CS/ECE/EEE/INSTR F241 – MICROPROCESSOR
PROGRAMMING & INTERFACING

MODULE 6: PROTECTED MODE OF OPERATION

QUESTIONS

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Q1. If the DPL of a segment is 10, What are the RPL values allowed for access?

Q2. If the 8byte descriptor of a segment in 80286 is 00 00 FF 32 00 00 00 FF

What is the size of the segment?

Is this a code or data segment?

Is this segment Read only/execute only, Read or Write?

Has this segment been accessed before?

What is the starting address of the segment?

What is the minimum RPL required to access this segment?

Q3. If the 8-byte descriptor of a segment in 80386 is **34 D0 93 24 00 00 00 03** - What is the size of the segment?

Q4. From the 8 byte 80386 descriptor given below (a) what will be the start address of the segment in memory and (b) what is the size of the segment in bytes? (Descriptor is given in BIG ENDIAN FORMAT (i.e.) MSB onwards)

A2 5F B7 00 00 00 FF FF

Q6. What will be the maximum size of virtual memory that can be supported by an 80386 system? And how do you get this value?

Q7. What will be the maximum size of virtual memory that can be supported by an 80286 system? And how do you get this value?

Q8. In an 80286 Processor – GDTR = 100000$_H$ with the following tables.

GDT

Address	Data							
100008	00	00	82	01	00	00	FF	FF
100010	00	00	82	20	00	00	FF	FF
100018	00	00	83	03	00	00	00	3F
100020	00	00	FC	0A	00	00	00	1F
100028	00	00	DF	B0	00	00	01	FF
100030	00	00	92	B1	00	00	0F	FF
100038	00	00	B2	7B	00	00	03	FF
100040	00	00	D2	7A	00	00	07	FF
100048	00	00	9F	A1	00	00	1F	FF
100050	00	00	C4	A3	00	00	3F	FF
100058	00	00	82	B1	00	00	FF	FF
100060	00	00	B3	50	00	00	1F	FF

LDT1

Address	Data							
010000	00	00	82	01	00	00	FF	FF
010008	00	00	82	20	00	00	FF	FF
010010	00	00	83	03	00	00	00	3F
010018	00	00	FC	0A	00	00	00	1F
010020	00	00	DF	B0	00	00	01	FF
010028	00	00	92	B1	00	00	0F	FF
010030	00	00	B2	7B	00	00	03	FF
010038	00	00	D2	7A	00	00	07	FF
010040	00	00	9F	A1	00	00	1F	FF
010048	00	00	B3	A3	00	00	3F	FF
010050	00	00	B3	B1	00	00	FF	FF
010058	00	00	82	50	00	00	1F	FF

LDT2

Address	Data							
200000	00	00	82	01	00	00	FF	FF
200008	00	00	82	20	00	00	FF	FF
200010	00	00	83	03	00	00	00	3F
200018	00	00	FC	0A	00	00	00	1F
200020	00	00	DF	B0	00	00	01	FF
200028	00	00	92	B1	00	00	0F	FF
200030	00	00	B2	7B	00	00	03	FF
200038	00	00	D2	7A	00	00	07	FF
200040	00	00	9F	A1	00	00	1F	FF
200048	00	00	B3	A3	00	00	3F	FF
200050	00	00	82	B1	00	00	FF	FF
200058	00	00	B3	50	00	00	1F	FF

(a) If the DS = 0050$_H$ and the instruction is – MOV AX, [1200$_H$]. What will be the Physical Address. What is the type of Segment, protection Level etc.?

(b) If the DS = 0054$_H$ and the LDTR – 0008$_H$. If the Instruction is MOV BX, [1234$_H$]. What will be the Physical Address? What is the type of Segment, protection Level etc.?

Q9. If in an 80386 Processor if: CR3 FF 00 00 00, and if Paging is Enabled and the following tables

GDT

Address	Data							
00100008	00	D0	82	01	00	00	FF	FF
00100010	00	D0	82	20	00	00	FF	FF
00100018	04	Do	83	03	00	00	00	3F
00100020	00	D0	FC	0A	00	00	00	1F
00100028	00	D0	DF	B0	00	00	01	FF
00100030	00	Do	92	B1	00	00	0F	FF
00100038	01	D0	B2	7B	00	00	03	FF
00100040	00	Do	D2	7A	00	00	07	FF
00100048	03	D0	9F	A1	00	00	1F	FF
00100050	00	D0	B3	A3	00	00	3F	FF
00100058	00	DF	82	B1	00	00	FF	FF
00100060	30	D0	B3	50	00	00	1F	FF

PD

Address	Data			
FF000000	01	00	00	00
FF000004	02	00	00	00
FF000008	03	00	00	00
FF00000C	04	00	00	00
FF000010	05	00	00	00
FF000014	06	00	00	00
FF000018	08	00	00	00
FF00001C	0A	00	00	00
FF000020	0B	00	00	00
FF000024	0C	00	00	00
FF000028	0E	00	00	00
FF00002C	0F	00	00	00

PT

Address	Data			
03000000	21	00	00	00
03000004	22	00	00	00
03000008	23	00	00	00
0300000C	24	00	00	00
03000010	25	00	00	00
03000014	26	00	00	00
03000018	28	00	00	00
0300001C	2A	00	00	00
03000020	2B	00	00	00
03000024	2C	00	00	00
03000028	2D	00	00	00
0300002C	30	00	00	00

Address	Data			
030008C0	10	00	00	00
030008C4	11	00	00	00
030008C8	12	00	00	00
030008CC	13	00	00	00
030008D0	14	00	00	00
030008D4	15	00	00	00
030008D8	16	00	00	00
030008DC	1A	00	00	00
030008E0	1B	00	00	00
030008E4	1C	00	00	00
030008E8	10	00	00	00
030008EC	12	00	00	00

If DS = 0050_H and the Instruction being executed is **MOV EAX,[00 00 00 34].** What will be the Physical Address, Type of Segment, Protection Level etc.?

Q10. If the starting address of a read only valid Non-system data segment in 80286 is C30000H and its size is 24KB, Highest Privilege Level, has been accessed before and addresses have to be incremented to read consecutive data (i.e. address expands upwards), what will be the 8-byte descriptor? (Write from MSB onwards)

Q11. If Paging is enabled and CR3 = 70 00 00 00_H and Linear address generated is AC 00 01 78_H. What will be the address in the Paging Directory that will you look for in order to get the starting address of the paging table?