Longest common subsequence

		0	1	2	3	4	5	6	7	8	9
			C	B	A	B	C	A	B	C	C
0		X 0	X 0	X 0	X 0	X 0	X 0	X 0	X 0	X 0	X 0
1	A	X 0	↑ 0	↑ 0	↖ 1	← 1	← 1	↖ 1	← 1	← 1	← 1
2	B	X 0	↑ 0	↖ 1	↑ 1	↖ 2	← 2	← 2	↖ 2	← 2	← 2
3	C	X 0	↖ 1	↑ 1	↑ 1	↑ 2	↖ 3	← 3	← 3	↖ 3	↖ 3
4	A	X 0	↑ 1	↑ 1	↖ 2	↑ 2	↑ 3	↖ 4	← 4	← 4	← 4
5	B	X 0	↑ 1	↖ 2	↑ 2	↖ 3	↑ 3	↑ 4	↖ 5	← 5	← 5
6	C	X 0	↖ 1	↑ 2	↑ 2	↑ 3	↖ 4	↑ 4	↑ 5	↖ 6	↖ 6
7	B	X 0	↑ 1	↖ 2	↑ 2	↖ 3	↑ 4	↑ 4	↖ 5	↑ 6	↑ 6
8	A	X 0	↑ 1	↑ 2	↖ 3	↑ 3	↑ 4	↖ 5	↑ 5	↑ 6	↑ 6

The algorithm to find the longest common subsequence between two strings is simple. The steps are as follows:

1. Construct a graph/matrix with the two strings and initial values of 0.

2. Start at the top left corner and move to the right, when the end is reached continue to the next row. Follow the rules:

Compare the two characters in the current cell. If they are the same character, then set the value to the upper-left diagonal + 1.

For example: in row 1 column 3 the characters match(both A). So the new value is equal to the diagonal (row 0 column 2) + 1. This gives a value of 1.

If the characters are different, compare the left and top cells and take the max.

For example: Row 4 column 7 value is set to 4 because the value to the left (4) is greater than the value above (3) .

Continue until the end is reached.

The final substring can be found by working backwards from the end and following the arrows. In this case, the longest common subsequence between the two strings is ABCABC which can be seen in the light green cells in the diagram.