CMPS 10 12-3-08

- LABS: GRACE PERIOD EXT. TO 24 HRS.
  WILL CLOSE 10 PM THUR.

- FINAL EXAM: WED DEC 10
  8-11 am
  BRING UCSC ID TO EXAM

UNARY REPRESENTATION

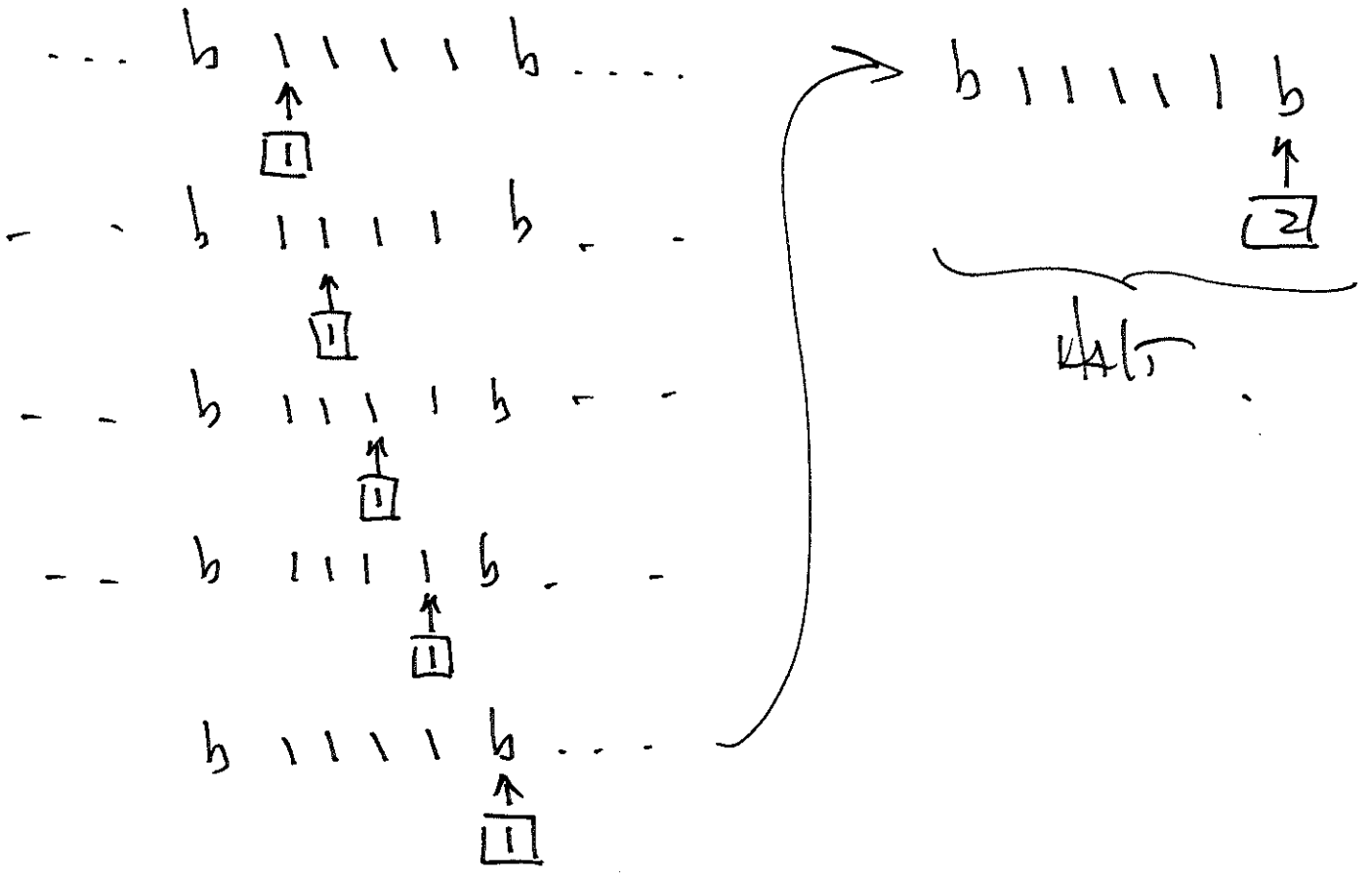
CAVE MAN	UNARY
1	0
11	1
111	2
1111	3
11111	4
111111	5
⋮	⋮

ALPHABET : $\{0, 1\}$

Ex. UNARY INCREMENT

1	1	1	1	R
1	b	1	2	R

TAPE:

