Let's try it!

Type QM on the Position to field, and press Enter.

QM
ENTER

Move the cursor to the option for Maximum sign-on attempts allowed, take the Display option, and press Enter.

(Display option)
ENTER

4.6a. How many attempts are allowed on your system?

Now return to the list screen. The cursor should still be on the Option field for QMAXSIGN.

Let's see what happens if you type in the Position to field a value that's less than the lowest (first) value in the list. (Relative values are determined by the computer's collating sequence; as in a telephone directory, any name beginning with A through P would be less than a name beginning with Q.)

Move the cursor to the Position to field (use back tab), and type a single letter lower than Q. Then press Enter.

4.6b. Where in the list has the cursor been repositioned?

4.6c. What predefined value could you have used to accomplish the same thing?

4.7. Using the information displayed for the appropriate system value, answer the following questions:

4.7a. Is your system set to AUTOmatically configure newly installed local (not virtual) devices?

Use Help for the system value discovered in step 4.7a to answer the next two questions.

4.7b. Autoconfiguration names each device according to a naming convention. (Hint: Read the Help information for QAUTOCFG.) What other system value controls which naming convention will be used?

4.7c. Does a change to the system value found in step 4.7a take effect when the system is re-IPLed or right away?

4.7d. Display the system value discovered in step 4.7b that controls the naming convention. Which naming convention does your system use?

4.7e. According to the naming convention, what kind of device would the device name PRT01 be used for? (Hint: Use Help.)

4.7f. From the system-value list, find the device name your system identifies as the system console.

4.7g. How many system values are there having to do with passwords? (Hint: OS/400 spells password PWD.)

You examine other system values in later labs, but now you need to look at another frequently used type of entry screen to complete your tour of common user displays.

First, return to the AS/400 Main menu by pressing F3 two or three times.

F3
F3
(F3)

Lab 1

Part 5

✓ **Goals**   Become familiar with the command prompt screen
                         Recognize required parameters of command prompt
                         Use Help to get information about specific parameters
✓ **Start at**   Any command line (press F3 to back out to a command line if necessary)
✓ **Procedure** Enter CPYF on the command line
                         Request Help from the CPYF command prompt screen

5.1. In the text of Lesson 1, we briefly discussed CL and examined the syntax of CL commands. We said that most commands have parameters, but the system doesn't expect us to remember all the parameters and their order for each command. Of course, when you type a command, you may include the required parameters if you know them; but if you don't know how to enter them, or you don't know which ones you need, you can use the command prompting facility simply by pressing F4 after typing the command. Then the system displays a command-prompt entry screen for you. Or, if you type only a command name and press Enter, the operating system displays a prompt screen if the command requires parameter values. (Most commands do.)

Let's see how command prompting works.

Type CPYF, for the CL Copy File command, on the command line and press Enter.

CPYF
ENTER

You should now see an entry or command prompt display with a message appearing at the bottom of the screen.

5.1a. What does the message say?

Notice the plus sign (+) at the right side of the message line. If an action causes more than one message, or if a message won't fit on the single line provided, the + appears to let you know that more of the message exists. To get to the additional message text, move the cursor down to the message line and press Page down.

5.1b. What does the next message say?

The input fields for missing required parameter values are highlighted in reverse-image blocks on the screen. This happens whenever you run a command (by pressing the Enter key) without providing necessary parameter values. Normally, if you realize that parameter values are required, you would use the prompt function (F4) instead of pressing Enter.

5.2. The command prompt screen shows you information that the system needs to execute the command. For many parameters, the system provides default values. Those values are already entered on the line when the command is initially prompted. The default value for the From member parameter, for example, is *FIRST, meaning the first member (subset of records) in the file. Default parameter values are most often predefined "special values" that begin with an asterisk (*).

Notice the indentation of Library under From file and To file. All objects are logically part of a library; the Library value qualifies the file object name, telling the system which library to search for the file object. So Library isn't a separate parameter but part of the From file or To file object name. The default library value is *LIBL, another special value that tells the system

to search the list of libraries currently assigned to this job. We explore the important concept of a library list in more detail in the next lesson.

Also notice that the only valid choice listed for From file is Name (in other words, no special values are allowed for this parameter). This means that you must identify the From file, specifying the user-defined name given to the object when it was created. This is a reasonable request — after all, even an intelligent operating system such as OS/400 can't read your mind to find out which file you want to copy!

