

Assignment 2

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Course: CSE 3313

Section: A

Ans to the Q. No 1 (Slide 10 - Problem 2)

(a)

~~For 12~~

$$\text{Blocks} = \frac{256 \times 2^{10}}{2^1 \times 2^2} = 2^{15}$$

For 12,

$$B.A = \lfloor 12 / 8 \rfloor = 1$$

$$B.N = 1 \% 2^{15} = 1$$

$\therefore 12 \rightarrow \text{miss}$

$$\begin{aligned}\therefore \text{Block copied from} &= (1 \times 8) \text{ to } (8 + 8 - 1) \\ &= 8 \text{ to } 15\end{aligned}$$

For 42,

$$B.A = \lfloor 42 / 8 \rfloor = 5$$

$$B.N = 5 \% 2^{15} = 5$$

$\therefore 42 \rightarrow \text{miss}$

$$\begin{aligned}\text{Block copied from} &= (5 \times 8) \text{ to } (8 \times 5 + 8 - 1) \\ &= 40 \text{ to } 47\end{aligned}$$

For 7,

$$B.A = \lfloor 7 / 8 \rfloor = 0$$

$$B.N = 0 \% 2^5 = 0$$

$\therefore 7 \rightarrow \text{miss}$

Block copied from = 0 to (8-1)

for 15,

$$B.A = \lfloor 15 / 8 \rfloor = 1$$

$$B.N = 1 \% 2^5 = 1$$

$\therefore 15 \rightarrow \text{hit}$

for 40,

$$B.A = \lfloor 40 / 8 \rfloor = 5$$

$$B.N = 5 \% 2^5 = 5$$

$\therefore 40 \rightarrow \text{hit}$

for 39,

$$B.A = \lfloor 39 / 8 \rfloor = 4$$

$$B.N = 4 \% 2^5 = 4$$

$\therefore 39 \rightarrow \text{miss}$

$\therefore \text{Total case} = 6, \text{miss} = 4$

$$\therefore \text{miss rate} = \frac{34}{6} = 66.67\% \quad (\text{Ans})$$

(b)

$$\text{Blocks} = \frac{2^8 \times 2^{10}}{2^2 \times 2^2} = 2^{14}$$

For 12,

$$B.A = \lfloor 12 / 16 \rfloor = 0$$

$$B.N = 0$$

12 \rightarrow miss

\therefore Block copied from = 0 to $(16-1) = 0$ to 15

For 42,

$$B.A = \lfloor 42 / 16 \rfloor = 2$$

$$B.N = 2 \% 2^{14} = 2$$

4 \rightarrow miss

For 7, \therefore Block copied from (2×16) to $(2 \times 16 + 16 - 1) = 32$ to 47

$$B.A = \lfloor 7 / 16 \rfloor = 0$$

$$B.N = 0 \% 2^{14} = 0$$

$\therefore 7 \rightarrow$ hit

For 15,

$$B.A. = \lfloor 15/16 \rfloor = 0$$

$$B.N. = 0$$

$\therefore 15 \rightarrow \text{hit}$ (d)

For 40,

$$B.A. = \lfloor 40/16 \rfloor = 2$$

$$B.N. = 2 \% 2^4 = 2$$

$\therefore 40 \rightarrow \text{hit}$

For 39,

$$B.A. = \lfloor 39/16 \rfloor = 2$$

$$B.N. = 2 \% 2^4 = 2$$

$\therefore 39 \rightarrow \text{hit}$

$$\therefore \text{miss rate} = \frac{\# \text{ of miss}}{\text{Total case}} = \frac{2}{6} = 33.33\%$$

(Ans)

(c)

In this case, spatial locality caused the change in miss rate. ^{in (b),} Because words per block increased and after that we saw that miss rate reduced. This happens due to spatial locality. (Ans)