16.317: Microprocessor Systems Design I

Summer 2012

Lecture 1: Key Questions
July 9, 2012

1. What are the major components of a computer? How do those components relate to the major components of a microprocessor?

2. Briefly describe the role of an ISA. What information specified in the ISA is required to translate a high-level statement such as `X[i]=i*2;` to assembly language?

3. What types of operations should a processor be able to perform?

4. What are the two major concerns when dealing with data on a microprocessor?

5. Briefly describe data types: what they specify, and what the different possibilities are for each aspect of a data type.

6. Explain the difference between how data can be interpreted as a signed or unsigned integer. Show the difference by interpreting the 8-bit value $1001\ 1111_2$ as both a signed and unsigned value.

7. What characteristics do we want storage media to have?

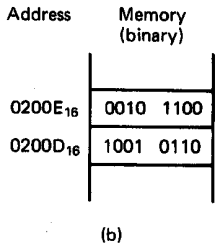
8. Describe the basic characteristics of processor registers.

9. Describe the basic characteristics of processor memory.

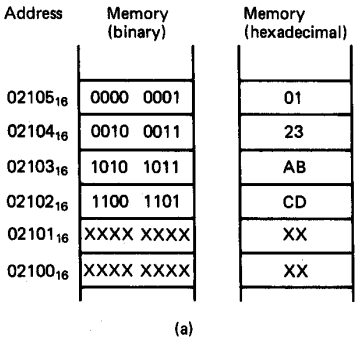
10. What does it mean for data to be aligned? What is the impact of mis-aligned data?

11. What is “little endian” data?

12. **Example:** Given the figure shown below (Fig. 2.5b), write the full data word in hexadecimal. Is this word aligned?



13. **Example:** Given the double word in this figure (Figure 2.7a), write the full double-word in hexadecimal. Is this double word aligned?



14. Describe the general characteristics of the 80386DX

15. Briefly describe the registers of the 80386DX.

16. Explain how the 80386DX address space is organized.

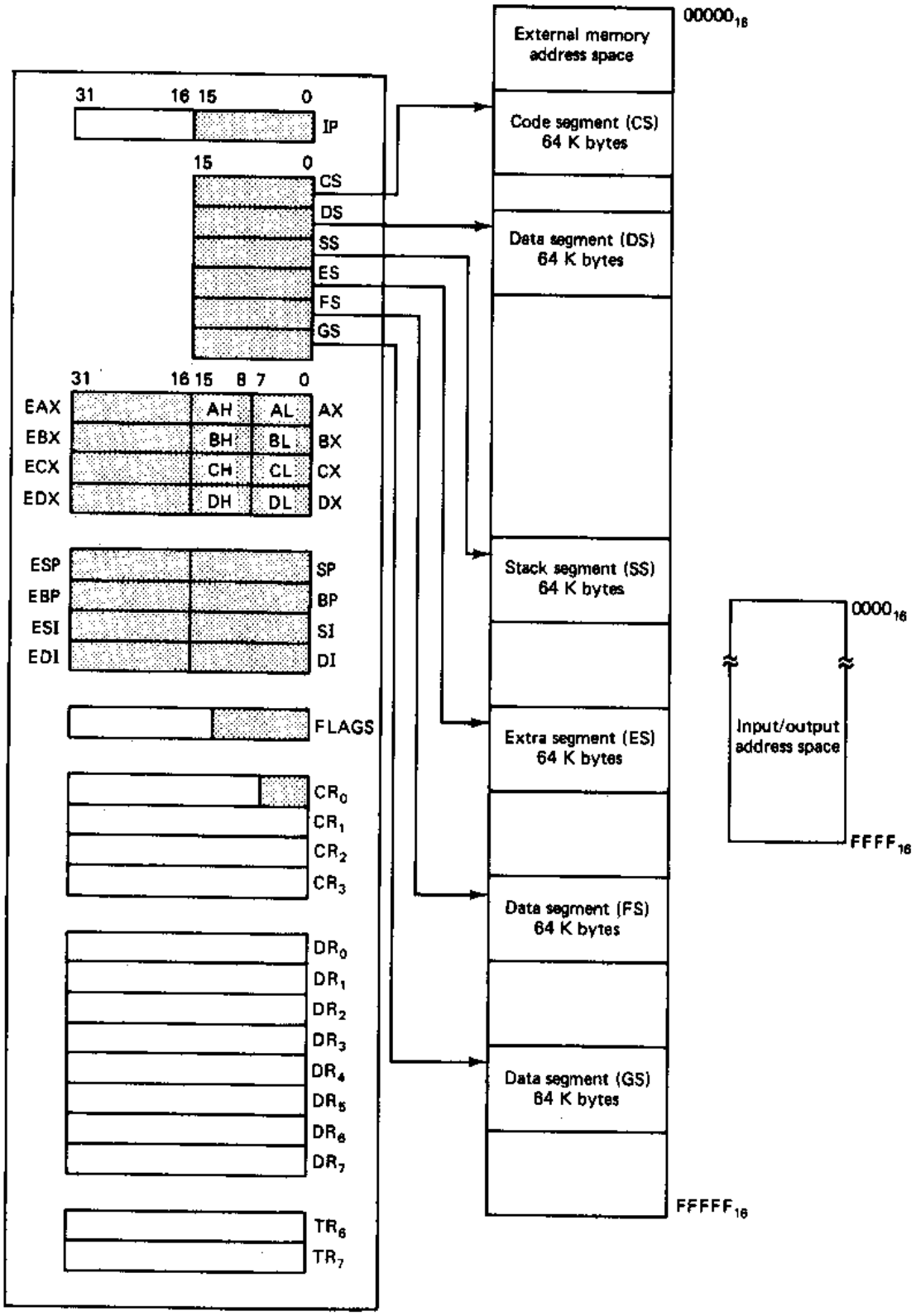


Fig. 2.2: Real-mode software model of the 80386DX microprocessor