

EXPLANATION for R CODE1

I wrote a code to figure out what the given dynamic programming algorithm does on two given input strings. I do implement the algorithm and test in on the test sequences that are provided below and describe what the algorithm is doing in a couple of sentences.

Here is the DP algorithm:

Input:

- Two strings $A[1..n]$ and $B[1..m]$ of length n and length m respectively.
- $F(i, 0) = 0$ for $0 \leq i \leq n$ $F(0, j) = 0$ for $0 \leq j \leq m$
 $F(i, j) = F(i-1, j-1)+1$ if $A[i]$ is equal to $B[j]$
 $F(i, j) = 0$ if $A[i]$ is not equal to $B[j]$

Example inputs:

- A: abcgdddegajsdcbfsghgghdfg
B: vsfhfsdgdecgbdddegafkffbjkkl
- A: edsfghdsfkgjghfksfjhgkskfjsdfgkjkhjh
B: ababfbabdbvbfdgfjsdfgerwhhvksdhfhfsd
- A: aaabbababaaabcccd dbdaabbcac
B: aaabccdababcabcbaadbacb
- A: aaaaaaaaaaaaaaaaaaaaaaaaaa
B: aaaaaaaaaa

- A: asdbfbfbsdsffjsjfhfsbsbsffhfsbsbfb

B: sfb sdfbsfsfb sdfbfb sfsbaabacbvbasdfbsbfasdfasdfhbjjahb

- A: aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa

B: bbbbbbbbbbbbbbbbbbbbbbbbbb

CODE

#This code provides a different an easy way to explore the mechanism behind the dynamic algorithm and totally.

#I prefer to write the code by taking a base of first example input then visualising will be easier:

```
A=c("a","b","c","g","d","d","e","g","a","j","s","d","c","b","f","s","g","h","g","g","h","d","f","g","0","0","0","0") # creating an array
```

```
B=c("v","s","f","h","f","s","d","g","d","e","c","g","b","d","d","e","g","a","f","k","f","f","b","b","j","k","k","l")
```

```
m=length(A) # gives the length of the aminoacid sequence
```

```
n=length(B) # same issue
```

```
mapply(function(x,y) sum(x!=y),strsplit(A,""),strsplit(B,"")) # I have created a function that signifies the matches and point them as "0".
```

#The next step should be the turning this result into a matrix's diagonal and make it as an iterative process.

#It qualifies the F(i,j) function as it is expected.

```
matrix1=matrix(0, nrow = m, ncol = n) # creates an empty matrix
```

```
matrix2=c( 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1)
```

```
matrix2=as.matrix(matrix2)
```

```
A=as.matrix(A) for (i in 0:m ) { A[i,0] = 0 }  
}
```

```
B=as.matrix(B) for (j in 0:n ) { B[j,0] = 0 }  
}
```

#from this point, it was written what F(i,j) function does.

```
if  
{ A[i] == B[j] matrix[i][j]=matrix[i-1][j-1]+1  
}  
A=as.matrix(A)
```

```
for (i in 0:m ) { A[i,0] = 0 }
```

```
B=as.matrix(B) for (j in 0:n ) { B[0,j] = 0 }  
}
```