

COS226 Week 10 Activity

Algorithms 4th edition, Section 5.2 and 5.3

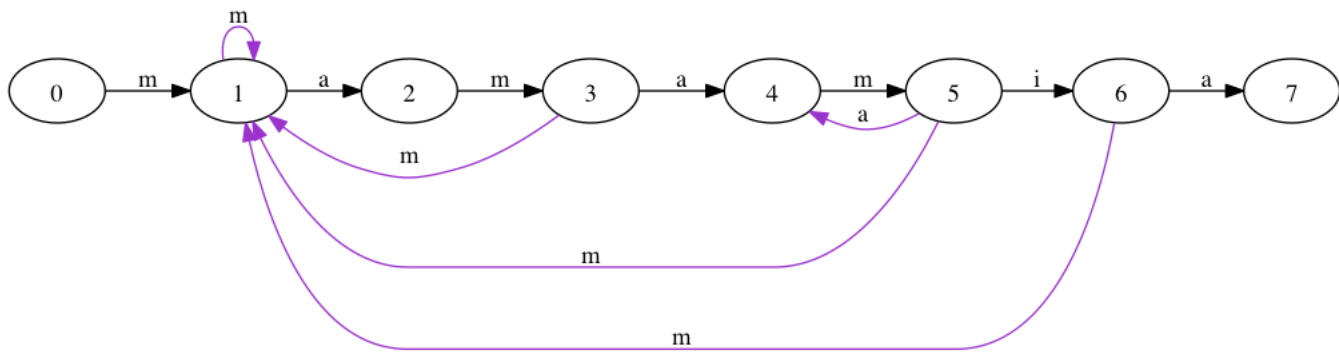
- Fill in the sorted suffixes and next[] columns of the table below.

i	Original Suffixes	Sorted suffixes	next[]
0	B A N A N A	A B A N A N	3 //where 0 ends up
1	A N A N A B	A N A B A N	4 //where 4 ends up
2	N A N A B A	A N A N A B	5 //where 2 ends up
3	A N A B A N	B A N A N A	2 //where 1 ends up
4	N A B A N A	N A B A N A	0 //where 5 ends up
5	A B A N A N	N A N A B A	1 //where 3 ends up

Transformed string: NNBAAA, first = 3

- Give the KMP DFA for the pattern MAMAMIA over the 3 letter alphabet by filling in the table below. Draw the DFA too.

	m	a	m	a	m	i	a
	0	1	2	3	4	5	6
a	0	2	0	4	5	4	7
i	0	0	0	0	0	6	0
m	1	1	3	1	0	1	1



3. Give the trace using Boyer-Moore to search for the pattern BANANA in the text

PINEAPPLESMANGOSANDBANANAS

by completing the table below.

i	j	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25		
		P	I	N	E	A	P	P	L	E	S	M	A	N	G	O	S	A	N	D	B	A	N	A	N	A	S		
0	5	B	A	N	A	N	A																						
6	4							B	A	N	A	N	A																
11	4											B	A	N	A	N	A												
16	5																B	A	N	A	N	A							
17	2																		B	A	N	A	N	A					
19	0																				B	A	N	A	N	A			

- 1st: P does not match, move to the right by $j+1$ spaces (6 spaces)
- 2nd: M does not match, move to the right by $j+1$ spaces (5 spaces) - move designed to not match M again
- 3rd: S does not match, move to the right by $j+1$ spaces (5 spaces)
- 4th: N does match, match N with rightmost occurrence in pattern ($j - \text{right}[N] = 5 - 4 = 1$)
- 5th: B does match, match B with rightmost occurrence in pattern ($j - \text{right}[B] = 2 - 0 = 2$)
- 6th: Match!

4. Build an R-way trie for the key-value pairs assuming $R = 5$: bad 1, bald 2, banana 3, ba 4, ban 5.
5. Build an 3-way trie for the same 5 key-value pairs.

