EXERCISE 1: Knuth-Morris-Pratt
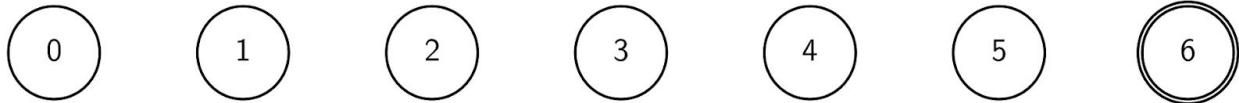
Construct the Knuth-Morris-Pratt DFA for the string `PAPAYA` over the alphabet `{A,P,Y}`. Complete the transition diagram and the corresponding DFA table.

	0	1	2	3	4	5
A	0	2	0	4	0	6
P	1	1	3	1	3	1
Y	0	0	0	0	5	0

EXERCISE 2: Boyer-Moore

Suppose that you run the Boyer-Moore algorithm (the basic version considered in the textbook and lecture) to search for the pattern D N A A in the text X N A A A D N A A. Give the trace of the algorithm in the grid below, circling the characters in the pattern that get compared with characters in the text.

X	N	A	A	A	D	N	A	A

EXERCISE 3: Algorithm & Data Structure Design

Given a string *txt* of length N, design a data structure that allows to search in *txt* for a given string s of length $m \ll N$ in *txt*. The length m is unknown in advance and is not fixed over different queries.

Performance Requirements. The running time of each search query should be in the order of m in the worst-case. The data structure can use up to $N^2 R$ space and can take up to $N^2 R$ time to construct, where R is the size of the alphabet, which is known in advance.