Name, Surname :
Number :
Course Code :
Course Name :

Exam : ○ Quiz ● Midterm ○ Final
Date :

Please make sure to write your name and student number on each paper that you have used

Question Number	1	2	3	Total
Mark				

Note: Exam duration is 60 minutes only.

1- (**3p each**)Convert the following decimal numbers into single-precision floating-point numbers:

Decimal	Binary	Normalized	Sign	Biased Exponent(8bit)	Mantissa(24bit)
+1.5					
−10.625					
+100.25					
−1200					

2- (**3p each**)Find the memory address of the next instruction executed by the microprocessor, when operated in the real mode, for the following CS:IP combinations:
   a. CS = 3456H and IP = ABCDH
   b. CS = 1A04H and IP = B00DH
   c. CS = 2323H and IP = 1A00H
   d. CS = 2089H and IP = 1000H
   e. CS = 1001H and IP = 2013H

3- (**3p each**)In the real mode, show the starting and ending addresses of each segment located by the following segment register values:
   a. 10A0H
   b. 1234H
   c. 2340H
   d. E00BH
   e. AB00H

4- (14p)If DS = 0103H in a protected mode system, the requested privilege level is _____.

5- (14)For a Core2 descriptor that contains a base address of 01000000H, a limit of 0FFFFH, and G = 0, what starting and ending locations are addressed by this descriptor?

6- (14)If the DS register contains 0020H in a protected mode system, which global descriptor tableentry is accessed?(just number)

7- (14p)If DS = 0105H in a protected mode system, which entry, table, and requested privilege level are selected?

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8-(20p)In protected mode system, what starting and ending locations are addressed by this descriptor

Descriptor 2

```
0 0
0 0
9 2
9 2
0 0
0 0
0 0
F 2
```

Descriptor 1

```
0 0
0 0
9 2
1 0
0 0
0 0
0 0
F F
```

DS
0 0 1 0

Global Descriptor

??????????

Data segment

??????????

000000

80386–P4

31										0	
Base B31		B24	G	D	0	A V	Limit L19 L16	Access Rights	Base B23	B16	4
Base B15					B0		Limit L15			L0	0

Segment	Offset	Special Purpose
CS	IP	Instruction address
SS	SP or BP	Stack address
DS	BX, DI, SI, an 8- or 16-bit number	Data address
ES	DI for string instructions	String destination address

Offset

15		3	2	1	0
Selector			TI	RPL	

RPL = Requested privilege level where 00 is the highest and 11 is the lowest

TI = 0 Global descriptor table
TI = 1 Local descriptor table

Selects one descriptor from 8192 descriptors in either the global or the local descriptor table

7	6	5	4	3	2	1	0
P	DPL		S	E	ED /C	R/W	A

A = 0 Segment not accessed
A = 1 Segment has been accessed

E = 0 Descriptor describes a data segment
ED = 0 Segment expands upward (data segment)
ED = 1 Segment expands downward (stack segment)
W = 0 Data may not be written
W = 1 Data may be written

E = 1 Descriptor describes code segment
C = 0 Ignore descriptor privilege level
C = 1 Abide by privilege level
R = 0 Code segment may not be read
R = 1 Code segment may be read

S = 0 System descriptor
S = 1 Code or data segment descriptor

DLP = Sets the descriptor privilege level

P = 0 Descriptor is undefined
P = 1 Segment contains a valid base and limit

Note: Some of the letters used to describe the bits in the access rights bytes vary in Intel documentation.

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