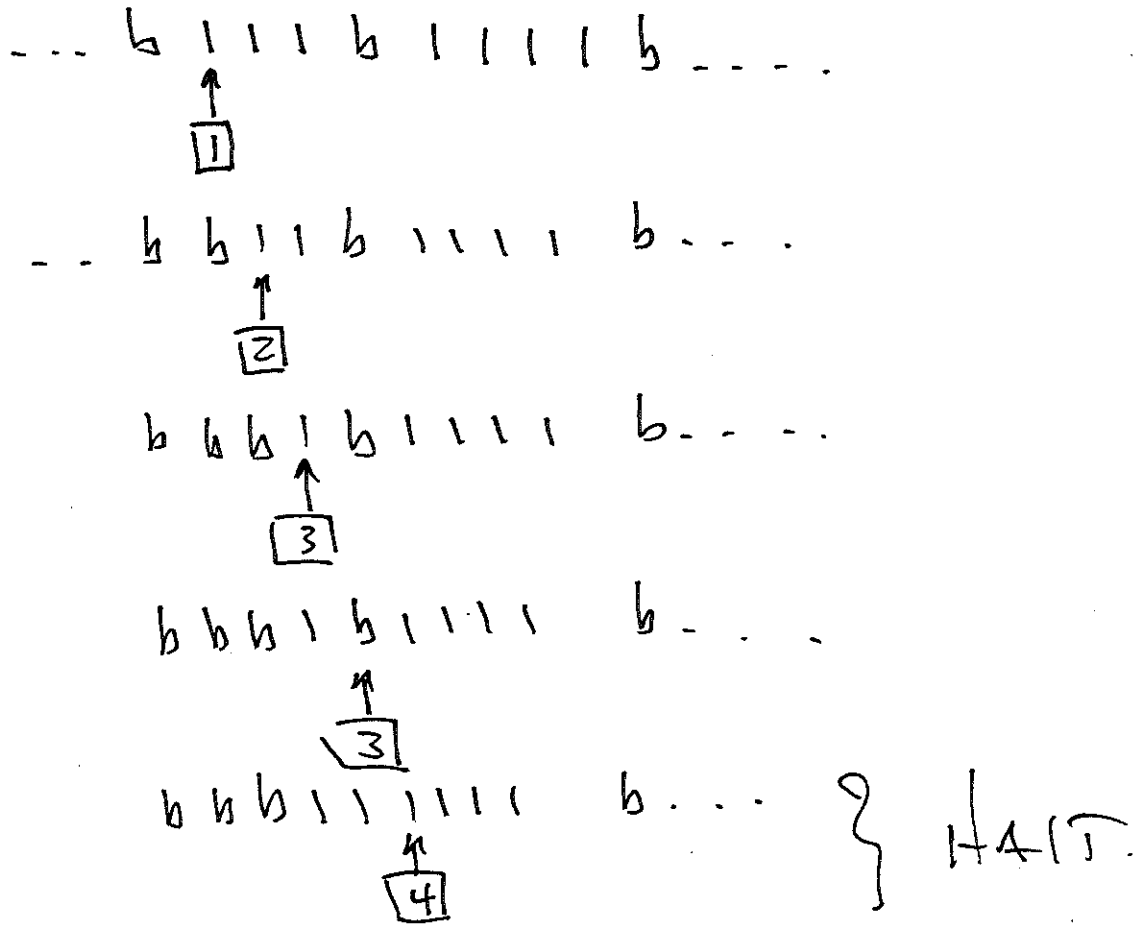


EX UNARY ADDITION

1	1	b	2	R
2	1	b	3	R
3	1	1	3	R
3	b	1	4	R

$2+3=5$

TAPE:



