Introduction to Programming

Labs – Week 7

# Task 1

Write a program that reads in integers (as many as the user enters) from standard-input and prints out the maximum and minimum values.

# Task 2

Write a program that reads in text from standard input and prints out the number of words in the text. For the purpose of this exercise, a word is a sequence of non-whitespace characters that is surrounded by whitespace. Use your program to count number of words in the novel *War and Peace by Chales Dickens* (attached).

# Task 3

Write a program to add two matrices a, b of the same size and print the result. You don’t need to take input from command-line or standard-input. Input matrices can be initialized as follows.

int[][] a = { {2, 5, 7, 1}, {1, 3, 6, 1}, {5, 4, 1, 3} };  
int[][] b = { {1, 9, 5, 0}, {7, 1, 5, 4}, {3, 4, 2, 8} };

# Task 4

Given a 2d-array a[][] and an index j, write a program that compute sum of elements in column j of a[][]. You don’t need to take input from command-line or standard-input.

# Task 5

Write a program that compute the transpose of matrix given as 2d-array a[][]. Store the transpose in matrix b[][] and also print it. You don’t need to take input from command-line or standard-input.

For example, following two matrices are transpose of each other.

|  |  |
| --- | --- |
| {{9, 5, 7},  {1, 3, 6},  {5, 4, 1},  {0, 8, 2}} | {{9, 1, 5, 0},  {5, 3, 4, 8},  {7, 6, 1, 2}} |

# Task 6

Write a program that reads in a sequence of integers from standard input and prints out both the integer that appears in a longest consecutive run and the length of the run. For example, if the input is 1 2 2 1 5 1 1 7 7 7 7 1 1, then your program should print   
Longest run: 4 consecutive 7s.

# Task 7

Write a program called is MagicSquare that accepts a two-dimensional array of integers as a input and prints true if it is a magic square. A square matrix is a magic square if it is square in shape (same number of rows as columns, and every row the same length), and all of its row, column, and diagonal sums are equal. For example, {{2, 7, 6}, {9, 5, 1}, {4, 3, 8}} is a magic square because all eight of the sums are exactly 15.