Memory System Design

In the following sections, you will design three different memory systems using four memory chips. The chips used are **four million address** by **four bit words**.

**Part A** Consider a **four million address** by **sixteen bit word** memory system.

How many address lines does the memory system require? ____________________________

How many data lines does the memory system require? ____________________________

What kind of address decoder is required? ______ to ______

**Part B** Consider a **eight million address** by **eight bit word** memory system.

How many address lines does the memory system require? ____________________________

How many data lines does the memory system require? ____________________________

What kind of address decoder is required? ______ to ______

**Part C** Consider a **sixteen million address** by **four bit word** memory system.

How many address lines does the memory system require? ____________________________

How many data lines does the memory system require? ____________________________

What kind of address decoder is required? ______ to ______

**Part D** Now design each system below. Be sure you label the memory system inputs, Addr, R/W, and Mem Sel, and the system’s outputs D0, D1, D2, etc. Also label bus widths, and inputs and outputs of any required decoders. **Put a star on the chips containing memory location 0.**
8 million address
8 bit words

16 million address
4 bit words