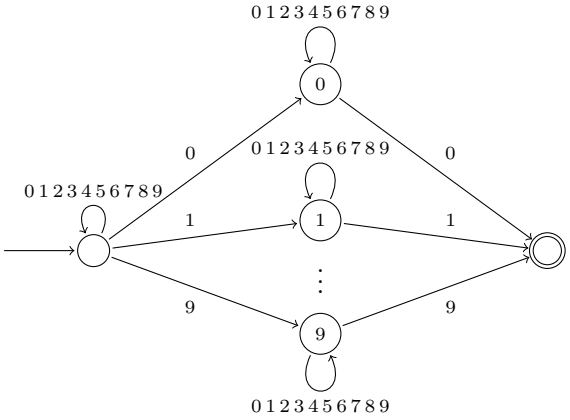
universität innsbruck

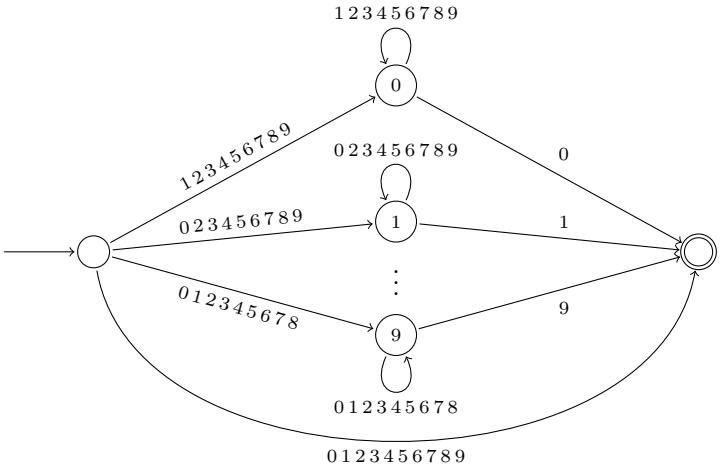
Automata and Logic	26W	LVA 703302 + 703303
Lecture 2		October 23, 2026

Selected Solutions

1 (a) The idea is to use states 0, 1, ..., 9 to guess that this is the repeated digit at the end:



(b) The idea is to use states 0, 1, ..., 9 to guess that this is the digit at the end which cannot appear before:



2 (a) We have $C_\epsilon(\{1\}) = \{1\}$, $C_\epsilon(\{2\}) = \{1, 2\}$ and $C_\epsilon(\{3\}) = \{1, 2, 3\}$.

(b) The strings c, ac, bb, bc, ca, cb and cc belong to $L(N)$.

(c) Eliminating ϵ-transitions yields the following NFA:

		a	b	c
$\rightarrow$	1	$\{1\}$	$\{1,2\}$	$\{1,2,3\}$
	2	$\{1,2\}$	$\{1,2,3\}$	$\{1,2,3\}$
	$3F$	$\{1,2,3\}$	$\{1,2,3\}$	$\{1,2,3\}$

The subset construction yields the desired DFA:

		a	b	c
$\rightarrow$	$\{1\}$	$\{1\}$	$\{1,2\}$	$\{1,2,3\}$
	$\{1,2\}$	$\{1,2\}$	$\{1,2,3\}$	$\{1,2,3\}$
	$\{1,2,3\}F$	$\{1,2,3\}$	$\{1,2,3\}$	$\{1,2,3\}$

Note that all states are accessible.