a written test

Chapter Test
Chapter 2

1. Problem Solving

Problems 1-4 refer to the following algorithm, which is intended for completing an invoice:

a. Let AMOUNT = 0.
b. Read QUANTITY and PRICE of an item.
c. Add the product QUANTITY x PRICE to AMOUNT.
d. If there is another item, go to step (b). Otherwise, continue with step (e).
e. If AMOUNT is not greater than 500, go to step (h). Otherwise, continue with step (f).
f. Evaluate the product .05 x AMOUNT, g. Subtract this product from AMOUNT.
h. Record the value AMOUNT and stop.

1. What interpretation could be given to the product appearing in step (f)?

2. What purpose would you say is served by step (e)?

3. If the values (10, 3.00), (50, 8.00), and (25, 12.00) are read by step (b), what value will be recorded by step (h)?

4. If the values (100, 2.00) and (50, 1.00) are read by step (b), what value will be recorded by step (h)?

Problems 5-8 refer to the following algorithm, which is intended for use by a payroll clerk as the preliminary step in the preparation of a payroll:

a. Read the next time card.
b. Let H = number of hours worked.
c. If H is not greater than 32, let G = B = 0 and go to step (f). Otherwise, continue with the next step.
d. Evaluate 6 x (H - 32) and assign this value to both G and B.
e. Let H = 32.
f. Evaluate 4 x H and add this value to G.
g. Write the values G and B on the time card,
h. If there is another time card, go to step (a). Otherwise, stop.

5. If the numbers of hours shown on the first four time cards are 20, 32,40, and 45, respectively, what amounts will be written on these cards?

6. What is the base hourly rate for each employee?

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What will be printed when each algorithm shown in Problems 9-12 is carried out?

9. a. Let SUM = O and N = 1.
   b. Add N to SUM.
   c. If N<6, increase N by 1 and return to step (b). Otherwise, continue with step (d).
   d. Print the value SUM and stop.

10. a. Let PROD = N = 1.
    b. Print the values N and PROD on one line.
    c. Increase N by 1.
    d. If N exceeds 6, stop. Otherwise, continue with the next step.
    e. Multiply PROD by N and go to step (b).

11. a. Let A = B = 1 and NUM = 3.
    b. Evaluate A + B and assign this value to F.
    c. If NUM does not exceed 9, increase NUM by 1 and proceed to step (d). Otherwise, print the value F and stop, d. Assign the values of B and F to A and B, respectively, and go to step (b).

12. a. Let NUM = 56, SUM = T, and D = 2.
    b. If D is a factor of NUM, add D to SUM and print D.
    c. lf D > NUM/2, print SUM and stop.
    d. Increase D by 1, and go to step (b).

Write an algorithm to carry out each task specified in Problems 13-19.

13. A retail store's monthly sales report shows, for each item, the fixed cost, the sale price, and the number sold. Prepare a three-column report with the column headings ITEM, GROSS SALES, and INCOME.

14. Each of several three-by-five cards contains an employee's name. Social Security number, job classification, and date hired. Prepare a report showing the names, job classifications, and complete years of service for employees who have been with the company for more than ten years.

15. A summary sheet of an investor's stock portfolio shows, for each stock, the corporation name, the number of shares owned, the current price, and the earnings as reported for the most recent year. Prepare a six-column report with the column headings CORP. NAME. NO. OF SHARPS. PRICE, EARNINGS, EQUITY, and PRICE/EARNINGS. Use this formula:

    Equity = No. of Shares x Price

17. Each of several cards contains a single number. On each card, write the letter G if the number is greater than the average of all of the numbers. Otherwise, write the letter L on the card. (You must read through the cards twice: once to find the average, and a second time to determine whether to write the letter G or the letter L on the cards.)

18. A local supermarket has installed a check-validation machine. To use this service, a customer must have previously obtained an identification card containing a magnetic strip and also a four-digit code. Instructions showing how to insert the identification card into a special magnetic-strip reader appear on the front panel. To validate a check, a customer must present the identification card to the machine, enter the four-digit code, enter the amount of the check, and place the check, blank side toward the customer, in a special clearly labeled punch unit. To begin this process, the CLEAR key must be depressed, and, after each of the two entries has been made, the ENTER key must be depressed. Prepare an algorithm giving instructions for validating a check.

