Edit distance

Your task is to determine the edit distance between two strings x and y, that is to find the cheapest way to convert x to y using only insert, delete, and replace operations. These operations cost c_i, c_d, and c_r.

Example

Suppose, $c_i = c_d = c_r = 1$. If x="apple" and y="sample", the cheapest way to turn x into y is to insert an 's' letter in the beginning of x and replace the first 'p' letter with an 'm' letter. Thus, the minimum cost solution (i.e., the edit distance) would be 2.

Question 1: You are given x and y, and the costs of insert, delete, and replace operations: c_i, c_d, and c_r. Use a top-down dynamic programming approach, write a function, EDITDISTANCE, to compute the the edit distance between these two strings. **Hint**: in each step, guess what operation is performed on suffixes of x and y.

Question 2: Analyze the running time of your code.

Question 3: Write a function, EDITDISTANCEBOTTOMUP, to solve the same problem using a bottom-up approach. **Hint**: decide on the order in which you must solve the subproblems and determine what needs to be stored in a table.

Question 4: Analyze the running time of your code.