**3.1 Introduction**

(No Questions)

**3.2 Algorithms**

3.1 Specifying the order in which statements are to be executed in a computer program is called

(a) an algorithm

(b) transfer of control

(c) program control

(d) pseudocode

ANS: (c)

3.2. The two key attributes of an algorithm are:

a) actions and start activity

b) flow and order of flow

c) actions and order of actions

d) flow and start activity

ANS: (c)

**3.3 Pseudocode**

3.3 Which of the following is *true* of pseudocode programs?

(a) they are executed by the computer

(b) they help the programmer “think out” a program

(c) they typically include definitions and all types of statements

(d) all of the above are false

ANS: (b)

3.4 Pseudocode does *not* typically include \_\_\_\_\_\_\_\_\_\_.

(a) definitions

(b) input/output

(c) action statements

(d) control statements

ANS: (a)

3.5 Which statement is *false*?

a) Pseudocode is an artificial and informal language that helps you develop algorithms.

b) Pseudocode is similar to everyday English.

c) Pseudocode is an actual programming language.

d) Pseudocode programs are not actually executed on computers.

ANS: (c)

3.6 Which statement is *false*?

a) Pseudocode helps you “think out” a program before attempting to write it in a programming language such as C.

b) Pseudocode programs consist purely of characters so programmers may conveniently type pseudocode programs into a computer using an editor program.

c) A carefully prepared pseudocode program is only a beginning; it still takes a tremendous amount of work to convert a pseudocode program into a C program.

d) Pseudocode consists only of action statements.

ANS: (c)

**3.4 Control Structures**

3.7 Which of the following encompasses the other three?

(a) sequence structure

(b) iteration structure

(c) control structure

(d) selection structure

ANS: (c)

3.8 In a flowchart of an algorithm, what is the shape of the *decision symbol*?

(a) circle

(b) rectangle

(c) diamond

(d) rounded rectangle

ANS: (c)

3.9 Which of the following is an iteration statement?

(a) if

(b) if…else

(c) do…while

(d) switch

ANS: (c)

3.10 How many types of control statements exist in C?

(a) 3

(b) 7

(c) 5

(d) 2

ANS: (a)

3.11 Normally, statements in a program are executed one after the other in the order in which they are written. This is called \_\_\_\_\_\_\_\_\_\_ execution.

a) inline

b) seeking

c) ordered

d) sequential

ANS: (d)

3.12 Various C statements enable you to specify that the next statement to be executed may be other than the next one in sequence. This is called \_\_\_\_\_\_\_\_\_\_.

a) change of order

b) instruction skipping

c) transfer of control

d) rerouting

ANS: (c)

3.13 Bohm and Jacopini’s work demonstrated that all programs could be written in terms of only three control statements, namely sequence, \_\_\_\_\_\_\_\_\_\_ and iteration.

a) selection

b) serialization

c) sorting

d) searching

ANS: (a)

3.14 Which statement is *true*?

a) Unless directed otherwise, the computer automatically executes C statements one before the other.

b) The sequence structure is essentially built into C.

c) A flowchart is a pseudocode representation of an algorithm or a portion of an algorithm.

d) Like pseudocode, flowcharts are useful for developing and representing algorithms, although flowcharts are preferred by most programmers.

ANS: (b)

3.15 The \_\_\_\_\_\_\_\_\_\_ flowchart symbol is also called the action symbol.

a) small circle

b) diamond

c) rounded rectangle

d) rectangle

ANS: (d)

3.16 Flowchart symbols are connected by arrows called \_\_\_\_\_\_\_\_\_\_.

a) flowlines

b) flow of control

c) flow delimiters

d) darts

ANS: (a)

3.17 Small circle symbols in a flowchart are often called \_\_\_\_\_\_\_\_\_\_ symbols.

a) little circle

b) collision

c) connector

d) collator

ANS: (c)

3.18 The diamond flowcharting symbol is also called the \_\_\_\_\_\_\_\_\_\_ symbol.

a) determination

b) derision

c) declarative

d) decision

ANS: (d)

3.19 The \_\_\_\_\_\_\_\_\_\_ selection statement performs an action if a condition is true and skips that action if the condition is false.

a) if

b) when

c) if …else

d) switch

ANS: (a)

3.20 The \_\_\_\_\_\_\_\_\_\_ selection statement performs an action if a condition is true and performs a different action if the condition is false.

a) if

b) when

c) if…else

d) switch

ANS: (c)

3.21 The \_\_\_\_\_\_\_\_\_\_ selection statement performs one of many different actions, depending on the value of an expression.

a) if

b) when

c) if…else

d) switch

ANS: (d)

3.22 The \_\_\_\_\_\_\_\_\_\_ is called a single-selection statement.

a) if

b) when

c) if…else

d) switch

ANS: (a)

