

Microprocessor

- Incorporates functions of Control Processing Unit (CPU) on one integrated circuit (IC)
- Programmable device, which processes input according to instructions stored in memory producing an output.
- Sequential Logic
- Used in computer, but also for embedded applications



Micro controller

Usually also integrates, in addition to a CPU, memory, programmable input/output peripherals,

(slide)

Micro processor vs FPGA

sequential	parallel
general purpose	power efficient
software programmable	hardware programmable
deep submicron	

CPU instructions

- Machine language : binary instructions for the CPU
- assembly language :
 - symbolic representation of binary instructions for ease of programming
 - translated by assembler

E.g.

MOV count, CX (r, r) → CX to mem loc. "count"

ADD small, 02H (r, imm) → +2 to value of (r. "small")

AND AX, 007FH (r, imm) → clears top 9-bits of 16-bit "AX" register (masking)

→ 127D → 0000 0000 0111 1111

INC count → adds .1 to contents of "count"

NEG AL → changes sign of contents of "AL"

Addressing

E.g.

MOV count, 100H direct, immediate

MOV [BX], 100H indirect, immediate

MOV [BX+100H], AX indexed, register

stack, push, & pop

- stack :
- a portion of memory used extensively by the CPU.
 - put data onto a stack (= push), then it goes to the next available spot (top of stack)
 - retrieve data from stack (= pop), then it is taken from the top, i.e. last item of stack

stack = consecutive list of data...

- stack pointer (SP) keeps track of the current "top" of the stack.

Bus signals

DATA, ADDRESS, STROBE, READ/WRITE

(slides)

• IOW (write strobe)
• IOR (read strobe)

STATUS BYTES & INTERRUPTS

STATUS must be continuously checked by CPU

INTERRUPT causes CPU to stop action, jump to program pointed to by interrupt, and jump back

↳ hardware request for attention

Direct memory access (DMA)

DMA takes temp. control of bus for data transfer from CPU

Software

- Operating System
- Drivers
- Etc..