**Chapter 6**

**6.28 *(Duplicate Elimination)*** In Chapter 12, we explore the high-speed binary search tree data structure. One feature of a binary search tree is that duplicate values are discarded when insertions are made into the tree. This is referred to as duplicate elimination. Write a program that produces 20 random numbers between 1 and 20. The program should store all nonduplicate values in an array. Use the smallest possible array to accomplish this task.

**6.31 *(Palindromes)*** A palindrome is a string that’s spelled the same way forward and backward. Some examples of palindromes are: “radar,” “able was i ere i saw elba,” and, if you ignore blanks, “a man a plan a canal panama.” Write a recursive function testPalindrome that returns 1 if the string stored in the array is a palindrome and 0 otherwise. The function should ignore spaces and punctuation in the string.

**Chapter 7**

**7.31 *(Calculator Using Function Pointers)*** Using the techniques you learned in Fig. 7.28, create a text-based, menu-driven program that allows the user to choose whether to add, subtract, multiply or divide two numbers. The program should then input two double values from the user, perform the appropriate calculation and display the result. Use an array of function pointers in which each pointer represents a function that returns void and receives two double parameters. The corre- sponding functions should each display messages indicating which calculation was performed, the values of the parameters and the result of the calculation.

**7.32 *(Polling)*** The Internet and the web are enabling more people to network, join a cause, voice opinions, and so on. The U.S. presidential candidates in 2008 used the Internet intensively to get out their messages and raise money for their campaigns. In this exercise, you’ll write a simple polling program that allows users to rate five social-consciousness issues from 1 (least important) to 10 (most important). Pick five causes that are important to you (e.g., political issues, global environ- mental issues). Use a one-dimensional array topics (of type char \*) to store the five causes. To sum- marize the survey responses, use a 5-row, 10-column two-dimensional array responses (of type int), each row corresponding to an element in the topics array. When the program runs, it should ask the user to rate each issue. Have your friends and family respond to the survey. Then have the program display a summary of the results, including:

1. a)  A tabular report with the five topics down the left side and the 10 ratings across the top, listing in each column the number of ratings received for each topic.
2. b)  To the right of each row, show the average of the ratings for that issue.
3. c)  Which issue received the highest point total? Display both the issue and the point total.
4. d)  Which issue received the lowest point total? Display both the issue and the point total.

**Chapter 8**

**8.34 *(Writing the Word Equivalent of a Check Amount)*** Continuing the discussion of the previ- ous exercise, we reiterate the importance of designing check-writing systems to prevent alteration of check amounts. One common security method requires that the check amount be both written in numbers and “spelled out” in words. Even if someone is able to alter the numerical amount of the check, it’s extremely difficult to change the amount in words. Write a program that inputs a numer- ic check amount and writes the word equivalent of the amount. For example, the amount 52.43 should be written as

FIFTY TWO and 43/100

**8.38 *(Spam Scanner)*** Spam (or junk e-mail) costs U.S. organizations billions of dollars a year in spam-prevention software, equipment, network resources, bandwidth, and lost productivity. Research online some of the most common spam e-mail messages and words, and check your own junk e-mail folder. Create a list of 30 words and phrases commonly found in spam messages. Write a program in which the user enters an e-mail message. Read the message into a large character array and ensure that the program does not attempt to insert characters past the end of the array. Then scan the message for each of the 30 keywords or phrases. For each occurrence of one of these within the message, add a point to the message’s “spam score.” Next, rate the likelihood that the message is spam, based on the number of points it received.

**Chapter 9**

**9.10 *(Temperature Conversions)*** Write a program that converts integer Fahrenheit temperatures from 0 to 212 degrees to floating-point Celsius temperatures with 3 digits of precision. Perform the calculation using the formula

celsius = **5.0** / **9.0** \* ( fahrenheit - **32** ); The output should be printed in two right-justified columns of 10 characters each, and the Celsius temperatures should be preceded by a sign for both positive and negative values.

**9.15 *(Reading Strings in Quotes)*** In some programming languages, strings are entered surround- ed by either single *or* double quotation marks. Write a program that reads the three strings suzy, "suzy" and 'suzy'. Are the single and double quotes ignored by C or read as part of the string?