①

Construct a map dp[2][length of string2 + 1] and initialize with zero. And define dp[i%2][j] be the minimum #operations need to transform string1 [0, i) to string2 [0, j). So the base case, will have to turn dp[0][j] into j·d (before the loop) and dp[i%2][0] = i·e (every time getting into the inner loop.) Then we run through a loop i from 1 → length of string 1 and a loop j with 0 → length of string 2 inside.

Then if string2[j-1] = string1[i-1] ⇒ dp[i%2][j] = dp[(i-1)%2][j-1]

if string2[j-1] ≠ string1[i-1], we have three choices:

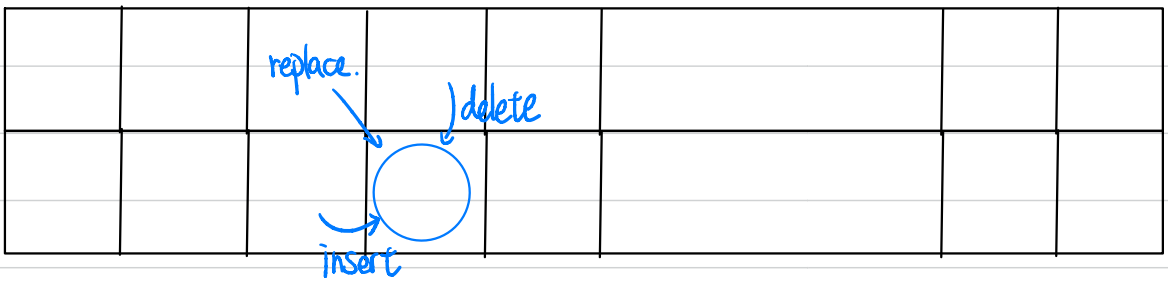
① replace string1[i-1] by string2[j-1], dp[i%2][j] = dp[(i-1)%2][j-1] + f

② delete string1[i-1], dp[i%2][j] = dp[(i-1)%2][j] + e

③ add string2[j-1] to string1[0, i), dp[i%2][j] = dp[i%2][j-1] + d

So dp[i][j] will be the minimum among them.

⇒ Thus dp[(length of string 1) % 2][length of string 2] is the answer.



∴ Time complexity O(a·b), Space : O(a) * (Psuedo Code in next page)

<Pseudo Code>

```
initialize DP[2][length of string 2 + 1] with 0

// Base condition when second string
// is empty then we add all characters
for i from 0 to length of string 1
    DP[0][i] = i * d

for i from 1 to length of string 1
    for j from 0 to length of string 2

        // delete all characters of string 2 for string1[0, i] to string2
        if j == 0
            DP[i % 2][j] = i * e

        // if string1[i - 1] == str2[j - 1]
        else if (str1[i - 1] == str2[j - 1])
            DP[i % 2][j] = DP[(i - 1) % 2][j - 1]


        // if string1[i - 1] not = str2[j - 1]
        // choose minimum from replace, delete, insert
        else
            DP[i % 2][j] = min(DP[(i - 1) % 2][j] + e, min(DP[i % 2][j - 1] + d, DP[(i - 1) % 2][j - 1] + f));


answer <- DP[length of string 1 % 2][length of string 2]
```

②

$$
DP[I \% 2, j] = \begin{cases} i * e & , \text{if } j == 0 \\ j * d & , \text{if } I == 0 \\ DP[(I - 1) \% 2][j - 1] & , \text{if string1 } [I - 1] == \text{string2 } [j - 1] \\ \min\{ DP[(i - 1) \% 2][j] + e, DP[i \% 2][j - 1] + d, DP[(i - 1) \% 2][j - 1] + f \} & , \text{otherwise} \end{cases}
$$