22C:160/55:132 Homework 3 sample solutions

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Question 1.
(Omitted)Everyone got this question right. Well done!

Question 2.

(a)

case	memory operation
Read hit	0 read, 0 write
Read miss	2 reads
Write hit	0 read, 1 write
Write miss	2 read, 1 write

So average memory bandwidth used for each memory reference is

$$75\% \cdot 5\% \cdot 2 + 25\% \cdot 95\% \cdot 1 + 25\% \cdot 5\% \cdot (2+1) = 0.35$$

Used bandwidth $= \frac{0.35 \cdot 10^9}{10^9} = 35\%$

(b)

case	memory operation
any hit	0 read, 0 write
miss and replace clean one	2 reads
miss and replace dirty one	2 reads, 2 writes

So average memory bandwidth used for each memory reference is

$$5\% \cdot 70\% \cdot 2 + 5\% \cdot 30\% \cdot (2+2) = 0.13$$

Used bandwidth $= \frac{0.13 \cdot 10^9}{10^9} = 13\%$