

ALM-4

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Q) construct LPS table and apply KMP algorithm to find the pattern "ABCDABD" the text "ABCABCDCABABCDABCDABDE" derive its complexity.

Ans:- Given

pattern: ABCDABD

text: ABC ABCDCAB ABCDABCDABDE

LPS table

index	0	1	2	3	4	5	6
pattern	A	B	C	D	A	B	D
LPS	0	0	0	0	1	2	0

at KMP algorithm

$i=0$: $A == A \rightarrow j=1$

$i=1$: $B == B \rightarrow j=2$

$i=2$: $C == C \rightarrow j=3$

$i=3$: $D \neq D$ mismatch $\rightarrow j=0$
continue with $i=4$

Eventually

$i=15$: $A == A \rightarrow j=1$

$i=16$: $B == B \rightarrow j=2$

$i=17$: $C == C \rightarrow j=3$

$i=18$: $D == D \rightarrow j=4$

$i=19$ $A==A$ $j=5$

$i=20$ $B==B$ $j=6$

$i=21$ $D==D$ $j=7$ pattern matched

Time complexity

LPS table :- $O(m)$

Pattern matching :- $O(n)$

Total time complexity

~~$O(m+n)$~~

Don't
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