The Heritage Computer Challenge 2000 Heritage High School Newport News, Virginia



Visual Basic

Instructions

The problems for this contest appear on the following pages, listed in order of difficulty. The maximum number of points you can earn is indicated under the title to each problem.

Problems are designed in the format used by The Great Computer Challenge, held annually each Spring at Old Dominion University. Some of these problems were actually used at the Great Computer Challenge in previous years.

Solutions should be saved as a project on your personal drive K in a folder whose name is IDENTICAL to the project file name (minus the extension). For each project, place your source code in the default source file named main.p.

*********** Problems *********

Check, Please! (10 points)
Three Sailors and a Monkey (10 points)
Palindrome Words (20 points)
Inscribed Polygons (20 points)
Dialer (30 points)

Check, Please! (10 points)

Save in folder named: Check

Write a Visual Basic program that will convert numerical dollar and cents amounts into words and a fraction, such as those required to be written on a check or bank draft.

For example, \$5.25 should be converted to "Five and 25/100". \$25.05 would be converted to "Twenty-five and 05/100". \$15.00 would be converted to "Fifteen and no/100". Amounts less than one dollar require special formatting like this: \$0.17 would be converted to "Only 17 cents".

The program should work for any monetary amount from \$0.01 to \$100.00.

Three Sailors and a Monkey (10 points)

Save in folder named: Sailors

Three sailors, shipwrecked with a monkey on a desert island, have gathered on one day a pile of coconuts that are to be divided early the next day. Sometime during the night, one sailor arises, divides the pile into three equal parts, and finds one coconut left over, which he gives to the monkey. He then hides his share, and returns the remaining coconuts to a single pile. Later during the same night, each of the other two sailors arises separately and repeats the performance of the first sailor. In the morning all three sailors arise, divide the pile into three equal shares, and find one coconut left over, which they give to the monkey.

Write a program in Visual Basic that will compute how many coconuts were in the original pile. Since there is more than one correct answer, the program should consider all coconut piles in the range of **1 to 100**. The output should be displayed on the screen and consist of the following:

a. The number of coconuts in the original pile.

b. The number of coconuts after each sailor removes a third.

One correct answer is 79 and may be used to check the correctness of the program. Output for this pile could look like the following:

Coconuts in the original pile 79 Coconuts after the first sailor 52 Coconuts after the second sailor 34 Coconuts after the third sailor 22

Palindrome Words (20 points)

(20 points)

Save in folder named: PalWords

A palindrome is a word or phrase that reads the same backwards and forwards regardless of capitalization, punctuation, or spacing. Thus, "noon" is a palindrome, but "moon" is not.

Write a Visual Basic program that allows the user to input a sentence. The program should then count the number of words in that sentence that are palindromes. Thus, if the user types "Dad drinks pop." your program should report that the sentence contains 2 palindromes.

Inscribed Polygons (20 points)

Save in folder named: Inscribed

Write a Visual Basic program that will prompt the user to enter an integer from 3 to 8. The program should then draw, on the form, a series of circles of equal radii, each with an inscribed regular polygon. The first circle should have an inscribed triangle, the second (if required) should have an inscribed square, the third (if required) an inscribed pentagon, and so forth. The last circle drawn should have an inscribed polygon with the number of sides typed by the user.

Dialer (30 points)

Save in folder named: Dialer



Before the days of touchtone dialing, all telephones had rotary dials--a round dial with 10 holes in it. The holes were arranged in a circular pattern around the edge of the dial. Each hole had a number, 0 to 9, showing through. The hole with number 1 was located on the right, then moving counter-clockwise, the hole with a 2, then with a 3, and so on. The hole with 0 followed the hole with 9. To dial a number, the caller placed a finger into the hole with the desired number and spun the dial manually in a clock-wise direction until the finger was stopped by the small cradle located just underneath the hole with number 1. The process was slow, but most people didn't have too much trouble learning to use a rotary dial telephone, as long as they weren't

too tired from hunting dinosaurs all day.

In this problem, you are to write a Visual Basic program that simulates the rotary dial of a rotary dial telephone, but you must do it in the following manner:

You must include a class module named Dialer. Each Dialer object will represent a single circular hole on a rotary dial telephone.

The Dialer class must maintain the following information: the container (use a variant type, although the container may be a form or a picture box), the coordinates of the center (in twips), the radius, the number that is displayed in the center, the forecolor and the fillcolor.

The Dialer class must contain the following methods (subroutines):

- an initializing subroutine that takes appropriate parameters so that, when called, will be able to set all maintained information.
- a subroutine named Show, with no parameters, that displays the Dialer object (note that the initializing subroutine does NOT display the object).
- A subroutine named Shade, also with no parameters, that displays the Dialer object, but always with a white forecolor and a black fillcolor.

The main form must set up 10 Dialer objects and display them in such as manner as to represent a rotary dial on a rotary dial telephone. Other graphics (or shape objects)--to complete the appearance of a rotary dial telephone--are optional. When the user types a phone number into a text box and then clicks a command button, each digit of the phone number is "dialed" as follows: beginning with the dialed number and progressing down to 1, the Dialer object containing that numbers turns white on black, then back to its original color, thus simulating the old fashioned act of dialing a rotary phone.