Problem  Draw a finite state machine that accepts a string of digits $s$ where either (1) $s$ is empty, or (2) $s$ is a single digit at most 3, or (3) sum of every pair of adjacent digits in $s$ is at most 3. So, 2, 103011 and 21003 will be accepted whereas 8 and 122 will be rejected.
Solution  Below, state numbered $i$ is reached when the last seen digit is $i$, and state 0 is reached initially. Any other symbol that is not shown explicitly at a state leads to a permanently rejecting state.

![Diagram of the automaton](image-url)

Figure 1: Solution