

Example: Turing Machine Building Blocks_{JP}

Define the following three simple Turing machines over input alphabet $\{\square, 0, 1\}$ to be used as components for another Turing machine.

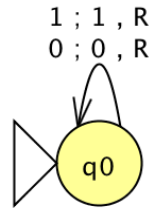
- TMScanR: Move right. If the character under the read/write head is not blank (\square), repeat. If blank, halt. This finds the first blank square to the right of the current square and leaves the read/write head at that location.
- TMScanL: Move left. If the character under the read/write head is not blank (\square), repeat. If blank, halt. This finds the first blank square to the left of the current square and leaves the read/write head at that location.
- TMShiftL: Transform input "... \square u \square w \square ..." into output " \square uw \square ". This shifts the string that is to the right of the read/write head over one square to the left by copying each symbol onto the square immediately to its left. Note that the read/write head begins on a blank between two strings and ends on the blank to the right of the concatenated strings.

Use these three Turing machines as building blocks for a machine TMConcat that concatenates multiple strings on the input tape. For example, if the input configuration to TMConcat was "... \square 001 \square 1110 \square 101 \square ..." then the output configuration will be "... \square 0011110101 \square ..." after halting.

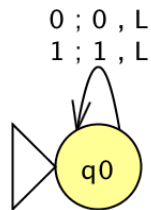
Use "Input > Step..." and "Input > Step by BuildingBlock" to follow along as JFLAP executes TMConcat on input "001 \square 1110 \square 101".

Sample Solution (see: TMScanR.jff, TMScanL.jff, TMShiftL.jff, TMConcat.jff)

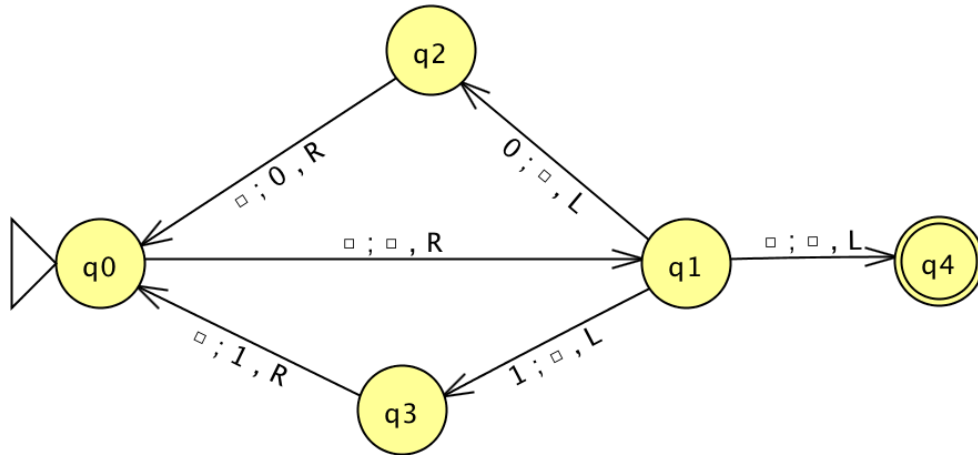
TMScanR:



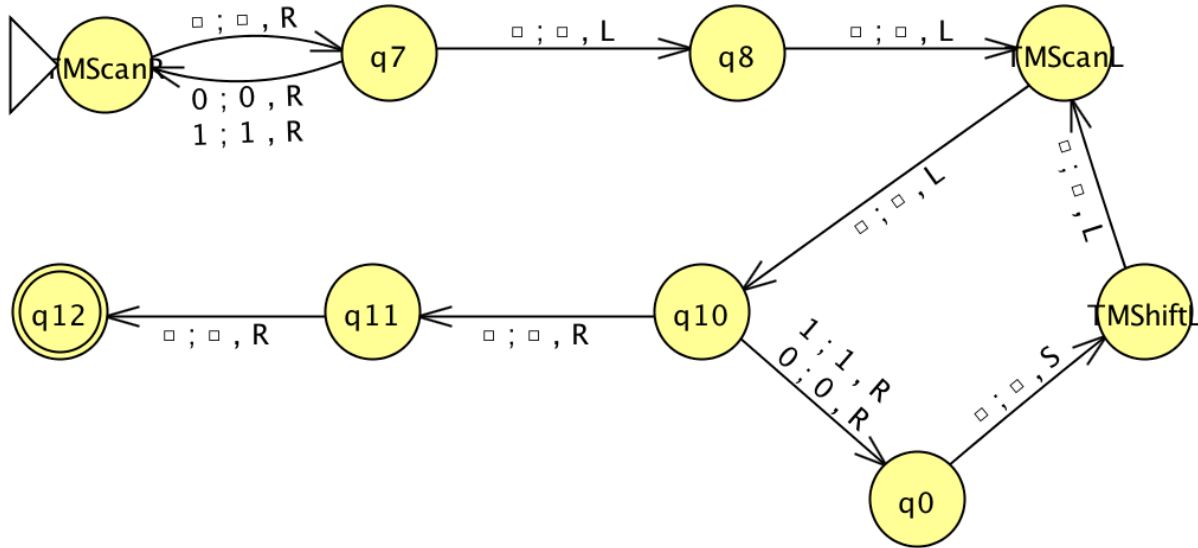
TMScanL:



TMShiftL:



TMConcat:



Sample Run Using Input > Step by BuildingBlock:

