DATA TRANSFER INSTRUCTIONS

Involves mainly the use of the instruction LOAD (LD). This class of instruction **moves** or **copy** or **write** data from one location into another location. Data can be transferred between registers (register to register), memory and register, and memory to memory.

Special data transfer instructions:-

1. PUSH and POP instructions uses stack pointer SP
2. IN and OUT instructions involves input/output unit

Examples:-

1. creating data in register

```
LD A, 34H                ;8 bit load
LD HL,5784H              ;16 bit load
```

2. moving data from register to register

```
LD A,B                   ;copy reg. B into reg. A
LD  H,E                  ;copy reg. E into reg. H
```

3. creating data in memory

```
                         ORG  1800H
1800   3E 76             LD     A, 76H          ;create data in reg. A
1802   32 70 18          LD     (1870H),A       ;copy data into memory
1805   FF                RST    38H             ;end
```

4. exchange data in memory address with another memory address

5. moving data from memory to memory (direct addressing)

```
                    ORG  1800H

1800   3A 50 18     LD     A,(1850H)   ;copy data from memory into reg. A

1803   32 70 18     LD     (1870H),A   ;copy data in reg. A into memory

1806   FF           RST    38H
```

6. moving data from memory to memory using pointer (16-bit reg. pair to hold the memory address)

```
                    ORG 1800H

1800  21 00 20     LD     HL,2000H      ;set source address in reg. HL

1803  11 00 30     LD     DE,3000H      ;set destination address in reg. DE

1806  7E           LD     A,(HL)        ;load data from memory into reg A

1807  12           LD     (DE),A    ;copy back data from reg. A into memory

1808  FF           RST    38H
```

7. moving data from memory to memory using index register IX and IY as pointer

```
                    ORG 1800H

1800   DD 21 00 20     LD     IX,2000H      ;set source addr. in IX

1804   FD 21 00 30     LD     IY,3000H      ;set destination addr. in IY

1808   DD 7E 00        LD     A,(IX+00H)  ;load data from memory into reg. A

180B   FD 77 00        LD   (IY+00H),A ;copy back data from reg. A into mem.

180E   FF              RST    38H
```

8. using special instructions eg. LDIR

```
                ORG 1800H

1800  21 00 20     LD     HL,2000H      ;set source address in reg. HL

1803  11 00 30     LD     DE,3000H      ;set destination address in reg. DE

1806  01 FF 00     LD     BC,00FFH      ;set number of bytes to be copied

1809  ED B0        LDIR                 ;do the transfer until finished
```

Exercises :

1. What five addressing modes are available for use with the Z80 microprocessor?

2. Describe how the memory address is stored with a direct addressed instruction.

3. How does one use the HL register pair in an instruction to indirectly address the memory?

4. Write a program that store 1234H into the register pair BC and 12H into the accumulator.

5. Write a program that store 16H into memory address 1900H and 17H into memory address 1901H.

6. Write a program that uses register indirect addressing to transfer the data stored in memory address 1850H into memory address 1851H.

7. If register IX have the value 1820H, and the following instruction is executed : LD A, (IX +12H), data in what memory address is loaded into the accumulator?

8. Write a program that exchange the contents of memory addresses 1900H to 1903H with the data in memory addresses 1950H to 1953H.

   a) using direct addressing

   b) using register indirect addressing

   c) using Index register addressing

9. If register IX have the value 1820H, and the following instruction is executed : LD A,

(IX +12H), data in what memory address is loaded into the accumulator?

Third Edition, November 2004