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Knuth Morris Pratt Algorith Manual

KMP Table

b	a	n	g	t	a	m	i	r	g	a	n	t	e	n	g
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Why did all KMP Table valued 0 ?

→ There ain't no prefix - suffix longest pattern, so there's no way we can skip any character. We don't need to compare adjacent characters due to no pattern char on the pattern we're trying to find.

Text :

h	a	h	g	o	e	d	a	r	e	k	g	b	a	n	g	e	b	a	n	g	t	n	e	f	b	a

n	g	t	a	m	i	r	g	a	n	t	e	n	g	g	i	w	o	w	i	F	w	r	r

g	a	w	r	h	r	t	g	a	b	c	d

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* T = text, P = Pattern

(We won't try to draw all the text every iterations)

T

b	a	h	g	o	e	g	a	r	e	k	g	b	a	n	g

P ↕ ↕ X

b	a	n	g	t	a	m	i	r	g	a	n	t	e	n	g

Iteration 1 : i = 1, j = 1 true { i = 2, j = 2 => false
start from i = 2

T

h	g	o	e	g	a	r	e	k	g	b	a	n	g	e	b

P X

b	a	n	g	t	a	m	i	r	g	a	n	t	e	n	g

Iteration 2 : i = 2, j = 0 => false, start from i = 3

g	o	e	g	a	r	e	k	g	b	a	n	g	e	b	a

X

b	a	n	g	t	a	m	i	r	g	a	n	t	e	n	g

Iteration 3 : i = 3, j = 0 => false, start from i = 4

o	e	g	a	r	e	k	g	b	a	n	g	e	b	a	n

X

b	a	n	g	t	a	m	i	r	g	a	n	t	e	n	g

Iteration 4 : i = 4, j = 0 => false, start from i = 5

The comparison will keep this way until it starts from i = 12

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i = 12

T

12															
b	a	n	g	e	b	a	n	g	t	n	e	f	b	a	n

P

b	a	n	g	t	a	m	i	r	g	a	n	t	e	n	g

Iteration 12 : i = 12, j = 0 => true → i = 15, j = 3 => true
i = 16, j = 4 => false.
i = 15 + 1 = 16 , j = KMPTable (j-1) = kmptable[3] = 0.
We'll start from i = 16

T

e	b	a	n	g	t	n	e	f	b	a	n	g	t	a	m

b	a	n	g	t	a	m	i	r	g	a	n	t	e	n	g

Iteration 16 : i = 16, j = 0 => false.
i++ => i = 17 j = 0

T

b	a	n	g	t	n	e	f	b	a	n	g	t	a	m	i

P

b	a	n	g	t	a	m	i	r	g	a	n	t	e	n	g

Iteration 17 : i = 17, j = 0 => true → i = 21, j = 4, => True
i = 22, j = 5 => false. j = kmptable[5-1] = 0,
i++ => 1 => 22, j = 0
We'll start on i = 22 and j = 0 (again)

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i=22

n	e	f	b	a	n	g	t	a	m	i	r	g	a	n	t

X

b	a	n	g	t	a	m	i	r	g	a	n	t	e	n	g

Iteration 22 ⇒ i = 22, j = 0 ⇒ false | i++ ⇒ i = 23

j = 0 (still)

e	f	b	a	n	g	t	a	m	i	r	g	a	n	t	e

X

b	a	n	g	t	a	m	i	r	g	a	n	t	e	n	g

Iteration 23 ⇒ i = 23, j = 0 ⇒ false | i++ ⇒ i = 24

j = 0 (still)

f	b	a	n	g	t	a	m	i	r	g	a	n	t	e	n

X

b	a	n	g	t	a	m	i	r	g	a	n	t	e	n	g

Iteration 24 ⇒ i = 24, j = 0 ⇒ false | i++ ⇒ i = 25

j = 0 (still)

We'll start on i = 25.

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i=25

T

b	a	n	g	t	a	m	i	r	g	a	n	t	e	n	g

P

b	a	n	g	t	a	m	i	r	g	a	n	t	e	n	g

Pattern found!

Iteration 25 :) i = 25, j = 0 → i = 40, j = 15 => True