

























































- 1  Chapter 15  
Program Development and Programming Languages
- 2  Chapter 15 Objectives
- 3  What Is a Computer Program?
  - 1  **What is a computer program?**
  - 2  ❖ **Set of instructions that directs computer to perform tasks**
- 4  The Program Development Life Cycle
  - 1  **What is the program development life cycle (PDLC)?**
  - 2  ❖ **Steps followed to build computer programs**
- 5  The Program Development Life Cycle
  - 1  **How is program development related to system development?**
  - 2  ❖ **Program development is ongoing process within system development**
- 6  Step 1 – Analyze Problem  
**What is involved in analyzing the problem?**
- 7  Step 1 – Analyze Problem
  - 1  **What is an IPO chart?**
  - 2  ❖ **Identifies program's inputs, outputs, and processing steps**  
❖ **Used to establish design specifications**
- 8  Step 2 – Design Programs  
**What is involved in designing programs?**
- 9  Step 2 – Design Programs
  - 1  **What is a hierarchy chart?**
  - 2  ❖ **Used to show program modules graphically**  
❖ **Also called structure chart or top-down chart**
- 10  Step 2 – Design Programs
  - 1  **What is structured design?**
  - 2  ❖ **Technique that builds all program logic from combination of three basic control structures**
- 11  Step 2 – Design Programs
  - 1  **What is a sequence control structure?**
  - 2  ❖ **Shows one or more actions following each other in order**  
❖ **Actions could be**
    - **Inputs**
    - **Processes**
    - **Outputs**
- 12  Step 2 – Design Programs
  - 1  **What is a selection control structure?**
  - 2  ❖ **Tells program which action to take, based on a certain condition**

- 13  Step 2 – Design Programs  
1 **What is an if-then-else control structure?**
- 14  Step 2 – Design Programs  
**What is a case control structure?**
- 15  Step 2 – Design Programs  
1 **What is a repetition control structure?**  
2 ♦ **Used when program performs one or more actions repeatedly as long as certain condition is met**
- 16  Step 2 – Design Programs  
1 **What is a do-while control structure?**  
2 ♦ **Repeats one or more times as long as condition is true**
- 17  Step 2 – Design Programs  
1 **What is a do-until control structure?**  
2 ♦ **Tests condition at end of loop**
- 18  Step 2 – Design Programs  
1 **What is a proper program?**  
2 ♦ **No dead code**  
♦ **No infinite loops**  
♦ **One entry point**  
♦ **One exit point**
- 19  Step 2 – Design Programs  
1 **How are entry and exit points shown?**  
2 ♦ **Each control structure should have one entry point and one exit point**
- 20  Step 2 – Design Programs  
1 **What is a program flowchart?**  
2 ♦ **Graphically shows logic in a solution algorithm**
- 21  Step 2 – Design Programs  
1 **What is a Nassi-Schneiderman (N-S) chart?**  
2 ♦ **Graphically shows logic in a solution algorithm**
- 22  Step 2 – Design Programs  
1 **What is pseudocode?**  
2 ♦ **Uses condensed form of English to convey program logic**
- 23  Step 2 – Design Programs  
1 **What is a quality review?**

- 2 **Review of program design**
    - Desk check
    - Structured walkthrough
- 24  **Step 3 – Code Programs**
  - 1 **What is involved in coding programs?**
  - 2 **Two steps**
    - Translating solution algorithm into a programming language
    - Entering programming language code into the computer
- 25  **Step 4 – Test Programs**
  - 1 **What is involved in testing programs?**
  - 2 **Goal is to ensure program runs correctly and is error free**
    - Three types of errors
      - Syntax
      - Logic
      - Run time
- 26  **Step 4 – Test Programs**
  - 1 **What is debugging?**
  - 2 **Process of locating and correcting syntax and logic errors in program**
- 27  **Step 5 – Formalize Solution**
  - 1 **What is involved in formalizing a solution?**
  - 2 **Programmer performs two activities**
    - Reviews program code
    - Reviews documentation
- 28  **Step 6 – Maintain Programs**
  - 1 **What is involved in maintaining programs?**
  - 2 **Two activities**
    - Identify errors
    - Identify enhancements
      - Involves modifying existing programs to improve their functionality
- 29  **Categories of Programming Languages**  
**What are the categories of programming languages?**
- 30  **Categories of Programming Languages**  
**What are low- and high-level programming languages?**
- 31  **Categories of Programming Languages**
  - 1 **What is machine language?**
  - 2 **Only language computer understands directly**
- 32  **Categories of Programming Languages**
  - 1 **What is assembly language?**