19. Write an algorithm describing the steps to be taken to cast a ballot in a national election. Assume that a person using this algorithm is a registered voter and has just entered the building in which voting is to take place. While in the voting booth, the voter should

2. True or False. Shade A if the statement is correct and B if not, in the answer sheet provided.

1. The terms algorithm and process are synonymous.

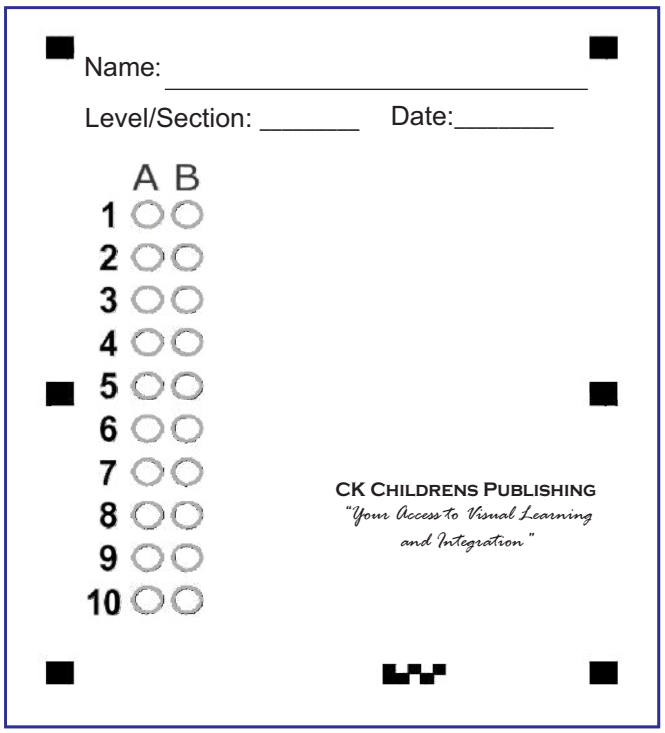
2. The following steps describe an algorithm, a. Let N = 0. b. Increase N by 10. c. Divide N by 2. d. If N< 10, go to step (b). e. Stop.

3. A computer program should describe an algorithm.

4. Every algorithm can be translated into a computer program.

5. The expression heuristic process refers to an algorithm.

6. It is always easier to verify the correctness of an algorithm that describes a very specific task than the correctness of a more general algorithm.



Programming

Now we are ready to discuss the subject of programming—taking a problem or task and designing an algorithm to handle this task, then using a programming language to express that algorithm so the computer will be able to execute that code.

Most people think of programming as being just about code. The lines of symbols and words that all of us have seen if we have ever opened a book on programming. It is more than code, however; it is a way of thinking about a problem and designing a solution that can then be written in a programming language. Look at this short C++ program that

Sample of a C++ Code

```
# include <iostream.h>
# include <string.h>
int main ()
{ int x;
string first_phrase;
first_phrase = "Could you please say that again?";
for (x = 0; x < 250; x++)
 {
   cout << first_phrase << endl;
 }
return 0;
```

Sample code from Scratch

Here is another version of the same program in Pascal.

Sample of a Turbo Pascal Code

```
program printmessage ()
var
x : integer; first_phrase :string;
begin
first_phrase := "Could you please say that again?";
for x := 0 to 250 do
 begin
  writeln (first_phrase);
  x := x + 1;
 end
```

The point of showing both of these programs is to focus on how they are similar rather than their language differences. As you move through the chapters that follow, keep in mind that languages will always change to suit the development of technology. Certain concepts remain the same regardless of language. If you learn these concepts well, you will have no

Each of these examples could have been written in any language. The main point of these programs is that they both contain a loop, which is another way of saying that a particular task

Summary

We looked at the basics of the computer, including its hardware and software. We examined the computer as an electronic machine that can recognize changes in states of ‘‘on’’ and ‘‘off’’; these states represent the basis of the digitization of information for the computer. Programming relies on the ability to write clear, step-by-step solutions called algorithms in a language. Some languages are high level and easy to use, while other languages are more difficult to learn because they are

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A. Identify the terms being described in each sentence.

_____1. It generate error messages of language code in the computer.
_____2. The language of computer that is comprised of binary code.
_____3. Any sequence of eight binary digits.
_____4. The language of computers that use commands that relate directly to the problem being programmed as opposed to the internal workings of the machine.
_____5. It come from the words binary digits, that implies two digits only.

B. Fill in the blank to complete the sentence.

1. The _____ and _____ are the two programming languages of the computer.
2. The _____ are the devices that uses electricity to operate.
3. The _____is the original file that is written by the programmer.
4. C## is an example of _____ of the computer.
5. The programming language should be translated to _____ so that computers can

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