(12) 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 :

00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F	10	11	12	13	14
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. Both pages show a single series of reads.

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

A = m(00)

Tag	0	1	2	3	H/M	
						line 1
						line 0

A = m(0B)

Tag	0	1	2	3	H/M	
						line 1
						line 0

A = m(01)

Tag	0	1	2	3	H/M	
						line 1
						line 0

A = m(0C)

Tag	0	1	2	3	H/M	
						line 0
						line 1

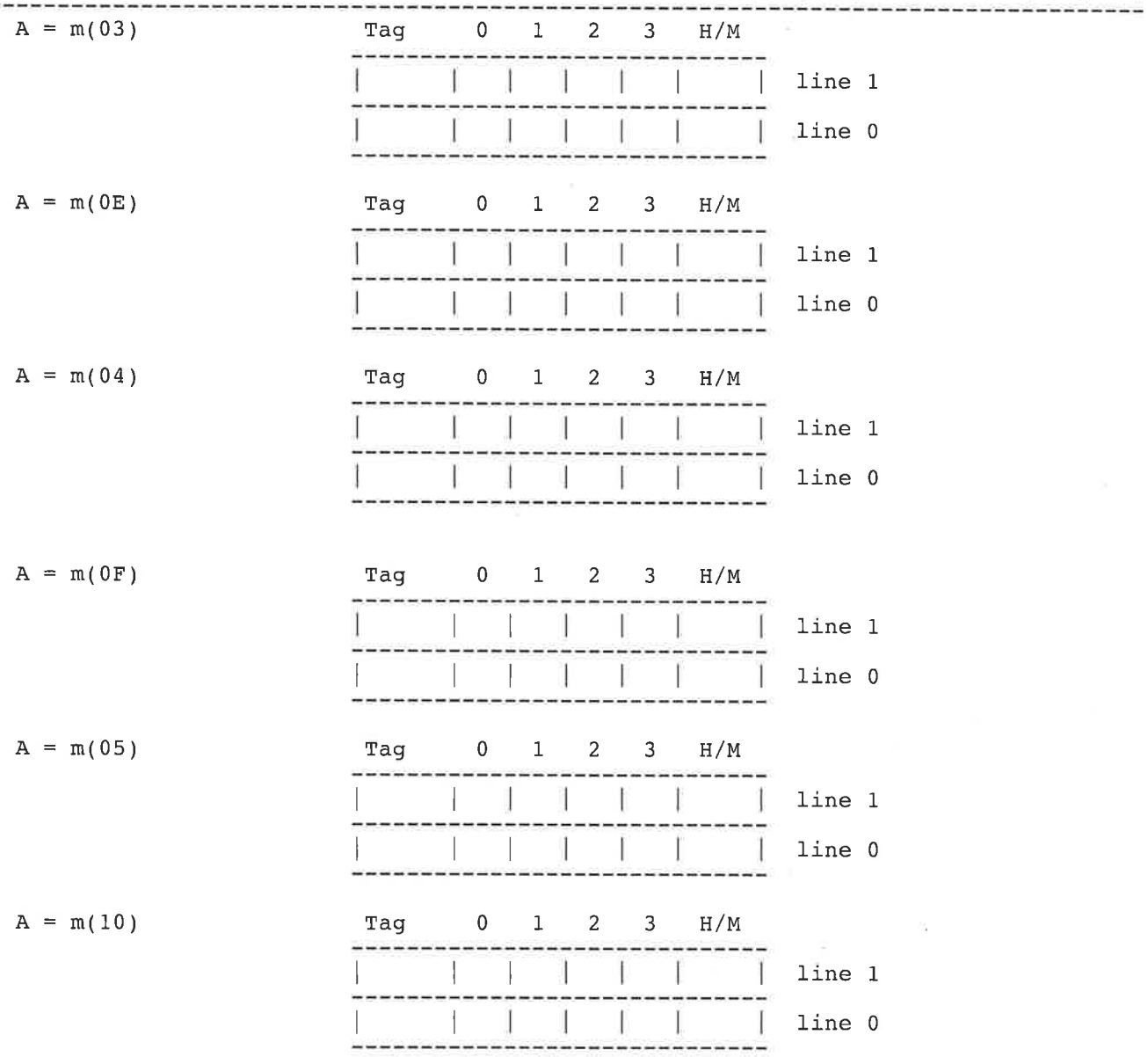
A = m(02)

Tag	0	1	2	3	H/M	
						line 1
						line 0

A = m(0D)

Tag	0	1	2	3	H/M	
						line 1
						line 0

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



(12) 2-Way Set Associative data cache of 2 bytes by 2 lines by 2-way is initially empty. Memory starts at address 0 to the left. Memory is initialized as follows :

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

Program below performs the specified memory access. Use first in first out if line full.

Show cache after each memory read. Indicate hit or miss on the appropiate line and CIRCLE specific byte in cache being read. Both pages show a single series of reads.

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

A = m(00)

Tag	0	1	Tag	0	1	H/M	
							line 1
							line 0

A = m(0B)

Tag	0	1	Tag	0	1	H/M	
							line 1
							line 0

A = m(01)

Tag	0	1	Tag	0	1	H/M	
							line 1
							line 0

A = m(0C)

Tag	0	1	Tag	0	1	H/M	
							line 1
							line 0

A = m(02)

Tag	0	1	Tag	0	1	H/M	
							line 1
							line 0

A = m(0D)

Tag	0	1	Tag	0	1	H/M	
							line 1
							line 0

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

A = m(03)

Tag	0	1	Tag	0	1	H/M	
							line 1
							line 0

A = m(0E)

Tag	0	1	Tag	0	1	H/M	
							line 1
							line 0

A = m(04)

Tag	0	1	Tag	0	1	H/M	
							line 1
							line 0

A = m(0F)

Tag	0	1	Tag	0	1	H/M	
							line 1
							line 0

A = m(05)

Tag	0	1	Tag	0	1	H/M	
							line 1
							line 0

A = m(10)

Tag	0	1	Tag	0	1	H/M	
							line 1
							line 0