

In continuous speech recognition, standard word sequential patterns are $A = \{b a d\}$, $B = \{a d c\}$ and an input speech sequence is $\{d a d c b a a c\}$. Language model is composed of continuous words of A, B ; $\{AA, AB, BA, BB\}$. In this cases, please solve the following problem of continuous speech recognition by using LB(Level Building) method.

Distance matrix between symbol a, b, c, d and DP path are shown in the following figures.

1. Show the recognized word sequence.
2. Show the correspondence of an input speech sequence and standard patterns.

	a	b	c	d
a	0	2	1	3
b	2	0	3	2
c	1	3	0	1
d	3	2	1	0

Fig 1. Distance matrix

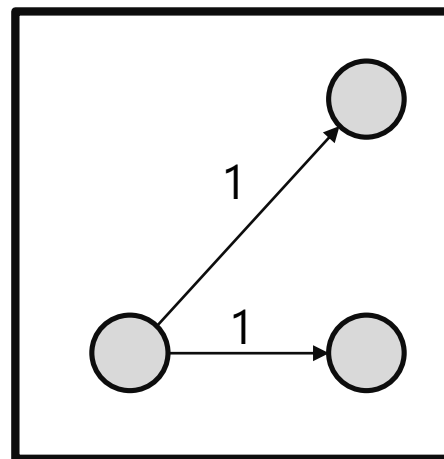


Fig 2. DP path

Hint

Standard sequential patterns $A = \{a b\}, B = \{a c\}$
 Input speech sequence $\{c a b b c\}$
 Language model (AA, AB, BA, BB)
 Distance matrix and DP path are fig 1 and fig 2.

DP matching in this case is shown.

2nd level

(A)

<i>b</i>	3	2	0	04	3 6
<i>a</i>	1	0	24	23	1 2
		<i>B</i> ²	<i>A</i> ¹	<i>A</i> ¹	
	<i>c</i>	<i>a</i>	<i>b</i>	<i>b</i>	<i>c</i>

(B)

<i>c</i>	3	1	3	3 7	0 3
<i>a</i>	1	0	24	23	1 2
		<i>B</i> ²	<i>A</i> ¹	<i>A</i> ¹	
	<i>c</i>	<i>a</i>	<i>b</i>	<i>b</i>	<i>c</i>

Decide the final path

1st level

Select one with the smallest cumulative distance

<i>b</i>	3	2 3	0 1	0 1	3 4
<i>a</i>	1 1	0 1	2 3	2 5	1 6
	<i>c</i>	<i>a</i>	<i>b</i>	<i>b</i>	<i>c</i>

<i>c</i>	0	1 2	3 4	3 6	0 5
<i>a</i>	1 1	0 1	2 3	2 5	1 6
	<i>c</i>	<i>a</i>	<i>b</i>	<i>b</i>	<i>c</i>

Answer sheet

Student number:

Name:

2nd level

(A)

<i>d</i>							
<i>a</i>							
<i>b</i>							
	<i>d</i>	<i>a</i>	<i>d</i>	<i>c</i>	<i>b</i>	<i>a</i>	<i>a</i>
							<i>c</i>

(B)

<i>c</i>							
<i>d</i>							
<i>a</i>							
	<i>d</i>	<i>a</i>	<i>d</i>	<i>c</i>	<i>b</i>	<i>a</i>	<i>a</i>
							<i>c</i>

1st level

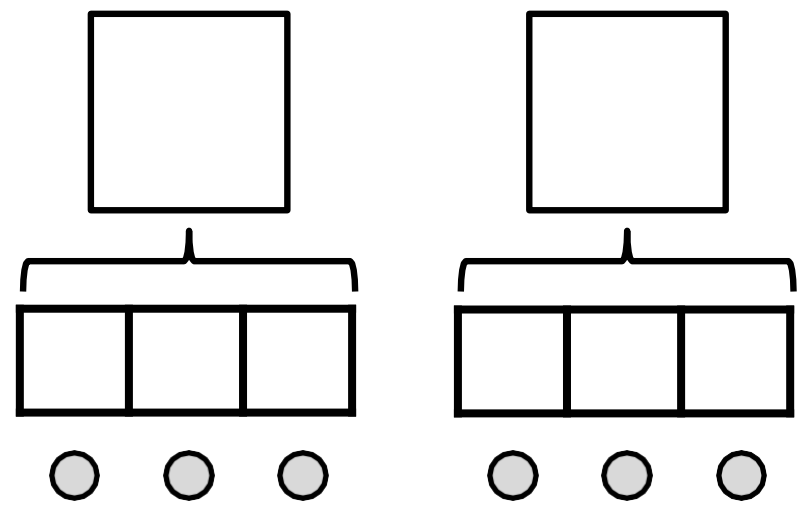
<i>d</i>							
<i>a</i>							
<i>b</i>							
	<i>d</i>	<i>a</i>	<i>d</i>	<i>c</i>	<i>b</i>	<i>a</i>	<i>a</i>
							<i>c</i>

<i>c</i>							
<i>d</i>							
<i>a</i>							
	<i>d</i>	<i>a</i>	<i>d</i>	<i>c</i>	<i>b</i>	<i>a</i>	<i>a</i>
							<i>c</i>

The recognized word sequence is

Fill selected words $\{A, B\}$ in upper squares, and fill the pattern $\{a, b, c\}$ in the lower squares, and then connect the corresponding frames between the two patterns.

Standard pattern



Input speech pattern

