2. Indicate whether each of the following type declarations is valid or invalid. Explain what is wrong with each invalid type declaration.
   a. type Letters = ('A', 'B', 'C');
   b. type Letters = (A, B, C);
      TwoLetters = (A, C);
   c. type Letters = ('A'..'Z');
   d. type Statements = (begin, end, while, for);
   e. type
      Day = (Sun, Mon, Tue, Wed, Thu, Fri, Sat);
      WeekDay = Mon..Fri;
      WeekEnd = Sat..Sun;

1. Declare an enumerated type Month and rewrite the following if statement, assuming that CurMonth is type Month instead of type Integer. Also, write the equivalent case statement.

   if CurMonth = 1 then
     WriteLn ('Happy New Year')
   else if CurMonth = 6 then
     WriteLn ('Summer begins')
   else if CurMonth = 9 then
     WriteLn ('Back to school')
   else if CurMonth = 12 then
     WriteLn ('Happy Holidays');

2. Rewrite procedure ReadLnColor (see Fig. 7.7) assuming that Black and Brown are also values for enumerated type Color.
3. Write procedure WriteDay for enumerated type Day.

2. List and explain three computational errors that may occur in type Real expressions.

5. Write a while loop equivalent to the following for loop. Assume variable Ch is type Char.

   for Ch := 'A' to 'Z' do
     Write(Ch)

1. An integer \( N \) is divisible by 9 if the sum of its digits is divisible by 9. Develop a program to determine whether the following numbers are divisible by 9 using this technique. Declare \( N \) to be type LongInt.

   \[ N = 154368 \]
   \[ N = 621594 \]
   \[ N = 123456 \]
3. Since communications channels are often noisy, numerous ways have been devised to ensure reliable data transmission. One successful method uses a checksum. A checksum for a message can be computed by summing the ordinal values of the characters in the message and taking the modulo of 64. The ordinal value of a space character is added to this result to obtain the checksum. Since this value is within the range of the displayable characters, it is displayed as a character as well. Write a program that accepts single line messages ending with a period and displays the checksum for each message. Your program should continue displaying checksums until the user enters a line with only a period.

2. Correct the syntax errors in these formal parameter lists:

   (var A, B: Integer, C : Real)
   (value M : Integer; var Next : Char)
   (var Account, Real: X + Y, Real)

1. Write a procedure that displays a table showing all powers of its first argument from zero through the power indicated by its second argument (a positive integer). The procedure also should return the sum of all values displayed. For example, if the first argument is 10 and the second argument is 3, the procedure should display 1, 10, 100, and 1000 and return 1111 as its result.

2. In Fig. 6.8, what would be the effect of executing the body of Procl as follows?

   begin {Procl}
   X := 5.5;
   Y := 6.6;
   M := 2;
   N := 3;
   You := M
   end; {Procl}

4. Consider program ScopeRules in Fig. 6.10.
   a. What kind of error would occur if the assignment statement

       Z := 15.0;

   were inserted in the main program?

   b. Show the new values of W, X, and Y if X were the actual parameter in the call to procedure Change.

   c. What if Y were the actual parameter in the call to Change?

   d. What would be the effect of making formal parameter X a value parameter?
2. In function FindTax in Fig. 6.15, why should you not replace each of the assignment statements

\[
\text{FindTax := OutOfRange}
\]

with the \texttt{WriteLn} statement

\[
\text{WriteLn (Salary :4:2, ' is out of range')}
\]

4. Which of the following tasks would be best implemented as a function and which as a procedure? Justify your answer.
   a. Computing the volume of a cone
   b. Displaying user instructions
   c. Testing whether a data value is in a specified range
   d. Computing the angle and muzzle velocity for a cannon based on the desired range

2. Write a function that raises a real number \(X\) to an integer power \(N\) by multiplying \(X\) by itself \(N\) times (use a \texttt{for} loop). Will your function work for negative values of \(X\) or \(N\)? \textit{Hint}: To make your function work for negative values of \(N\), use \texttt{Abs(N)} as the final expression in the \texttt{for} loop. Then use \(X^N = 1 / X^{-N}\) to compute the correct result when \(N\) is negative.

1. Write a recursive function that, given an input value of \(N\), computes \(N + N-1 + \ldots + 2 + 1\).

2. Write a function \(C(N, R)\) that returns the number of different ways \(R\) items can be selected from a group of \(N\) items. The mathematical formula for \(C(N, R)\) follows. Test \(C(N, R)\) using both the recursive and the nonrecursive versions of function \texttt{Factorial}.

\[
C(N, R) = \frac{N!}{R!(N - R)!}
\]

1. Write a recursive function \texttt{Divide(A, B)} to compute \(A \div B\) using only integer subtraction and no multiplication or division.
2. Complete the following recursive function, which calculates the value of a number (Base) raised to a power (Power). Assume that Power is positive.

function PowerRaiser (Base, Power : Integer) : Integer:
begin
  if Power = __________ then
    PowerRaiser := __________
  else
    PowerRaiser := __________
  end;

4. If a program had the statement F := Fibonacci(5), how many calls to Fibonacci would be performed?