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An Object-Oriented Perspective

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An Object-Oriented Perspective

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Preface

The term *software engineering* has been used extensively in different contexts. In a broader sense, software engineering encompasses every aspect of software systems; these include models, algorithms, programming, and management. Depending on one's interest, different perspectives of software engineering have been produced: project managers have emphasized managerial aspects of software products, programmers efficient programming, and computer scientists modeling and automating the programming process.

This book first introduces a number of software life cycle models and the basic concepts of object-oriented systems. Subsequently it discusses in more detail different phases of a software life cycle, with an emphasis on the object-oriented paradigm: "Formal Specification and Verification" (Chapter 3), "Design Methodologies and Specifications" (Chapter 4), "Programming and Coding" (Chapter 5), "Program Verification and Testing" (Chapter 9), and "Software Maintenance" (Chapter 10). Two of the six phases, namely, the requirement stage and the integration stage, are not covered extensively in separate chapters; rather in Chapter 1, several approaches to software integration are briefly discussed. It is my understanding that these two stages have been less understood in the past and more systematic approaches are yet to be developed. Several managerial issues related to software project management are covered in Chapter 12. Approaches to distributed software development are discussed in each stage whenever possible.

I cover the following subjects in more detail: "Programming Tools" (Chapter 6), "Declarative Programming" (Chapter 7), and "Automatic Program Synthesis and Reuse" (Chapter 8). The roles played by the preceding are shown graphically in the diagram below. With the aid of software libraries, programming tools allow a program to be composed with off-the-shelf modules, fully tested by experts, to increase the productivity of programmers and the quality of the software produced. Automatic program synthesis, although not a reality yet, can provide a shortcut from requirements specifications to maintenance. Declarative programming on the other hand is somewhat less ambitious but may relieve programmers of many implementation details. These chapters summarize the current status of such issues. Chapter 11 covers advanced software engineering environments that span several stages of the software development process; these

Scope of the book.

include knowledge-based programming environments, visual programming environments, distributed object-oriented programming environments, component software services, and concurrent engineering environments. Chapter 12 discusses issues of interest to software engineers; these include project management, fault-tolerant systems, discrete event simulation, and Internet programming.

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Although I tried my best to make this book an ideal one, I am sure it is not free of errors, typos, or omissions. I will appreciate it if the reader kindly lets me know of them. Suggestions for improvements will be deeply appreciated as well.

P. C.-Y. Sheu

Irvine, California

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