

0/0,R

(q0)00010 -> 0(q0)0010 -> 00(q0)10 -> 00(q1)000  
-> 0(q1)0000 -> (q1)00000 -> (q1) " " 00000 -> (q2)00000 -> (q3)0000

(q0)1 -> (q1)0 -> (q1)"0" -> (q2)0 -> (q3)" "

```
graph LR; Start(( )) --> q0((q0)); q0 -- "0/0,R" --> q0; q0 -- "1/0,L" --> q1((q1)); q1 -- "0/0,L" --> q1; q1 -- "␣/␣,R" --> q2((q2)); q2 -- "0/␣,L" --> q3(((q3))); style Start fill:none,stroke:none; style q3 stroke-width:4px;
```

01010101001101001000101011000101000101011000100010000100010011000010100100010

Hand-drawn state transition diagram for a Turing machine. States are represented by circles labeled  $q_1$  through  $q_{11}$ . Transitions are labeled with input/output and head movement (e.g.,  $u/u, L$ ). The diagram shows a complex sequence of states and transitions, including loops and paths that eventually lead to a final state  $q_2$ .

Binary strings representing state transitions:

- $q_1 \rightarrow q_3$ : 0101000100010011
- $q_1 \rightarrow q_{11}$ : 0100010000000000000010001011
- $q_3 \rightarrow q_3$ : 0001010001010011
- $q_3 \rightarrow q_4$ : 000100010000100010011
- $q_4 \rightarrow q_5$ : 000010100000100010011
- $q_4 \rightarrow q_9$ : 00001000100000000010001011
- $q_5 \rightarrow q_5$ : 00000101000001010011
- $q_5 \rightarrow q_6$ : 0000010001000000100010011
- $q_6 \rightarrow q_6$ : 0000001010000001010011
- $q_6 \rightarrow q_7$ : 000000100010000000101011
- $q_7 \rightarrow q_7$ : 00000001010000000101011
- $q_7 \rightarrow q_8$ : 0000000100010000000010001011
- $q_8 \rightarrow q_8$ : 0000000010100000000101011
- $q_8 \rightarrow q_4$ : 000000001000100001010011
- $q_9 \rightarrow q_9$ : 000000000101000000000101011
- $q_9 \rightarrow q_{10}$ : 00000000010001000000000010001011
- $q_{10} \rightarrow q_{10}$ : 00000000001010000000000101011
- $q_{10} \rightarrow q_1$ : 00000000001000100100010011
- $q_{11} \rightarrow q_{11}$ : 00000000000010100000000000101011
- $q_{11} \rightarrow q_2$ : 000000000001000100100010011