3.23 The \_\_\_\_\_\_\_\_\_\_ is called a double selection statement.

a) if

b) when

c) if …else

d) switch

ANS: (c)

3.24 The \_\_\_\_\_\_\_\_\_\_ is called a multiple selection statement.

a) if

b) when

c) if …else

d) switch

ANS: (d)

3.25 Which is *not* a C iteration statement?

a) while

b) do…while

c) for

d) do…for

ANS: (d)

3.26 Which statement is *true*?

a) Each of C’s control statements is characterized as being single-entry, single-exit.

b) Each of C’s control statements is characterized as being single-entry, multiple-exit.

c) Each of C’s control statements is characterized as being multiple-entry, single-exit.

d) Each of C’s control statements is characterized as being multiple-entry, multiple-exit.

ANS: (a)

3.27 Any C program we’ll ever need to build can be constructed from only \_\_\_\_\_\_\_\_\_\_ different control statements combined in only \_\_\_\_\_\_\_\_\_\_ ways.

a) 7, 3

b) 6, 2

c) 7, 2

d) 6, 3

ANS: (c)

**3.5 The if Selection Statement**

3.28 If grade has the value of 60 what will the following code print?

if (grade >= 60) {

puts("Passed");  
 }

(a) nothing

(b) 60

(c) Passed

(d) puts("Passed");

ANS: (c)

3.29 Indentation in the if selection statement is \_\_\_\_\_\_\_\_.

(a) always mandatory

(b) always optional

(c) only mandatory if there is more than one statement following the if statement

(d) only optional if there is more than one statement following the if statement

ANS: (b)

3.30 The C compiler ignores \_\_\_\_\_\_\_\_\_\_ characters like blanks, tabs and newlines used for indentation and vertical spacing.

a) transparent

b) translucent

c) white

d) whitespace

ANS: (d)

3.31 Which statement is *true* about the contents of a correct diamond symbol in a correct flowchart.

a) It must contain an expression that evaluates to zero or one.

b) It must contain a condition or expression that can be either true or false.

c) It must contain relational operators.

d) It must contain equality operators.

ANS: (b)

3.32 A correct decision symbol has \_\_\_\_\_\_\_\_\_\_ flowlines emerging from it.

a) 4

b) 3

c) 2

d) 1

ANS: (c)

3.33 Which of the following statements correctly prints “Passed” if the student’s grade is greater than or equal to 60 and “Failed” if the student’s grade is less than 60? [The quotes, of course, should not print.]

a) printf("%s\n", grade >= 60 : "Passed" : "Failed");

b) grade >= 60 : puts("Passed ") ? puts("Failed ");

c) printf("%s\n", grade >= 60 ? "Passed" : "Failed");

d) grade >= 60 ? puts("Passed ") ? puts("Failed ");

ANS: (c)

3.34 Which statement is *false*?

a) A compound statement can be placed anywhere in a program that a single statement can be placed.

b) The if selection statement can have only one statement in its body.

c) A set of statements contained within a pair of braces ({ and }) is called a compound statement.

d) An if slection statement can have a compound statement in its body.

ANS: (b)

**3.6 The if…else Selection Statement**

3.35 The *conditional operator* (?:) \_\_\_\_\_\_\_\_.

(a) is the only ternary operator in C

(b) is a unary operator

(c) associates from left to right

(d) accepts two operands

ANS: (a)

3.36 Which of the following will generate an error?

(a) if (answer == 7) {

puts("correct");  
 }

else {

puts("incorrect");  
 }

(b) puts(answer == 7 ? "correct" : "incorrect");

(c) printf("%s\n", answer == 7 ? "correct" : "incorrect");

(d) answer == 7 ? puts("correct") : puts("incorrect");

ANS: (b)

3.37 A statement is called a *block* if it \_\_\_\_\_\_\_\_.

(a) is a compound statement

(b) contains definitions

(c) is a compound statement that contains definitions

(d) does not contain definitions

ANS: (c)

3.38 Placing a semicolon after the parenthesized condition in an if statement leads to a \_\_\_\_\_\_\_\_\_\_ error in single-selection if statements and a \_\_\_\_\_\_\_\_\_\_ error in double-selection if statements.

a) logic, logic

b) logic, syntax

c) syntax, logic

d) syntax, syntax

ANS: (b)

3.39 The empty statement is represented by placing \_\_\_\_\_\_\_\_\_\_ where a statement would normally be.

a) empty

b) ;

c) null

d) :

ANS: (b)

**3.7 The while Iteration Statement**

3.40 What is wrong with the following loop?

While (sum <= 1000) {

sum = sum + 30;  
}

(a) The parenthesis should be braces.

(b) The braces around sum = sum +30; should be removed.

(c) While should be while.

(d) There should be a semicolon after While (sum <=1000).

ANS: (c)

3.41 How many times will the following program print hello?

i = 1;

while (i <= 10) {

puts("hello");  
}

(a) 10

(b) 8

(c) an infinite number of times

(d) 0

ANS: (c)

3.42 Consider the following *correct* segment of a *correct* C program:

p = 2;

while (p < 2000) {

p = 2 \* p;  
 }

What is the value of p *after* this while loop completes its execution?

a) 1023

b) 1024

c) 2047

d) 2048

ANS: (d)

**3.8 Formulating Algorithms Case Study 1: Counter-Controlled Iteration**

3.43 An uninitialized variable contains \_\_\_\_\_\_\_\_.

(a) the value last stored in the memory location reserved for that variable

(b) no value

(c) a value of zero

(d) a randomly assigned value

ANS: (a)

3.44 Counter-controlled iteration is often called \_\_\_\_\_\_\_\_\_\_ iteration because the number of iterations is known before the loop begins executing.

a) indefinite

b) sentinel

c) definite

d) determinate

ANS: (c)

**3.9 Formulating Algorithms with Top-Down, Stepwise Refinement Case Study 2: Sentinel-Controlled Iteration**

3.45 Indefinite iteration is controlled by a

(a) counter

(b) sentinel value

(c) data value

(d) non-constant condition

ANS: (b)

3.46 A fatal logic error is *always* caused by:

(a) not initializing variables before executing an iteration statement

(b) choosing a sentinel value that is also a data value

(c) using a counter variable in a calculation after the loop

(d) an attempt to divide by zero

ANS: (d)

3.47 In *indefinite* iteration, an input value

(a) should always be evaluated before being processed

(b) should always be processed directly after it is entered

(c) should never be modified

(d) can be entered, processed, and evaluated in any order

ANS: (a)

3.48 What is the *final* value of x after performing the following operations?

int x = 21;

double y = 6;

double z = 14;

y = x / z;

x = 5.5 \* y;

(a) 8.25

(b) 5.5

(c) 5

(d) 8

ANS: (d)

3.49 Which operation does *not* take place in the following example?

int x = 21;

double y = 6;

double z = 14;

y = x / z;

x = 5.5 \* y;

(a) implicit conversion

(b) promotion

(c) explicit conversion

(d) truncation

ANS: (c)

3.50 Which of the following is *not* a synonym for “sentinel value.”

a) signal value

b) dummy value

c) counter value

d) flag value

ANS: (c)

**3.10 Formulating Algorithms with Top-Down, Stepwise Refinement Case Study 3: Nested Control Statements**

3.51 Having a loop within a loop is known as

(a) recursion

(b) doubling up

(c) nesting

(d) a redundancy

ANS: (c)

3.52 Which statement is *true*?

a) With nested control statements, the inner control statement is executed in sequence after the outer control statement completes its own execution.

b) With nested control statements, the inner control statement is executed exactly once.

c) Experience has shown that the most difficult part of solving a problem on a computer is converting an already correct algoithm to a C program.

d) A double-selection statement can be nested in an iteration statement.

ANS: (d)

**3.11 Assignment Operators**

3.53 If x = 3, which of the following sets x to 7?

(a) x \*= 4;

(b) x += 4;

(c) x =+ 4;

(d) x + 4 = x;

ANS: (b)

3.54 Which assignment expression is equivalent to c = c / 2 ?

(a) c / = 2

(b) c / c = 2

(c**)** c /= 2

(d) c =/ 2

ANS: (c)

**3.12 Increment and Decrement Operators**

3.55 Which of the following will *not* increment variable c by one?

(a) c + 1;

(b) c++;

(c) ++c;

(d) c += 1;

ANS: (a)

3.56 In which of the following is y *not* equal to 5 after execution? Assume that x is equal to 4.

(a) y = 5;

(b) y = x++;

(c) y = ++x;

(d) y = x = 5;

ANS: (b)

3.57 Which statement is *true*?

a) The expression ++(a + 1) adds 2 to a.

b) The expression \*\*a multiplies a by 1.

c) The ANSI standard for the C programming language specifies the order in which each operator’s operands will be evaluated.

d) The expression --(abc \* 37) is a syntax error

ANS: (d)

**3.13 Secure C Programming**

3.58 Which of the following statements is true about undefined behavior, which can leave a system open to attack?

(a) It’s not possible to have undefined behavior when adding two integers.

(b) Adding two integers can result in arithmetic overflow, which can cause undefined behavior.

(c) You should not worry about undefined behavior in your programs.

(d)None of the above.

ANS: (b)

3.59 Which of the following statements is true?

(a) A counter variable that stores only non-negative numbers should be declared as an unsigned integral type.

(b) A counter variables that stores only non-negative numbers should be declared as a signed integral type.

(c) The type of a counter does not matter

(d)None of the above.

ANS: (a)