

# ID1063 Lab Exam One

## EE

Time: 3 hours

Total Marks: 15  
(Q1: 4 marks, Q2: 5 marks, Q3: 6 marks)

1. Write a program that accepts a number in  $\{1, 2, \dots, 999\}$  and spells it in English. Example run:

Enter the number: 245

The number is two hundred and forty five.

2. Write a program that accepts a character and displays all the letters in the English alphabet starting from the given letter. If the letter is uppercase, the function displays the alphabet in uppercase. If the character is not from the English alphabet, the function displays an error message.

Example runs:

Enter a character: c

c d e f g h i j k l m n o p q r s t u v w x y z a b

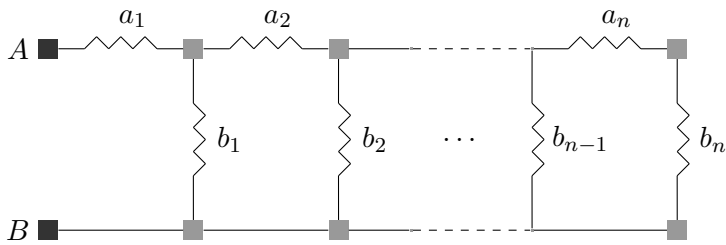
Enter a character: H

H I J K L M N O P Q R S T U V W X Y Z A B C D E F G

Enter a character: \$

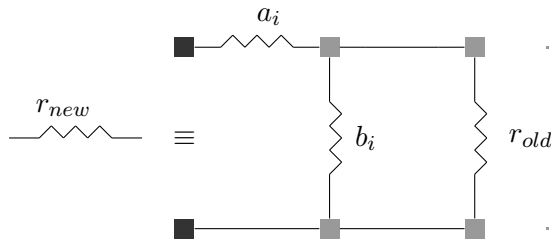
\$ is not an English letter.

3. 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.



When two resistances of value  $r_1, r_2$  are combined in parallel, the effective resistance is  $\frac{r_1 r_2}{r_1 + r_2}$ , and when they are in series, the effective resistance is  $r_1 + r_2$ .

Example runs:

Enter the value of n: 2

Enter the value of the  $a_i$ : 2 2

Enter the value of the  $b_i$ s: 1 1

The effective resistance is: 2.75.

Enter the value of n: 3

Enter the value of the  $a_i$ : 1 2 3

Enter the value of the  $b_i$ s: 1 1 1

The effective resistance is: 1.7368.