

- distributed computing 5
- dynamic content 9
- edit phase 12
- editor program 12
- executable image 14
- execute 14
- execute phase 12
- FORTAN (FORmula TRANslator) 10
- function 8
- gcc compilation command 14
- hardware 2
- hardware platform 7
- high-level language 7
- input device 4
- input unit 4
- International Standards Organization (ISO) 2
- Internet 5
- interpreter 7
- Java 9
- link phase 12
- linker 13
- linking 13
- load phase 12
- loader 14
- loading 14
- local area network (LAN) 5
- logical unit 4
- machine dependent 6
- machine language 6
- mainframe 3
- memory 4
- memory unit 4
- Moore's Law 15
- multi-core processor 5
- multiprocessor 5
- multitasking 10
- .NET platform 10
- object 9
- object code 12
- object-oriented programming (OOP) 9
- output device 4
- output unit 4
- Pascal 10
- persistent information 5
- personal computing 5
- portable program 7
- preprocess phase 12
- preprocessor 12
- preprocessor directive 12
- primary memory 4
- program clarity 15
- secondary storage unit 5
- server 5
- software 2
- software reusability 8
- standard error stream (stderr) 14
- standard input stream (stdin) 14
- standard output stream (stdout) 14
- structured programming 10
- supercomputer 3
- translation 6
- translator programs 6
- Visual Basic 10
- Visual C++ 10
- Visual C# 10
- volatile information 4
- World Wide Web 6

## Self-Review Exercises

1.1 Fill in the blanks in each of the following:

- a) The company that popularized personal computing was Apple.
- b) The computer that made personal computing legitimate in business and industry was the IBM PC.
- c) Computers process data under the control of sets of instructions called computer program.
- d) The six key logical units of the computer are the Input, Output, Memory unit, ALU, CPU and the SSU.
- e) The three types of languages we discussed are Machine, Assembly, and High level.
- f) The programs that translate high-level language programs into machine language are called compiler.
- g) C is widely known as the development language of the UNIX operating system.
- h) The Department of Defense developed the Ada language with a capability called multi tasking, which allows programmers to specify activities that can proceed in parallel.



1.2

Fill in the blanks in each of the following sentences about the C environment.

- C programs are normally typed into a computer using a(n) editor program.
- In a C system, a(n) preprocessor program automatically executes before the translation phase begins.
- The two most common kinds of preprocessor directives are \_\_\_\_\_ and \_\_\_\_\_.
- The linker program combines the output of the compiler with various library functions to produce an executable image.
- The loader program transfers the executable image from disk to memory.
- To load and execute the most recently compiled program on a Linux system, type ./a.out

## Answers to Self-Review Exercises

1.1 a) Apple. b) IBM Personal Computer. c) programs. d) input unit, output unit, memory unit, arithmetic and logic unit, central processing unit, secondary storage unit. e) machine languages, assembly languages and high-level languages. f) compilers. g) UNIX. h) multitasking.

1.2 a) editor. b) preprocessor. c) including other files in the file to be compiled, replacing special symbols with program text. d) linker. e) loader. f) ./a.out.

## Exercises

1.3 Categorize each of the following items as either hardware or software:

- CPU
- C++ compiler
- ALU
- C++ preprocessor
- input unit
- an editor program

1.4 Why might you want to write a program in a machine-independent language instead of a machine-dependent language? Why might a machine-dependent language be more appropriate for writing certain types of programs?

1.5 Fill in the blanks in each of the following statements:

- Which logical unit of the computer receives information from outside the computer for use by the computer? input unit
- The process of instructing the computer to solve specific problems is called programming.
- What type of computer language uses English-like abbreviations for machine-language instructions? Assembly language
- Which logical unit of the computer sends information that has already been processed by the computer to various devices so that the information may be used outside the computer? output unit
- Which logical units of the computer retain information? memory units
- Which logical unit of the computer performs calculations? ALU
- Which logical unit of the computer makes logical decisions? CPU
- The level of computer language most convenient for you to write programs quickly and easily is high-level language
- The only language that a computer directly understands is called that computer's machine language
- Which logical unit of the computer coordinates the activities of all the other logical units? CPU



statement terminator (;) 26  
 <stdio.h> header 25  
 straight-line form 35  
 string 26  
 structured programming 24  
 syntax error 30

true 38  
 type 33  
 value 33  
 variable 29  
 white space 41

## Self-Review Exercises

- 2.1 Fill in the blanks in each of the following.
- Every C program begins execution at the function main.
  - The left brace begins the body of every function and the right brace ends the body of every function.
  - Every statement ends with a(n) semi colon.
  - The printf standard library function displays information on the screen.
  - The escape sequence \n represents the new line character, which causes the cursor to position to the beginning of the next line on the screen.
  - The scanf Standard Library function is used to obtain data from the keyboard.
  - The conversion specifier %d is used in a scanf format control string to indicate that an integer will be input and in a printf format control string to indicate that an integer will be output.
  - Whenever a new value is placed in a memory location, that value overrides the previous value in that location. This process is said to be destructive.
  - When a value is read out of a memory location, the value in that location is preserved; this process is said to be non destructive.
  - The if statement is used to make decisions.

