



Created by

ARSLAN AHMED SHAAD (1163135)

AND

MUHAMMAD BILAL (1163122)

VISIT : www.vbforstudent.com

Also visit : www.techo786.wordpress.com

For more notes of DAE

CHAPTER # 8

INTERRUPTS

COURSE OUTLINE QUESTIONS:

Q_{no1} What is interrupt?

An interrupt is a hardware-initiated procedure that interrupts whatever program is currently executing.

OR

The meaning of 'interrupts' is to break the sequence of operation. WHEN Microprocessor is executing a program, an 'interrupt' breaks the normal sequence of execution of instructions, diverts its execution to some other program called Interrupt Service Routine (ISR).

OR

Interrupt is a mechanism by which I/O or an instruction can suspend the normal execution of processor and get itself serviced. Generally, a particular task is assigned to that interrupt signal. In the microprocessor-based system, the interrupts are used for data transfer between the peripheral devices and the microprocessor.

Q_{no2} Describe Purpose of Interrupts?

Interrupts are useful when interfacing I/O devices at relatively low data transfer rates, such as keyboards inputs. Interrupt processing allows the processor to execute other software while the keyboard operator is thinking about what to type next. When a key is pressed, the keyboard encoder denounces the switch and puts out one pulse that interrupts the microprocessor.

Q_{no3} Define and explain Interrupt Instructions (BOUND, INTO, INT, INT-3, IRET)?

Bound :

The BOUND instruction, first made available in the 80186 microprocessor, is a comparison instruction that may cause an interrupt (vector type number 5). This instruction compares the contents of any 16-bit or 32-bit register against the contents of two words or double words of memory: an upper and a lower boundary. If the value in the register compared with memory is not within the upper and lower boundary, a type 5 interrupt ensues. If it is within the boundary, the next instruction in the program executes.

The microprocessor has three different interrupt instructions that are available to the programmer: INT, INTO, and INT 3

INTO:

Interrupt on overflow (INTO). It is a 1-byte instruction and their mnemonic INTO. As the name suggests it is a conditional interrupt instruction, i.e. it is active only when the overflow flag is set to 1 and branches to the interrupt handler whose interrupt type number is 4. If the overflow flag is reset then, the execution continues to the next instruction.

INT:

It is 2-byte instruction. First byte provides the op-code and the second byte provides the interrupt type number. There are 256 interrupt types under this group.

INT-3:

Break Point Interrupt Instruction

An INT 3 instruction is a special software interrupt designed to function, as a breakpoint the difference between it and the other software interrupts is that INT 3 is a 1-byte instruction, while the others are 2-byte instructions. These instructions are inserted into the program so that when the processor reaches there, then it stops the normal execution of program and follows the break-point procedure.

IRET:

The interrupt return instruction (IRET) is used only with software or hardware interrupt service procedures. Unlike a simple return instruction (RET), the IRET instruction will (1) pop stack data back into the IP, (2) pop stack data back into CS, and (3) pop stack data back into the flag register. The IRET instruction accomplishes the same tasks as the POPF, followed by a far RET instruction.

Q_{no4} Define and explain the Operation of Interrupt Flag?

IF (Interrupt Flag) is a system flag bit in the x86 architecture's FLAGS register, which determines whether the CPU will handle maskable hardware interrupts. The bit, which is bit 9 of the FLAGS register, may be set or cleared by programs with sufficient privileges, as usually determined by the Operating System.

Q_{no5} Describe Programmable interrupt controller?

A Programmable Interrupt Controller (PIC) is an interrupt controller that manages interrupt signals received from devices by combining multiple interrupts into a single interrupt output. PIC is found on most PCs today. One of the most well-known Programmable Interrupt Controllers is Intel 8259A, which was included in the x86 PC as a part of the motherboard chipset.

OR

A PIC is a chip that is used to offload the evaluation of interrupts from the CPU. When an interrupt is received, it is necessary for the CPU to perform a lookup in the Interrupt Vector Table (IVT) to find the interrupt handling program, and execute it, before resuming the evaluation of the current program. This wastes clock cycles. The PIC can return the memory location of the interrupt handling code. This is more flexible as interrupt priority can be reassigned and many PICs can be cascaded to allow more than 8 interrupts.

NOTE:

**Some questions have multiple answers
learn only that answer which is easier for
you. thankyou**