Gowsalya

Be happy always with what you have.

INSTRUCTIONS AND INSTRUCTION SEQUENCING

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Four types of operations

1. Data transfer between memory and processor registers.
2. Arithmetic & logic operations on data
3. Program sequencing & control
4. I/O transfers.

1) Register transfer notations(RTN)

R3<–[R1]+[R2]

- Right hand side of RTN-denotes a value.
- Left hand side of RTN-name of a location.

2) Assembly language notations(ALN)

Add R1, R2, R3

- Adding contents of R1, R2 & place sum in R3.

3) Basic instruction types-4 types

- **Three address instructions**– Add A,B,C

A, B-source operands

C-destination operands

- **Two address instructions**-Add A,B

B <–[A] + [B]

- **One address instructions** –Add A

Add contents of A to accumulator & store sum back to accumulator.

- **Zero address instructions**

Instruction store operands in a structure called push down stack.

4) Instruction execution & straight line sequencing

- The processor control circuits use information in PC to fetch & execute instructions one at a time in order of increasing address.
- This is called straight line sequencing.
- Executing an instruction-2 phase procedures.
- 1st phase–**"instruction fetch"-**instruction is fetched from memory location whose address is in PC.
- This instruction is placed in instruction register in processor
- 2nd phase-**"instruction execute"-**instruction in IR is examined to determine which operation to be performed.
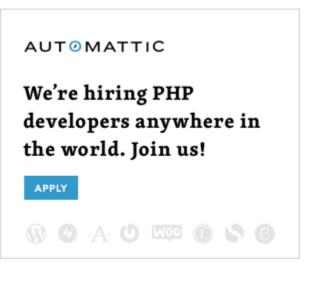
5) Branching

- Branch-type of instruction loads a new value into program counter.
- So processor fetches & executes instruction at this new address called "branch target"
- Conditional branch-causes a branch if a specified condition is satisfied.
- E.g. Branch>0 LOOP –conditional branch instruction .it executes only if it satisfies condition.

6) Condition codes

- Recording required information in individual bits called "condition code flags".
- These flags are grouped together in a special processor register called "condition code register" or "status register"
- Individual condition code flags-1 or 0.
- 4 commonly used flags.

1) N (negative)-set to 1 if result is –ve or else 0.

2) Z (zero)-set to 1 if result is 0, or else 0 .

3) V (overflow)-set to 1if arithmetic overflow occurs or else 0.

4) C(carry)-set to 1 if carry out results from operation or else 0

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