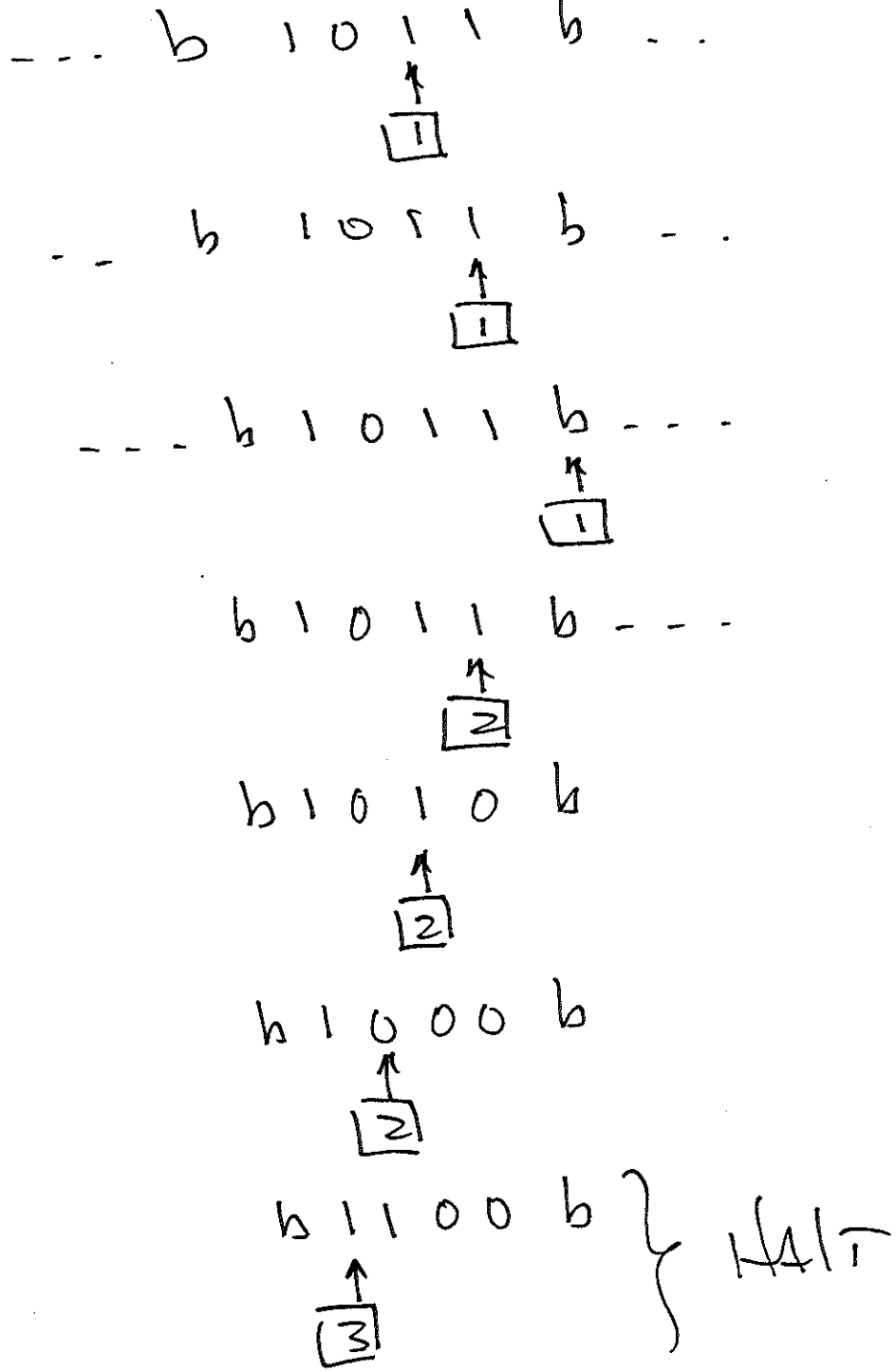
EX. BINARY INCREMENT

ALPHABET = { b, 0, 1 }

1 1 1 1 R
1 0 0 1 R
1 b b 2 L
2 0 1 3 L
2 1 0 2 L
2 b 1 3 R

TAPE: . . b 1 0 1 1 b . . . $(11)_{10}$

. . b 1 0 1 1 b . .


... b 1 0 1 1 b ...
1
.. b 1 0 1 1 b ..
1
... b 1 0 1 1 b ...
1
b 1 0 1 1 b ...
2
b 1 0 1 0 b
2
b 1 0 0 0 b
2
b 1 1 0 0 b
3
HALT

$(12)_{10}$

Ex. Binary Addition

Exercise. (HW 9!!)

HW 9 #9| Describe action of

1	1	1	1	R
1	0	0	2	L
2	1	0	2	L
2	b	1	3	L
3	b	b	1	R

On tape: ... b 1 0 1 b ...

Never halts!!

Would halt on ... b 1 1 1 b ...

Ex. A SIMPLER EXAMPLE

1 1 1 1 R
1 b b 1 R
1 0 0 2 R

HALTS: _ _ b 0 b _ _ _

DOES NOT HALT ON: _ _ _ b 1 b _ _ _

PROBLEM: THE HALTING PROBLEM

GIVEN A TURING MACHINE T AND AN INITIAL TAPE t,
DOES T HALT WHEN RUN ON t?