

DATA MANIPULATION INSTRUCTIONS

Uses the ALU in the CPU to carry out these instructions. One of the operand must be kept in the accumulator or reg. A for 8-bit operations. For 16-bit operations the operand is kept in a register pair HL.

Arithmetic :- ADD, ADC, SUB, SBC, CP, INC, DEC, DAA

Logic :- AND, OR, XOR, NEG, CPL

Bit :- BIT, SET, RES

Shift & Rotate :- SLA, SRA, SRL, RLC, RRC, RR, RL

Examples :-

1. adding two numbers in stored registers
2. subtracting two numbers stored in registers
3. adding two numbers stored in memory

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ORG 1800H

1800 3A 50 18  LD  A,(1850H)  ;get 1st no. into A
1803 47          LD  B,A      ;copy no. into B
1804 3A 51 18  LD  A,(1851H)  ;get 2nd no. into A
1807 80          ADD  A,B     ;add up
1808 FF          RST  38H

```

;example on adding numbers in memory using register HL as pointer

ORG 1800H

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1800 21 50 18    LD    HL,1850H    ;set pointer
1803 7E          LD    A,(HL)      ;get 1st no. into A
1804 23          INC    HL        ;increment pointer
1805 46          LD    B,(HL)      ;get 2nd no. into B
1806 80          ADD   A,B        ;add up
1807 FF          RST   38H

```

;example on adding numbers in memory using Index register as pointer

ORG 1800H

```

1800 DD 21 50 18    LD    IX,1850H    ;set pointer
1804 DD 7E 00       LD    A,(IX+00H)  ;get 1st no. into reg. A
1807 DD 86 01       ADD   A,(IX+01H)  ;add up
180A FF            RST   38H

```

4. incrementing the value in a register
5. decrementing the value in a register
6. comparing two numbers stored in registers and finding which one is larger (this require the use of a jump instruction)
7. **anding** two numbers in stored registers
8. **oring** two numbers in stored registers
9. **xoring** two numbers in stored registers

10. complementing (1's and 2's) number in a register
11. testing a bit, resetting and setting it
12. shifting and rotating data in a register

Exercises :

1. What forms of addressing modes are used with most arithmetic and logic instructions?
2. Write a program that will add 55H to the number in reg. B.
3. Write a program that will add the number in reg. H to the number in reg. L. Store the answer in reg. B.
4. Write a program that will add the number in memory addressed by the reg. pair HL to the number in reg. C. Store the result in reg. D.
5. Write a program that will add the number in reg. pair DE to the HL reg. pair.
6. Write a program that uses register indirect addressing to add the data stored in memory address 1850H with the data in memory address 1851H. Store the answer in reg. B.
7. Repeat question 6 using register IX as the memory pointer.

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