**Homework – Segmented Memory Model**

**Deadline: Monday 2nd November, 2020**

**Important Instructions: Make one PDF file of your solution. Your file name should be your roll number.**

**Physical Address Calculation:** If segment register e.g. DS has value XXXX and offset register e.g. BX has value YYYY then memory access **mov [BX], 5** is referring to logical address (XXXX:YYYY) and its corresponding physical address can be calculated as a 20-bit number (XXXX0 + 0YYYY).

Segment Registers in iAPX88: CS, DS, ES, SS

Offset Registers in iAPX88: BX, SI, DI, BP, SP, IP

**Question 1 - Fill-in the table for the Segment register values given below and answer following questions:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Segment**  **Register**  **Value** | **Minimum value in Offset Register** | **Maximum value in Offset Register** | **Range of Logical Addresses** | **Minimum Physical Address** | **Maximum Physical Address** | **Segment window range in (1MB) Physical Memory** |
| 0000 | 0000 | FFFF | 0000:0000  to  0000:FFFF | 00000 +  00000 =  00000 | 00000 +  0FFFF =  0FFFF | 00000 to 0FFFF |
| 0001 |  |  |  |  |  |  |
| 0002 |  |  |  |  |  |  |
| 0003 |  |  |  |  |  |  |
| 000A |  |  |  |  |  |  |
| 000F |  |  |  |  |  |  |
| 0010 |  |  |  |  |  |  |
| 001F |  |  |  |  |  |  |
| FFFE |  |  |  |  |  |  |
| FFFF |  |  |  |  |  |  |

**Findings from above table:**

1. If value of a segment register CS is 0xABCD
   1. What is the starting (physical) address of Code Segment in 1MB memory? \_\_\_\_\_\_\_\_\_\_
   2. What is the range of logical addresses of this segment? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. What is the range of this Code Segment in 1MB Memory? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. What is the size of this Code Segment and Why? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. If CS = 0x0000 and DS = 0x0001
   1. Are these segments overlapping? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Are they fully overlapping or partially overlapping? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. What is overlapping memory space in these segments?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. Logical Addresses of overlapping space range between (0000 : \_\_\_\_) to (0000 : \_\_\_\_\_)

Or (0001 : \_\_\_\_\_\_) to (0001 : \_\_\_\_\_\_)

1. If CS = 0xFFFE, draw memory configuration of Code Segment. (Submission not required.)

**Book Exercise Questions (Sir Bilal Hashmi Notes):**

Chapter 1: 17, 18, 19

Chapter 2: 3, 4, 5, 7, 8