8086 Microprocessor Addressing Worksheet

Topic: Code and Data Segment Addressing

Question 1

The 8086 microprocessor is about to fetch its next instruction.
At this moment, the Code Segment (CS) register contains the value 2B30H, and the Instruction Pointer (IP) register holds 45F2H.

Using this information:
a) Write down the logical address of the instruction being fetched.
b) Identify the offset address in this logical pair.
c) Calculate the physical address where this instruction actually resides in memory.
d) Determine the lower range (starting physical address) of this code segment.
e) Determine the upper range (ending physical address) of this code segment.
f) Explain what the CS and IP registers do during instruction fetching.

Question 2

Assume a small assembly program is stored in the code segment with a segment value of 35C0H. The instruction pointer currently points to the offset address 6A4EH.

Answer the following:
a) Express the instruction's logical address.
b) Convert this logical address into its corresponding 20-bit physical address.
c) Determine the starting and ending addresses (range) of this code segment.

Question 3

In another program, the data segment register (DS) holds 7C10H, and a variable array starts at an offset of 15B2H.

Answer the following:
a) Write the logical address for the start of this array.
b) Compute its physical address.
c) Find the total address range (lower and upper limit) of the data segment.
d) If another variable is located at offset 15B5H, what would be its physical address?

Question 4

Suppose a lookup table is defined in the data segment with DS = 2100H.
The CPU is currently accessing the 16th entry, located at offset 02F0H.

Determine:
a) The logical address of the entry.
b) The physical address.
c) The range of addresses covered by this data segment.

Good luck.

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