Solution ab QT-1

Cache = 2kB

= 2x1024

= 2048

Blocks = $2048/8 \times 4$ = 64

$2^n = 64$

$2^n = 2^6$

32 bytes / block

check	index calc	cache states	Decision
15	15/32 = 0 0 %. 64 = 0	0 → 0 - 31	M
19	19/32 = 0 %. 64 = 0	found at 0	H
4097	4097 / 32 = 128 %. 64 = 0	0 → 4096 → 4127	M
4098	4098 / 32 = 128 %. 64 = 0	found at 0	H
7	7 / 32 = 0 %. 64 = 0	0 → 0 - 31	M
30	30 / 32 = 0 %. 64 = 0	found at 0	H
2098	2098/32 = 65 %. 64 = 1	1 → 2080 - 2111	M
126	126/32 = 3 %. 64 = 3	3 → 96 → 127	M

miss rate = $F_0/8$

$= 0.62 F_0$

$= 62.F_0\%$.

(2)

$\frac{2048}{16} = 128$

16 bytes/block

check	index	Cache S	Desicion
15	15 /. 16 = 0 0 /. 128 = 0	0 - 15	m
19	19 /16 = 1 1 /. 128 = 1	~~16 - 31~~ 1 → 16 - 31	m
9097	4097 /16 = 256 256 /. 128 = 0	0 - 4096 -P ↓ 4111	m
4098	4098 /16 = 256 256 /. 128 = 0	found at 0	H
7	7 /. 16 = 0 0 /. 128 = 0	~~found~~ -P 0 — 0 - 15	m
30	30 /16 = 1 1 /. 128 = 1	found at 1	H
126	126 /16 = 7 7 /. 128 = 7	7 → 112 — 127 P	m
2098	2098 /16 = 131 131 /. 128 = 3	3 — 2096 - 2111 P	m

$$\text{miss rate} = \frac{6}{8} = 0.75$$

③ offset = 6

index = 7 $\quad n = 7 \quad ; \; m+n+2 = 13$

$m = 13 - n - 2$

Tag = 32 - (6+7)

$m = 13 - n - 2$

$= 19$

$= 13 - 9$

$= 4$

$2^n = 2^7$ blocks

2^{m+2} bytes $= 2^6$ bytes /p.block

(4) $\frac{256 \times 1024}{8 \times 2^3} = 4046$ blocks $= 2^{12} = 2^n$ $n = 12$

64 bytes/block $= 2^6$ $m + 3 = 6$

$m = 3$

Tag $= 32 - (n + m + 3)$

$= 32 - (12 + 6)$

$= 32 - 18$

$= 14$

Actual size $= 2^{12} \left(2^4 + \underbrace{(32 - (m + n + 3))}_{14} + 1\right)$