5.2a. What is the default for Print format?

Even if a command has several screens of parameters, as the CPYF command does, the parameters that require a value are shown on the first screen. The entry fields of these required parameters will be blank, with the underlines in high intensity (on color displays, the underlines will be white or a contrasting color). If you tried to run a command without supplying the required values, the entry fields of the required parameters would be displayed in reverse image, along with an error message.

For other parameters, you can simply type over any defaults that need to be changed.

5.3. You can use the AS/400 online Help facility when you need to know what a certain display is for, what a particular command does, or what value a certain parameter requires. On many displays, you can obtain specific information about a given entry from context-sensitive Help by moving the cursor to that area or line and then pressing the Help key.

For example, let's see what Help tells you about the From file parameter. Position the cursor anywhere on the From file line of the CPYF command prompt screen. Now press the Help key (F1) to get information from the system about the meaning of the From file parameter.

F1

5.3a. The file you name must be one of four types of files — what are they?

General Help that explains the purpose of the screen, the command, entry fields, and perhaps function keys is called extended Help. You can get extended Help in one of two ways:

• Press F2 from a field Help screen like the one you are looking at now. Go ahead, try it.

  F2

• The second way is to press F1 or Help from a non–field-sensitive area of the screen.

From the extended Help for the CPYF command that you should be looking at now, press F3 to return to the CPYF command prompt screen.

F3

Place the cursor in a part of the screen that is not sensitive to an entry or zone. For example, move the cursor up so it is on a line anywhere above the first input field line.

Now press F1 or the Help key.

F1

You should see the same Copy File Help screen that you saw when you pressed F2 for extended Help previously.

Let's review the organization of extended Help. First, there is an explanation of the general topic — in this case, the CPYF command. Now page down, and you see restrictions to the

Lab 1

use of the command followed by error messages that could result. Following error messages, you begin to see field Help — in this case, explaining the parameters of the CPYF command and their possible values.

PAGE DOWN (several times)

Many screens of Help information are available for the CPYF command because it has a large number of parameters and therefore many fields.

Now use F3 to exit Help and then F3 again to return to the AS/400 Main menu.

F3
F3

From the Main menu, you can take choice 90 to Sign off. Doing so will return you to the AS/400 sign-on screen.

Whenever you're finished using the workstation, remember to follow your installation's lab procedures to protect the equipment and leave the workstation ready for the next user.

In Summary

In this lesson, we examined some important AS/400 characteristics. We discussed the interactive nature of the system and the idea of how jobs are run in subsystems. We know that an interactive job is started when a user signs on to the system and that, at normal operational security levels, a user profile must exist for a sign-on to be successful.

Once on the system, most users rely on several different types of screens to accomplish their tasks. Most work on the system can be done by traversing a series of menus. As we progress down the menu path, we are clarifying to the system what task we want to accomplish until an appropriate command can be executed. The command may take us to another screen, such as an information or a list screen, or it may run a program; or if the command has no required parameters, it may invoke a system function.

We also examined the AS/400's Help facility, and we realize that for most system displays, Help is available both at the extended and at the field or "context" level.

As you work through subsequent lab exercises, you should always try to maintain your orientation — what kind of display you are at, what the purpose of that display is, and how you got there. And use Help freely when you have questions about a display or are uncertain about the meaning of an input field or the use of a function key.

The AS/400 can tell you a lot about itself if you just ask for Help.

Mastering the AS/400, Third Edition

Lab 1 Answer Sheet

Name: _____

Date Due: _____   Class Time: _____

1.2a. System: _____   Subsystem: _____   Display: _____

2.1a. _____

2.2a. _____   2.3a. _____

2.3b. _____   2.3c. _____

2.3d. _____   2.3e. _____

2.3f. _____

3.1a. _____

3.1b. _____

_____

4.3a. _____

4.3b. _____   4.3c. _____

4.4a. _____

4.4b. _____

4.4c. _____   4.4d. _____

4.5a. _____   4.6a. _____

4.6b. _____   4.6c. _____

4.7a. _____   4.7b. _____

4.7c. _____   4.7d. _____

4.7e. _____

4.7f. _____   4.7g. _____

5.1a. _____

5.1b. _____

5.2a _____

5.3a. _____