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Experiment no 10.

Q Evaluation of x-86 architecture code.

a) 8080 - It was world's first general purpose micro-processor. It was a 8-bit machine with an 8 bit data path memory. It was used in the first personal computer.

b) 8086 :- It was 16 bit machine and was far more powerful tha the previous one. It had a wider data path of 16 bits and larger registers along with an instruction cache or queue.

c) 80286 :- It has an addressable memory of 16 mb instead of 1mb and contains 2 modes - real mode and first generation 16 bit protected mode.

d) 8036 :- It was intel's first 32-bit machine. Due to it's 32 bit architecture; it was able to compute against the complexity ~~of~~ and power of micro computers and mainforms introduced.

e) 80486 :- It introduced the concept of cache technology and instruction pipeline. It contained a white protect. feature and offered a built-in- feature. That off loaded complex ~~with~~ math operation from the CPU.

f) Pentium :- The use of super scaler technique was introduced as multiple instruction started executing in parallel.

g) Pentium Pro :- It's used register remaining, branch prediction, data flow analysis, speculative execution and more pipeline stages.

(h) Pentium II :- It was able to process video, audio and graphics data oficially by incorporating Intel MMX technology.

(i) Pentium III :- It contains SMD and support 3D graphic software.

(j) Core :- It is the first Intel microprocessor with dual core which is the implementation of 2 processor on single chip.

Q2 There are 2 types of interrupts.
1) Hardware interupts.
2) Software interupts.

1) Hardware Interupts :- It is caused by any peripheral device by sending a signal through a specified pin to the microprocessor.

NMI :- It is a single non-maskable interupt pin having higher priority from the maskable interupt request pin (INTR) and it's of Type 2 interupt.

INTR :- The INTR is a maskable interupt because the microprocessor will be implemented only if interupts are enabled using set interupt flag instruction.

2) Software Interupts :- Some instructions are inserted at the desired position into the program to create interrupts. Those can be used to test the working of various instructions that interupts handless. This includes INT, INT-3 and INTO.

INT :- This is interrupt instructions with type number. It is a 2 byte instruction. First byte provides the OP-code and second byte provides the interrupt type number.

INT 3 :- Break point Interrupt Instruction. It is a 1-byte instruction having OP-code in CCH. These instructions are inserted into the program so that when the processor readies there, then it stops the normal execution.

INTO :- This is interupt an overflow instruction. Its a 1 byte instruction and their mnemonic INTO. The OP-code for this instruction is CEH.

Q3 Short note :- Direct Memory Access.

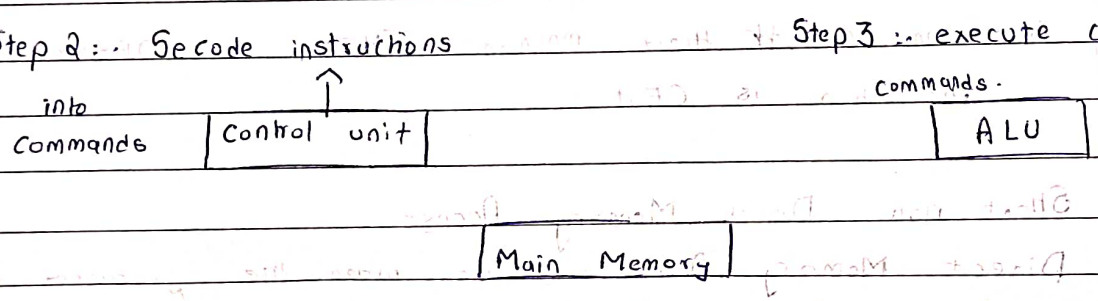
→ Direct Memory Access occurs when the processor only has to initiate the data transfer and the DMA controller takes ones to complete it. This central method is very fast compared to programmed and interrupt driven I/O, and also move efficient because it requires minimal processor involument.

Q4 Explain following parts of CPU in detail.

1) ALU
2) Register Organisation.

→ ALU

ALU conducts arithmetic and logical operations. It is a major component of the CPU in the computer system. An integer unit (IU) is just an integrated circuit within a CPU or GPU that performs last calculations in the processor. It can execute operations like boolean operation like subtraction, addition and shifting. Binary numbers can also perform bit wise and mathematical operation. AU and LU are 2 types of Arithmetic logic unit.



Machine Cycle.

Register Organisation :-

If the arrangement of register in the processor. The processor designed designers decide the organisation as the registors in a program. Different processor may have different register organisation. Depending on the roles played by the register they can be categorized into 2 types.

User Visible Register :- These are visible to the assembly or machine language programme and they use them efficiently to minimize the memory refrences in the instructions as well, there register can be refenced using the machine or assembly language.

→ Control and Status Register :- The control and status register hold the adress or data that is important to control the processor's operation. The most important thing is those are not visible to user.

Types → Program Counter.
→ Instruction Counter
→ Memory adress Coonter.
→ Memory Buffer Counter.

Write a short note on.

Integer Representation :-
Integers are whole numbers on fixed point numbers with the radix point fixed after the least significant bit. They are constrast to real numbers on floating point number, where the position of the radix point varies.

- unsigned Integers - can represent zero and +ve integer.
- Signed Integers - can represent zero, +ve and -ve integers

3 schemes have been proposed for signed integers.

a) Sign - Magnitude representation.
b) 1's complement representation.
c) 2's complement representation.

:) Floating Point Numbers representation.

A floating-point no can represent a very large value or a very small value. It can also represent a very large -ve and small -ve number as well as zero. A floating number is typically expressed in the scientific notation with a fraction (F) and an exponent (E) of a certain radix (r) in the form $F \times r^E$. Decimal no use radix of 10 ($F \times 10^E$) while binary number use radix of 2 ($F \times 2^E$) floating number arithmetic is very much less efficient than integer arithmetic. It could be speed up with a so called dedicated floating point compressor.