9 Exercises

1. Write code to input the lengths of the sides of a triangle and output a message classifying the triangle in terms of acute, right, obtuse, isosceles, and equilateral. Assume the user inputs the sides in nondecreasing order.

2. Write code that, given a 9-digit integer, calculates the sum of its digits (without using an inbuilt function such as \texttt{sumOfDigits}!) For example, if the user inputs a value of 462831597, your code should print out 45.

3. Write code that prints out an imitation $8 \times 8$ chess board using 'w' and 'B' for the squares.

4. Using a vector to store the month-lengths, write code to take month and day as integers and print out which day of the year it is. Assume not leap year. For example, input of 2 and 28 should produce 59 while input of 7 and 18 should print out 199.

5. Write code for a function that takes an array of the coefficients of a polynomial and returns the array of the coefficients of the derivative of that polynomial. For example, the function called with $[1 \ 0 \ 0 \ -3 \ 0]$ should return $[4 \ 0 \ 0 \ -3]$.

6. Call a vector \textbf{bivalued} if the vector contains exactly two distinct elements. For example, $[1 \ 3 \ 1 \ 3 \ 3]$ is bivalued, but neither $[2 \ 2 \ 3 \ 3 \ 4]$ nor $[5 \ 5 \ 5]$ is. Write code for a function to determine whether a vector is bivalued or not.

7. Create a function \texttt{interleaved} that takes two equal-length strings and returns the result of interleaving them; that is, the string formed from the first char from the first string, then the first char from the second string, then the second char from the first string and so on. For example, \texttt{interleaved('Tiger', 'sloth')} should return \texttt{Tsilgoetrh}. If the two strings are not the same length, your function should return the empty string.

8. Create a function with parameter a $3 \times 3$ matrix that returns whether or not the matrix is a magic square (all row and column sums equal).