

## Preface

ILE RPG, the version of the RPG language that participates in IBM's Integrated Language Environment (ILE), represents a dramatic step forward in RPG's evolution. ILE RPG (also known generically as RPG IV) diverges from its predecessor, RPG/400 (aka RPG III), in significant ways. In many ways, though, ILE RPG maintains backward compatibility with older versions of RPG. Programs written using earlier RPG syntax can be readily converted to the new syntax. Although such backward compatibility is a practical solution for language developers and programmers, it means that the language must retain some components that, in fact, the new features make obsolete.

Writing a textbook about a new version of a language presents authors with a difficult decision: How much emphasis to give to those features that, although still available in the language, really represent an outmoded approach to programming? Giving obsolete syntax equal importance with the language's more modern features might inappropriately encourage students to write outdated code; at the very least, equal coverage can unnecessarily complicate the learning process. However, ignoring those obsolete features completely would give students an incomplete understanding of the language and would ill prepare them for program-maintenance tasks. With the introduction of free-format specifications, the challenge becomes even more problematic than before. The free-format syntax represents a much more dramatic departure from traditional columnar RPG than did previous releases.

This textbook tries to solve the dilemma by initially presenting students with the most suitable, modern techniques that ILE RPG offers for solving typical programming problems. As ILE RPG becomes widespread, it's important to present students with the language in its most current form, using the style and techniques that will serve them for the long term. Thus, the bulk of the book features the appropriate methods and strategies that contemporary programmers use, relegating much of the older style, operations, and fixed-format techniques to a special section in many chapters: "Navigating Legacy Code." This section still discusses ILE RPG, but it points out older coding styles that may appear in programs that programmers may have to maintain.

*Programming in ILE RPG* tries to bridge the gap between academia and the business world by presenting all the facets of RPG that a professional programmer needs. The material is introduced incrementally, and the book is organized so that students quickly begin writing complete, although simple, programs. Each successive chapter introduces additional information about RPG syntax and fundamental programming methods so that students become increasingly proficient at developing RPG programs—programs that grow in complexity as students progress through the book.

Each chapter includes a brief overview, which orients students to the material contained in the chapter, and a chapter summary, which reviews the chapter's major points. The end-of-chapter sections include discussion and review questions and exercises designed to help students develop their analytical and problem-solving skills, as well as their proficiency with RPG syntax.

## NEW STRUCTURE MAKES LEARNING EASIER

The structure and order of this edition of *Programming in ILE RPG* have dramatically changed from previous editions of *Programming in RPG IV*. The new sequence of topics is the result of actual experience using the existing materials in both corporate training and academic institutional environments. We think you'll find that the new order and the new topics work better than previous editions to methodically introduce students to RPG. This edition also places much more emphasis on ILE and on Structured Query Language (SQL) than did previous editions. It enhances earlier coverage of procedures, service programs, binding, and APIs. The material uses Release 7.2 as a baseline and is current at that release and later.

Appendix A and the downloadable "ILE RPG Style Guide" are intended to be reference material not only for students but also for working RPG programmers. Appendix A serves as a reference digest of RPG specifications, keywords, and miscellaneous entries. The style guide suggests style guidelines for writing programs that will be easy to read, understand, and maintain.

Although a complete introduction to using IBM i programmer tools is beyond the scope of this text, Appendix B introduces students to working on the system by using Rational Developer for i (RDi) as well as the older, but still widely used, Programming Development Manager (PDM). This appendix also acquaints students with RDi's LPEX editor and PDM's Source Entry Utility (SEU). Appendix C provides some insights into program testing and debugging, often bewildering processes for beginning programmers.

Depending on the length of the school term and the pace of the course, some instructors may choose to present this material over two terms. Instructor materials are available to those instructors adopting this text for classroom use. The materials provide answers to the review questions and solutions to the exercises. The instructor materials also include the source code for the solutions to the programming assignments and copies of the output produced by the solutions. The materials contain two versions of the databases used in the text. One is based on traditional files developed using DDS, and the other is an SQL schema.

## SUPPLEMENTAL MATERIALS ONLINE

Supplemental materials offer students further opportunity to hone their programming skills. These programming assignments, their accompanying data files, and an ILE RPG style guide, are available for download at [www.mc-store.com/Programming-ILE-RPG-Fifth-Edition/dp/1583473793](http://www.mc-store.com/Programming-ILE-RPG-Fifth-Edition/dp/1583473793). Or simply scan the QR code at the end of this section to access the download links on the book's Web page.

The programming exercises for each chapter are arranged roughly in order of difficulty, so that instructors can assign programs appropriate to their time schedules and their students' abilities. Although none of the program solutions are long by commercial standards, some of the necessary algorithms are quite difficult; the assignments require time and effort on the students' part to develop correct solutions. Unfortunately, there is no easy road to becoming a good programmer, nor can students learn to deal with program complexity by merely reading or talking it about it. Programming, as much as any other activity we know, is truly a matter of learning by doing. Those students interested in becoming IT professionals must recognize that they have chosen a rewarding—but demanding and challenging—profession, and they need to realize that they must be willing to work hard to succeed in this profession.

To give students experience developing application systems, rather than programming in a vacuum, most of the programming assignments relate to three fictitious organizations and their application needs. By working on these assignments, students should gain a sense of how a company's data files are repeatedly used by numerous applications for different, related purposes. To find supplemental information about each of these entities, including database files, visit the following sites:

- Pyxis Global Airlines: [www.pyxisair.net](http://www.pyxisair.net)
- Cloud Services 24x7: [www.cloudservices24x7.net](http://www.cloudservices24x7.net)
- Wibaux University: [www.wibaux.net](http://www.wibaux.net)

(This supplemental information is also available at the previously mentioned *mc-store.com* link.)

The following supplemental materials for this book are available for download at [www.mc-store.com/Programming-ILE-RPG-Fifth-Edition/dp/1583473793](http://www.mc-store.com/Programming-ILE-RPG-Fifth-Edition/dp/1583473793).

- Programming Assignments
- ILE RPG Style Guide
- Data Files for Programming Exercises

Or scan the QR code to access this book's supplemental materials:



## **ADDENDUM**

Shortly after this book was published in September 2015, IBM announced support for “fully free” RPG, which allows RPG code anywhere on a source line, from column 1 to the end of the line.

The first line of any source file that contains fully free code must contain the special **\*\*FREE** directive in column 1 of the first source line. **\*\*FREE** cannot be coded anywhere but the first line. After that line, the

entire source member must be free-format. If the program requires fixed-format code, it must be in a copybook. If a copybook uses fully free code, it must have its own **\*\*FREE** directive. You can copy a fully free copybook into “classic” source, and you can copy a classic copybook into fully free source.

There is no limit on the length of a source line, other than the record length of a source physical file. The **/COPY** directive will also allow any length for the copybook, and copybooks may be IFS files with a long path.

**/FREE** and **/END-FREE** directives are not allowed in fully free code.

RD<sub>i</sub> Release 9.5 supports **\*\*FREE**.

*Programming in ILE RPG* (5th Edition) uses classic free-format examples, but they also apply to fully free-format RPG; simply add the **\*\*FREE** directive to the beginning of the program.