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Assignment - 6

Title : Write an ALP to read and display the table content pointed by GDTR / LDTR and IDTR.

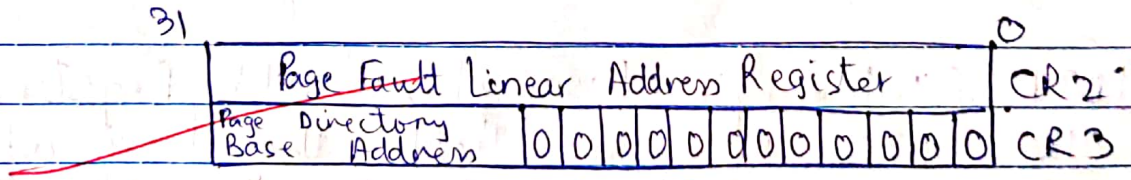
Objective : To understand how to read and display contents of GDTR, LDTR and IDTR registers.

Outcome : Students will study different descriptors tables in system also different registers associated with it.

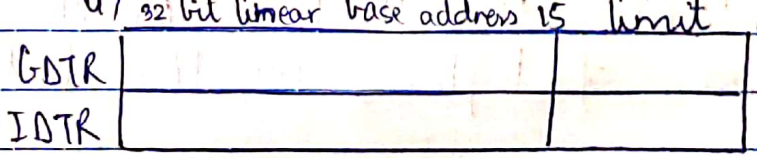
Theory :

i) GDTR (Global Descriptor Table Register)

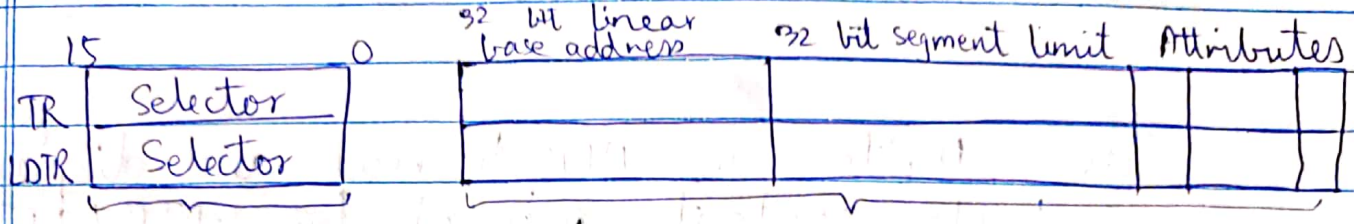
The GDTR holds the base address (32 bit) in protected mode and the limit (16 bit) for the GDT. The base address specifies the linear address of byte 0 of the GDT; the table limit specifies the number of bytes in the table.



Control Registers 2 and 3



System address Registers



System Segment registers Descriptor Registers (Automatically loaded)

LDTR and TR

These registers hold the 16 bit selector for the LDT descriptor and TSS descriptor, respectively. When a task switch occurs, the LDTR is automatically loaded with the segment selector and descriptor for the LDT for the new task. The contents of the LDTR are not automatically saved prior to writing the new LDT information into the registers.

On power up or reset of the processor the segment selector and base address are set to the default value of 0 and the limit is set to 0FFFF H.

IDTR (Interrupt Descriptor Table Register)

The IDTR registers holds the base address and 16 bit table limit for the IDT. The base address specifies the linear address of byte 0 of the IDT, the Table limit specifies the number of bytes in the table.

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Instructions :

1) LGDT :
This instruction is used to load the GDT register The source operands specifies a 6 byte memory location that contains the base address and the limit (size of table in bytes) of the GDT Used in OS software.

2) SGDT :
This instruction is used to store the contents of GDTR register. The destination operand specifies a 6 byte memory location where we want to store the contents.

3) LIDT :
This instruction is used to ~~store~~ load the IDT register. The source operand specifies a 6 byte memory location that contains the base address and the limit (size of table in bytes) of the IDT.
Used only in OS software, is not used in application ~~real~~ programs.

4) SIDT :
This instruction is used to store the contents of IDTR register. The destination operand specifies a 6 byte memory location where we want to store the contents.

5) LLDT :

This instruction loads the source operand into the segment selector field of LDTR. The source operand (a general-purpose register or a memory location) contains a segment selector that points to a LDT.

6) SLDT :

This instruction is used to store the contents of LDTR (16 bit) in a memory location or a general purpose register.

Test case:

1) Value of LDTR is zero.
2) GDTR is 48 bit.
3) MSW is odd value.
4) System always works in Protected mode.

Conclusion:

We have successfully displayed the contents of GDTR, IDTR, LDTR and checked whether the system is in real or protected mode by using respective instructions.