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CSC 137

Homework #7

P1 In order to minimize the duration of a read cycle, the _oe can be asserted at any time within a maximum time after the _ce is asserted, as illustrated in the timing diagram.

A. True

B. False

P2 A memory write cycle is similar to a read cycle, except the data must be placed on the data bus at the same time that _ce is asserted or within a maximum delay after _we is asserted to minimize the time the data bus is used. Figure 7.17 illustrates an SRAM memory write cycles.

I: A memory cycle is initiated by which component in the computer motherboard?

- By the CPU (central Processing Unit)

II: A memory cycle, typically, how many CPU clock cycles to complete?

- It typically takes multiple CPU clock cycles to complete.

7.10 Consider a 32-bit data bus SDRAM. Given that the clock frequency of the bus is 200 MHz, what is the peak memory bandwidth in megabyte per second (MBs)?

$$32 \text{ bits} \times \frac{1 \text{ Byte}}{8 \text{ bits}} = 4 \text{ Bytes}$$

$$\text{PMB} = 200{,}000{,}000 \frac{\text{cycles}}{\text{sec}} \times 4 \frac{\text{Bytes}}{\text{cycle}}$$

$$= 800{,}000{,}000 \frac{\text{Bytes}}{\text{sec}}$$

$$= \boxed{800 \text{ MBs}}$$

(7.11) Consider a 64-bit data bus SDRAM. Given that the clock frequency of the bus is 200 MHz, what is the peak memory bandwith in megabyte per second (MBs)?

$$64 \text{ bits} \times \frac{1 \text{ Byte}}{8 \text{ bits}} = 8 \text{ Bytes}$$

$$\text{PMB} = 200,000,000 \frac{\text{cycles}}{\text{sec}} \times 8 \frac{\text{Bytes}}{\text{cycle}}$$

$$= 1,600,000,000 \frac{\text{Bytes}}{\text{sec}}$$

$$= \boxed{1,600 \text{ MBs}}$$

(7.12) Consider a 32-bit data bus DDR SDRAM. Given that the clock frequency of the bus is 200 MHz, what is the peak memory bandwith in megabyte per second (MBs)?

$$32 \text{ bits} \times \frac{1 \text{ Byte}}{8 \text{ bits}} = 4 \text{ Bytes}$$

$$\text{DDR SDRAM} \Rightarrow 4 \text{ Bytes} \times 2 = 8 \text{ Bytes}$$

$$\text{PMB} = 200,000,000 \frac{\text{cycles}}{\text{sec}} \times 8 \frac{\text{Bytes}}{\text{cycles}}$$

$$= 1,600,000,000 \frac{\text{Bytes}}{\text{sec}}$$

$$= \boxed{1,600 \text{ MBs}}$$