C

Direct data cache of 4 bytes by 2 lines is initially empty. Memory starts at address 0 to the left. The memory is initialized as follows :

L0	S0			L1				L0	S1			L1				L0			S2	L1	
00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	10	11	12	13	14	15
T	h	i	r	d	-	t	e	s	t	-	C	S	C	I	-	4	6	3	-	-	-

Assume memory cells are 8 bits and addresses in decimal. Program below performs the specified memory access.

Show cache after each memory read. Indicate hit or miss on the appropiate line and CIRCLE specific byte in cache being read.

A = accumulator m(i) is memory being read where i is specific address.

A = m(0) 0 0000

Tag	0	1	2	3	H/M	
						line 1
00	(T)	h	i	r	m	line 0

A = m(A) 0 1010

Tag	0	1	2	3	H/M	
						line 1
01	S	t	(-)	C	m	line 0

A = m(1) 0 0001

Tag	0	1	2	3	H/M	
						line 1
00	T	(h)	i	r	m	line 0

A = m(B) 0 1011

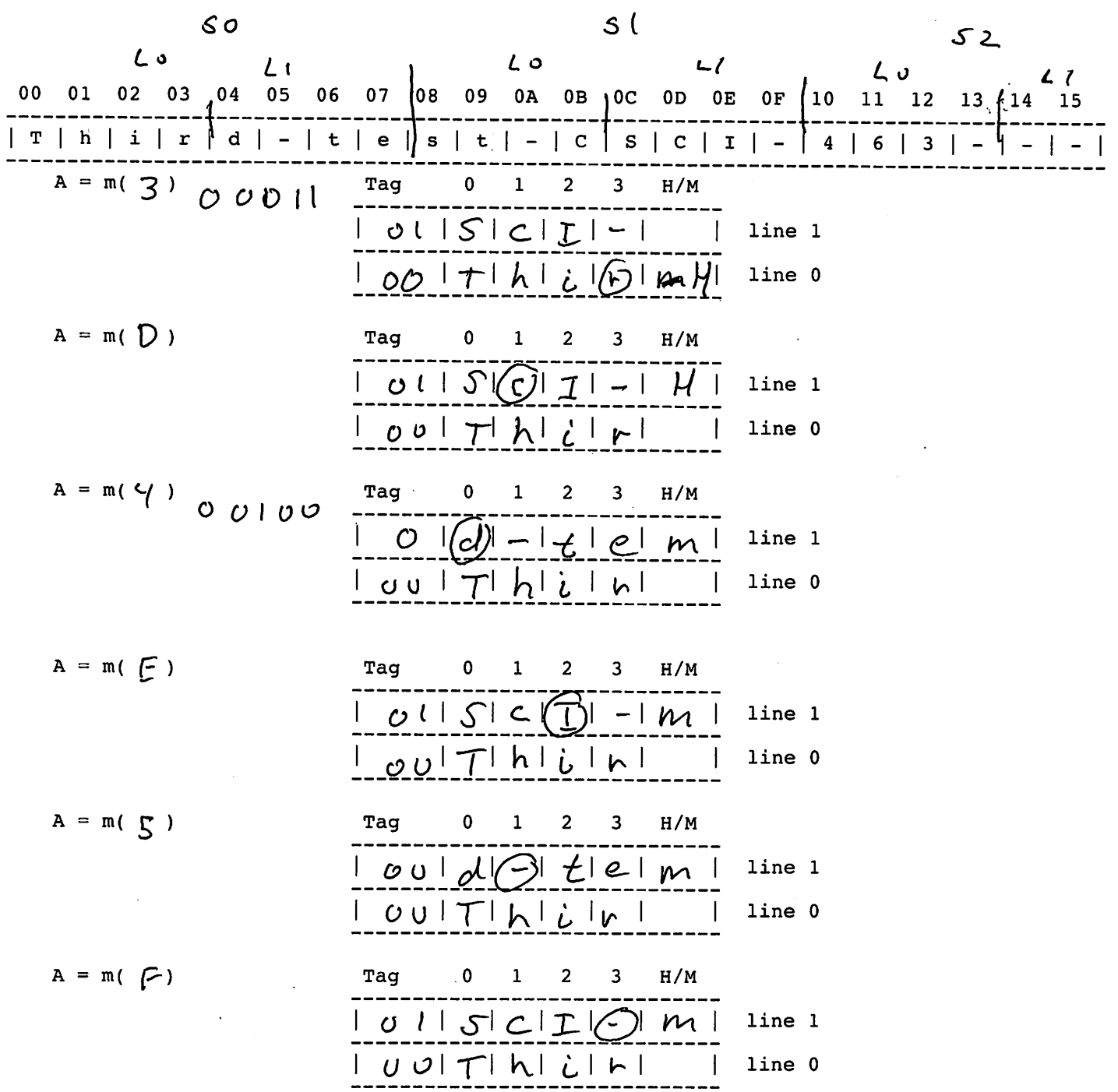
Tag	0	1	2	3	H/M	
						line 0
01	S	t	-	(C)	m	line 1

A = m(2) 0 0010

Tag	0	1	2	3	H/M	
						line 1
00	T	h	(i)	r	m	line 0

A = m(C) 0 1100

Tag	0	1	2	3	H/M	
01	(S)	C	I	-	m	line 1
00	T	h	i	r		line 0


S0
S1
S2
L0 L1 L0 L1 L0 L1
00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 10 11 12 13 14 15
| T | h | i | r | d | - | t | e | s | t | - | C | S | C | I | - | 4 | 6 | 3 | - | - | - |
A = m(3) 00011
Tag 0 1 2 3 H/M
| 01 | S | C | I | - | | line 1
| 00 | T | h | i | r | H | line 0
A = m(D)
Tag 0 1 2 3 H/M
| 01 | S | C | I | - | H | line 1
| 00 | T | h | i | r | | line 0
A = m(4) 00100
Tag 0 1 2 3 H/M
| 0 | d | - | t | e | m | line 1
| 00 | T | h | i | r | | line 0
A = m(E)
Tag 0 1 2 3 H/M
| 01 | S | C | I | - | m | line 1
| 00 | T | h | i | r | | line 0
A = m(5)
Tag 0 1 2 3 H/M
| 00 | d | - | t | e | m | line 1
| 00 | T | h | i | r | | line 0
A = m(F)
Tag 0 1 2 3 H/M
| 01 | S | C | I | - | m | line 1
| 00 | T | h | i | r | | line 0