

Lab Four

ID1303: Introduction to Programming

1. (a) Write a program to accept two integers m and n and display the perimeter of a $m \times n$ rectangle.

Example run:

Enter the value of m : 4

Enter the value of n : 7

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* * * * * * *
*           *
*           *
* * * * * * *
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- (b) Implement the above as a function.
2. (a) Write a program that accepts a positive integer n and a sequence of n numbers from the user and prints their sum. (b) Implement the above as a function.
3. Write a program that accepts a string and a number k and prints the string left-rotated k times.

Example runs:

Enter the string: APPLE

Enter the number of left-rotations: 1

The rotated string is: PPLEA

Enter the string: CHROME

Enter the number of left-rotations: 4

The rotated string is: MECHRO

4. (a) Write a **function** that accepts a positive integer n and a position k and checks if the k th bit of n (from right) is equal to 1.

Example runs:

Enter the number: 5

Enter the position: 2

The bit is zero.

Enter the number: 5

Enter the position: 3

The bit is one.

[Hint: Method 1: AND with 2^{k-1} ; Method 2: Right-shift $k - 1$ times.]

(b) Accept a string as input and print all subsets of the string (in any order). Hint: Let the length of the string be n . Map the subsets to numbers in $\{0, 1, \dots, 2^n - 1\}$ as shown in class and for each of these numbers, print the appropriate characters, possibly using the function in part (a).

Example run:

Enter the string: CAT

T

A

TA

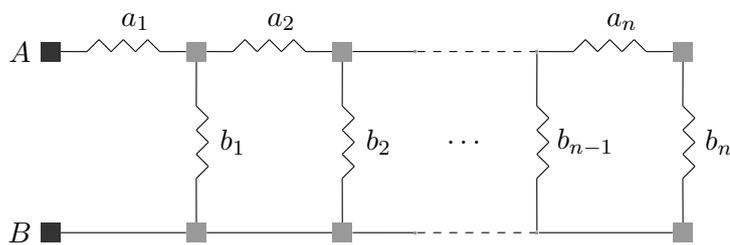
C

TC

AC

TAC

5. A **step-ladder** arrangement of resistors is shown below.



Write a program which accepts the the values of the resistances (a_i s and b_i s as in the picture) in two arrays, and prints the effective resistance between A and B . Assume that all values are in some common unit, eg: ohms.

Hint: Update the value of the effective resistance from right-to-left as shown below.