- 2 ✦ Instructions made up of symbolic instruction codes
- 33 ☐ Categories of Programming Languages
- 1 **What is a third-generation language (3GL)?**
- 2 ✦ Uses a series of English-like words to write instructions
- ✦ Procedural language
- Requires program instructions to tell computer what to accomplish and how to do it
- 34 ☐ Categories of Programming Languages
- 1 **What is a compiler?**
- 2 ✦ Program that converts entire source program into machine language before executing it
- 35 ☐ Categories of Programming Languages
- 1 **What is an interpreter?**
- 2 ✦ Program that translates and executes one program code statement at a time
- ✦ Does not produce an object program
- 36 ☐ Categories of Programming Languages
- 1 **What is a fourth-generation language (4GL)?**
- 2 ✦ Syntax is closer to human language than that of a 3GL
- ✦ SQL and report generator are examples
- 37 ☐ Categories of Programming Languages
- 1 **What is a fifth-generation language (5GL) ?**
- 2 ✦ Provides visual or graphical interface for creating source code
- ✦ Visual Basic.NET is an example
- 38 ☐ Object-Oriented Program Development
- 1 **What is the object-oriented (OO) approach ?**
- 2 ✦ Programmer can package data and program (or procedure) into a single unit, called an object
- ✦ Class is larger category of objects
- 39 ☐ Object-Oriented Program Development
- 1 **What is an object-oriented programming (OOP) language?**
- 2 ✦ Language that uses the OO approach
- ✦ OOP is event-driven
- Checks for and responds to set of events
- ✦ C++ is complete object-oriented language
- 40 ☐ Programming Languages
- 1 **What are the most widely used programming languages?**
- 2 ✦ Hundreds of programming languages exist

- 41  Programming Languages
- 1 **What is BASIC?**
  - 2
    - ❖ Designed for use as a simple, interactive problem-solving language
    - ❖ Beginner's All-purpose Symbolic Instruction Code
- 42  Programming Languages
- 1 **What is Visual Basic?**
  - 2
    - ❖ Windows-based application that assists programmers in developing event-driven Windows-based applications
- 43  Programming Languages
- 1 **What is COBOL?**
  - 2
    - ❖ Procedural language with English-like statements that make it easy to read, write, and maintain
    - ❖ Common Business -Oriented Language
    - ❖ 70 billion lines of code exist
- 44  Programming Languages
- 1 **What is C?**
  - 2
    - ❖ Powerful language designed primarily to write system software
- 45  Programming Languages
- 1 **What is C++?**
  - 2
    - ❖ Object-oriented programming language
    - ❖ Includes all elements of C language, plus additional features for working with object-oriented concepts
- 46  Programming Languages
- 1 **What is RPG?**
  - 2
    - ❖ Easy-to-write nonprocedural language used primarily in small businesses
    - ❖ Report Program Generator
- 47  Program Development Tools
- 1 **What are program development tools?**
  - 2
    - ❖ User-friendly software products designed to help both program developers and nontechnical users create solutions to information requirements
- 48  Program Development Tools
- 1 **What is Visual Basic for Applications (VBA)?**
  - 2
    - ❖ Used to write own macros in Word, Excel, Access, and PowerPoint
    - ❖ Use objects, classes, and other object-oriented concepts

- 49 ☐ Web Page Program Development  
**What Web page development tools are available?**
- 50 ☐ Web Page Program Development  
**How does HTML code look?**
- 51 ☐ Web Page Program Development  
**How are special effects and forms added to a Web page?**
- 52 ☐ Web Page Program Development  
1 **What is the common gateway interface (CGI)?**  
2 ✦ **Communications standard that defines how Web server communicates with clients**
- 53 ☐ Web Page Program Development  
1 **What is dynamic HTML (DHTML)?**  
2 ✦ **Allows you to include more graphical interest and interactivity on Web page**
- 54 ☐ Web Page Program Development  
**What are XML, XHTML, and WML?**
- 55 ☐ Web Page Program Development  
1 **What is the .NET Platform?**  
2 ✦ **Environment for developing and running applications**  
✦ **Allows for creation and running of Web services**
- 56 ☐ Web Page Program Development  
1 **What is Web page authoring software?**  
2 ✦ **Creates sophisticated Web pages using a tool that is much easier to use than HTML**  
✦ **Generates HTML**
- 57 ☐ Multimedia Program Development  
1 **What is multimedia authoring software?**  
2 ✦ **Combines text, graphics, animation, audio, and video into interactive presentation**  
✦ **Also called authorware**
- 58 ☐ Multimedia Program Development  
1 **How is multimedia authoring software used?**  
2 ✦ **Creates computer-based training (CBT)**  
✦ **CBT software called courseware**  
✦ **Distance learning, distance education, or online learning**
- 59 ☐ Selecting a Programming Language or Program Development Tool  
**What factors should be considered in selecting a programming language?**
- 60 ☐ Summary of Program Development and Programming Languages

- ❖ What is a computer program?
- ❖ The program development life cycle
- ❖ Object-oriented program development
- ❖ Programming languages
- ❖ Program development tools
- ❖ Web page program development
- ❖ Multimedia program development
- ❖ Selecting a programming language