

Preface

The Purpose of This Book

IBM's AS/400 is still a relatively new technology, different in many important ways from other computers — large and small — that have gone before it. But there should be no doubt by now that the AS/400 is here to stay and that the demand will continue to grow for trained programmers and operators who can use the AS/400 to its best advantage.

Having accepted the responsibility several years ago for training students to meet this need, I was immediately overwhelmed by the lack of affordable, suitable materials for this purpose, especially in a structured, hands-on lab environment.

Driven by panic, I immediately set out to put together lab materials that would impress upon students the unique character of the AS/400 while teaching them the introductory skills they would need to go on to higher-level AS/400 courses.

Those lab materials have evolved into this textbook, which I hope will provide serious students of the AS/400 with a guidebook that opens to them the horizons of this remarkable machine. If this book succeeds, students who complete it should have a solid foundation in AS/400 library-object structure, utilities and database management capabilities, application development tools, and OS/400 Control Language.

Currently, the course that this book was designed for is a prerequisite to all AS/400 programming and database courses at Kirkwood Community College. As such, it eliminates the need to cover introductory topics such as SEU, PDM, and DDS in programming and database courses.

Intended Audience

This book was originally intended for students of a two-year technical curriculum at a community college, probably as a second-semester course following a general introduction to computers. I hope, however, that computer professionals from other platforms who need to work on the AS/400 — as well as university students trying to program on the AS/400 without benefit of an introductory course — will find this book useful as a self-study guide for getting up to speed in the shortest possible time.

Special Features

The primary teaching methodology of this book is structured, hands-on lab exercises. It is essential that all students have access to an AS/400 and, if not to a formal instructor, to an experienced programmer who can serve as mentor. I firmly believe that the best way to become familiar with the terrain of a new environment is to work your way through it on the ground — and that is exactly the orientation of this book.

I expect that students will spend at least as much time working through the extensive lab exercises at the end of each lesson as in reading and studying the text itself. I am convinced that students who diligently work through the labs — not just to finish them, but with a sense of exploration and a dedication to understanding — will come away with a sense of accomplishment and the confidence to journey on.

Summary of Contents

This book is divided into twelve lessons. Each lesson consists of a text, which presents and explains the concepts that are the lesson's focus; and a lab, which allows the immediate transmission of concept into application. The text of each lesson begins with a lesson overview and a list of objectives and ends with a list of key terms that must be mastered to explain and communicate the concepts.

Each lab consists of an ordered number of activities, or steps, that guide the student through the lab's objective. A number of questions in each lab serve to document the student's observations as he or she progresses through the lab. At the end of each lesson is a short summary that highlights the important concepts.

Lesson 1 provides an overview of the AS/400 environment from a programmer's or operator's perspective. It provides initial exposure to menus, entry screens, list screens, and information screens. And it emphasizes the availability of interactive help on the system and provides an introduction to InfoSeeker and Information Assistant.

Lesson 2 examines Control Language (CL) syntax and uses CL examples to help students create a library, examine their library list, and change their user profile.

Lesson 3 provides an introduction to object-based systems and, more specifically, to objects on the AS/400. It explains in detail the concept of library lists and how objects are stored and retrieved on the system. It also introduces printer spooling and the use of output queues.

Lesson 4 covers in detail the entire operation of printing output from printer device files through the spooling subsystem to output queues and printer writers. Students learn how to manage spooled files and how to print them when needed.

Lesson 5 provides an introduction to Data Description Specifications (DDS) as the primary means of describing database files. The chapter also provides a brief introduction to Source Entry Utility (SEU) and Programming Development Manager (PDM). Using SEU, students describe a database physical file in DDS.

Lesson 6 builds on the use of PDM and SEU and describes the process of compiling a database source physical file member to create a file object. Students create a physical file and add records using the Data File Utility (DFU).

Lesson 7 introduces Query/400 and covers many of its more useful features, including join queries. Students create several queries and learn to change query output from display to a printed report.

Lesson 8 provides an introduction to logical files. The lesson explains simple, multiple-format, and join logical files and presents examples of each. Students also are introduced to projection, selection, and access paths. Students create new physical files and then base several new logical files on them.

Lesson 9 covers the procedures for making changes to an existing database file, explaining and contrasting the CRTDUPOBJ (Create Duplicate Object) and CPYF (Copy File) commands. In addition, the lesson introduces the powerful parameters of the CHGPF (Change Physical File) command that let you change the record format of a file while keeping the data intact. This lesson also introduces object and library authorization and the different levels of authority, including authorization lists and group profiles.

Lesson 10 covers the creation of permanent Data File Utility (DFU) programs. The lesson explains various features and options of permanent DFUs and presents examples of DFUs for keyed files and multiple-format logical files. Students create their own DFU programs. In addition, this lesson provides a brief introduction to Structured Query Language (SQL), which gives students another tool to query and update their files. Students use command-line SQL to query the database and add, change, and delete database records.

Lesson 11 provides an overview of Screen Design Aid (SDA). The lesson covers many features of SDA and explains how to create menus and display files.

Lesson 12 introduces CL programming. The lesson explains many of the important commands that provide structure and flexibility to CL programs. Students create several working CL programs.

Note to Students

The basic premise of this book is that craftsmanship comes from the practical application of concepts, and it follows that the greatest potential benefit of this book is in the lab exercises. Please approach each lab exercise in the spirit of discovery and challenge. If your goal is truly to learn, then insist on not merely observing, but understanding what you are doing in the labs. Do not work mechanically through them — you will end up learning little. If questions arise that are not answered in the materials, remember that the AS/400 itself contains a great deal of interactive help.

Note to Instructors

In the lab exercises, students create their own libraries, output queues, and other objects as needed. Initially, all that is required to get them started is a *PGMR class user profile with *NONE special authority. (This is not the default for programmer class, but no special authority is required and allowing students job control can cause problems.) I do not use group profiles for Intro students. Nor do I restrict any commands beyond the implicit restrictions of their class authority. I have found this arrangement to work very well with no serious problems for several years and several hundred students.