Analysis Assignment 2 Report

The assignment is based on solving a famous problem which is the sequence alignment problem.
Our specific goal is to find the best alignment according to the weighting matrix provided with the problem.

The approach taken in the code is as follows:
We start by having a few global static variables as those will be used to contain our final results.
The method takes 3 parameters, the two strings we need to align as well as the weighting matrix.

It starts by initiating the score matrix (named results in my code), with 0's in the first row/column then by calculating values for the rest of the matrix.

Once that is calculated, we are ready to construct our string by iterating over the score table and finding the optimal choice in each iteration.
The choice will always be one of three:
1 – We will take a character from each of the strings, hence aligning two letters.
2 – We will take a character from the first string, and align it with a gap in the second string.
3 – We will take a character from the second string, and align it with a gap in the first string.

The code also includes a findIndex function which is used to point towards the specific entry needed in the weighting matrix provided to find the score of the specific choice.

As for the time complexity of our code, it is in fact **O**(**nm**), where **n** represents the length of the first string and **m** represents the length of the second string.
This is due to the time complexity of both loops used in the code.
The first loop which initiates the score matrix loops from 0 to **n**, and the nested loop inside it also goes from 0 to **m**, hence taking **O**(**nm**).

The same applies for constructing the solution where we loop from **n** to 0 and **m** to 0 hence taking **O**(**n**+**m**). (The worst case being decrementing the n to 0 first then the m).

Thank you and have a great rest of your day.