State whether each of the following is true or false. If false, explain why.

- Function printf always begins printing at the beginning of a new line. F
- Comments cause the computer to print the text enclosed between /\* and \*/ on the screen when the program is executed. F
- The escape sequence \n when used in a printf format control string causes the cursor to position to the beginning of the next line on the screen. T
- All variables must be defined before they're used. T
- All variables must be given a type when they're defined. T
- C considers the variables number and NuMbEr to be identical. F (case sensitive)
- Definitions can appear anywhere in the body of a function. F
- All arguments following the format control string in a printf function must be preceded by an ampersand (&). F
- The remainder operator (%) can be used only with integer operands. T
- The arithmetic operators \*, /, %, + and - all have the same level of precedence. F
- The following variable names are identical on all Standard C systems. F  
 thisisasuperduperlongname123456Z  
 thisisasuperduperlongname1234568

- l) A program that prints three lines of output must contain three printf statements. F

2.3 Write a single C statement to accomplish each of the following:

- Define the variables c, thisVariable, q76354 and number to be of type int.
- Prompt the user to enter an integer. End your prompting message with a colon (:) followed by a space and leave the cursor positioned after the space.
- Read an integer from the keyboard and store the value entered.



- g) printf( "Remainder of %d divided by %d is\n", x, y, x % y );
- h) if ( x = y ) ;  
printf( "%d is equal to %d\n", x, y );
- i) print( "The sum is %d\n", x + y );
- j) Printf( "The value you entered is: %d\n", &value );

My name is kh and not a

2.8 Fill in the blanks in each of the following:

- a) Comments are used to document a program and improve its readability.
- b) The function used to display information on the screen is printf.
- c) A C statement that makes a decision is if.
- d) Calculations are normally performed by arithmetic statements.
- e) The scanf function inputs values from the keyboard.

terrific

2.9 Write a single C statement or line that accomplishes each of the following:

- a) Print the message "Enter two numbers."
- b) Assign the product of variables b and c to variable a.
- c) State that a program performs a sample payroll calculation (i.e., use text that helps to document a program).
- d) Input three integer values from the keyboard and place these values in integer variables a, b and c.

Zim Zindagi

Zindagi

na milegi

dobara.

2.10 State which of the following are true and which are false. If false, explain your answer.

- a) C operators are evaluated from left to right. F
- b) The following are all valid variable names: under\_bar, m928134, t5, j7, her\_sales, his\_account\_total, a, b, c, z, z2. T
- c) The statement printf("a = 5;"); is a typical example of an assignment statement. F
- d) A valid arithmetic expression containing no parentheses is evaluated from left to right. F
- e) The following are all invalid variable names: 3g, 87, 67h2, h22, 2h. F

2.11 Fill in the blanks in each of the following:

- a) What arithmetic operations are on the same level of precedence as multiplication? division, modulus, remainder
- b) When parentheses are nested, which set of parentheses is evaluated first in an arithmetic expression? inner most pair of parentheses
- c) A location in the computer's memory that may contain different values at various times throughout the execution of a program is called a Variable Pointer.

2.12 What, if anything, prints when each of the following statements is performed? If nothing prints, then answer "Nothing." Assume x = 2 and y = 3.

- a) printf( "%d", x ); 2
- b) printf( "%d", x + x ); 4
- c) printf( "x=" ); x =
- d) printf( "x=%d", x ); 2
- e) printf( "%d = %d", x + y, y + x ); 5 = 5
- f) z = x + y; nothing
- g) scanf( "%d%d", &x, &y ); Nothing
- h) /\* printf( "x + y = %d", x + y ); \*/ nothing
- i) printf( "\n" ); nothing

isai 84, 82, 99, 9

2.13 Which, if any, of the following C statements contain variables whose values are replaced?

- a) scanf( "%d%d%d%d", &b, &c, &d, &e, &f );
- b) p = i + j + k + 7;
- c) printf( "Values are replaced" );
- d) printf( "a = 5" );