carry: Exercises01 0 : {write: 1, L} # halt on the leftmost digit. [1,' ']: {write: 0 , L: left} input: '101101' blank: ' ' left: start state: right [1,0]: L '': {R: sub} table: # scan to the rightmost digit sub: '':R right: [1,0]: R 1: {R: done} ' ' : {L: carry} 0: {write: '', R: done} # then carry the 1 done: carry: 1 : {write: 0, L} [0,' ']: {write: 1, L: left} Exercises02: : Divisible by 3 left: # Modify the machine to check if n-1 is divisible by 3 [1,0]: L '': {R: done} start state: q0 table: done: q0: #2*0+0=00: R # adds 2 to a binary number. 1: $\{R: q1\} \# 2*0 + 1 = 1$ input: '1000' blank: ' ' q1: start state: right $0: \{R: q2\} \# 2*1 + 0 = 2$ 1: $\{R: q0\} \# 2*1 + 1 = 3$ table: ' ': {R: accept} # scan to the rightmost digit right: q2: [1,0]: R $0: \{R: q1\} \# 2*2 + 0 = 4$ '': {L: lastdigit} 1: $\{R: q2\} \# 2*2 + 1 = 5$ lastdigit: accept: [1,0]: {L : carry} # Round the number up to the nearest multiple of 3. carry: : {write: 0, L} start state: q0 [0,' ']: {write: 1, L: haltleft} table: haltleft: q0: #2*0+0=00: R [1,0]: L '': {R: done} 1: $\{R: q1\} \# 2*0 + 1 = 1$ done: q1: # subtract 1. $0: \{R: q2\} \# 2*1 + 0 = 2$ input: '1001' 1: $\{R: q0\} \# 2*1 + 1 = 3$ blank: ' ' ' ': {L: add2} start state: right q2: table: $0: \{R: q1\} \# 2*2 + 0 = 4$ # scan to the rightmost digit 1: $\{R: q2\} \# 2*2 + 1 = 5$ right: ' ': {L: add1} add1: [1,0]: R

1

: {write: 0, L}

' ' : {L: carry}

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[0,' ']: {write: 1, L: done}
add2:
 [1,0]: {L : carry}
carry:
  1
           : {write: 0, L}
  [0,' ']: {write: 1, L: done}
done:
```

Round the number down to the nearest multiple of

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3.
start state: q0
table:
  q0:
                  # 2*0 + 0 = 0
    0: R
     1: \{R: q1\} \# 2*0 + 1 = 1
  q1:
    0: \{R: q2\} \# 2*1 + 0 = 2
     1: \{R: q0\} \# 2*1 + 1 = 3
    ' ': {L: sub1}
  q2:
    0: \{R: q1\} \# 2*2 + 0 = 4
     1: \{R: q2\} \# 2*2 + 1 = 5
    ' ': {L: sub2}
  sub1:
    0
              : {write: 1, L}
    [1,' ']: {write: 0 , L: left}
  left:
    [1,0]: L
    ' ' : {R: sub}
  sub:
    '':R
     1: {R: done}
```

0 : {write: '', R: done}

sub2:

done:

[1,0]: {L: sub1}