16.317: Microprocessor Systems Design I

Fall 2013

Protected Mode Practice Problems
October 28 & 30, 2013

Assume an x86 processor is running in protected mode with the state given below (all values in hex); note that each memory location shown contains a descriptor about a particular segment:

GDTR = 00200000001F
LDTR = 000B

DS = 0017
SS = 0018
ESI = 00001000
EBX = 0001120

Memory	Address
Base = 030010F0 Limit = 020F	00200000
Base = 00200020 Limit = 0017	00200008
Base = 00200038 Limit = 0010	00200010
Base = 1200C000 Limit = FFFF	00200018
Base = 12340000 Limit = 00FF	00200020

Memory	Address
Base = 01000010 Limit = 1127	00200028
Base = 03170200 Limit = 03F7	00200030
Base = 1A000000 Limit = 01FF	00200038
Base = 06B01000 Limit = 0F07	00200040
Base = 05000120 Limit = 000F	00200048

a. What is the base address and limit of the global descriptor table? How many descriptors does this table contain?

b. What is the base address and limit of the current local descriptor table? How many descriptors does this table contain?

c. What are the starting and ending addresses for the current data and stack segments?

d. What address is accessed by each of the following instructions?

i. `MOV AX, [0100H]`
ii. `ADD DX, [SI]`
iii. `MOV AX, SS:[SI+EF00]`
iv. `SUB SS:[A200], CX`
v. `MOV DX, [BX+SI]`
vi. `MOV CX, [BX+SI+1EH]`

Space to answer questions

Space to answer questions