Addition of two 8-bit numbers without carry

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ADDITION OF TWO 8-BIT NUMBERS WITHOUT CARRY

OBJECTIVE
       To write a assembly language program to add two 8-bit numbers and display the value.

INDIRECT ADDRESSING MODE

ASSEMBLY LANGUAGE PROGRAM
(Note: In assembly language program mentioned below, coloumn 1 represents the address, coloumn 2 represents Mnemonics, coloumn 3 represents Hex code and coloumn 4 represents the description.)

```
C000 LXI H C100   21 ; Load the address of the data(i.e.C100) in
C001              00 ; memory location to register pair HL
C002              C1 ; immediately
C003 MOV A M      7E ; Move the content of memory location(Addend-
                       Input data) into the accumulator
                       (C100) => (A) = 03
C004 INX H        23 ; Increment the HL register pair and it
                       points to augend (Input data)
                       (C100) + (0001) => (C101) = 0A
C005 ADD M        86 ; Add the content of memory location(augend)
                       with accumulator content (addend)
                       (C101) + (A) => (A)
                         0A   + 03  => 0D
C006 INX H        23 ; Increment the HL register pair
                          (C101) + (0001) => (C102)
C007 MOV M A      77 ; Move the accumulator content(Sum - Output
                       data) to the memory location
                         (A) => (C102) = 0D
C008 HLT          76 ; Halt the execution
```

EXECUTION
(Note: In the below mentioned data, coloumn 1 represents the address, coloumn 2 represents the data, coloumn 3 represents description.)

```
C100 03 ; Addend(Input data)
C101 0A ; Augend(Input data)
C102 0D ; Sum(Output data)
```

PROGRAM TRACE

Addr	MC	Mnemonic	A	B	C	D	E	H	L	SP	Flag Word
			00	00	00	00	00	00	00	0000	0000 0000
C000	21	LXI H C100	00	00	00	00	00	C1	00	0000	0000 0000
C003	7E	MOV A M	03	00	00	00	00	C1	00	0000	0000 0000
C004	23	INX H	03	00	00	00	00	C1	01	0000	0000 0000
C005	86	ADD M	0D	00	00	00	00	C1	01	0000	0000 0000
C006	23	INX H	0D	00	00	00	00	C1	02	0000	0000 0000
C007	77	MOV M A	0D	00	00	00	00	C1	02	0000	0000 0000
C008	76	HLT	0D	00	00	00	00	C1	02	0000	0000 0000

FLAG WORD

(Note: The final content of the flag)

S	Z	x	Ac	x	P	x	Cy
0	0	0	0	0	0	0	0

DIRECT ADDRESSING MODE

ASSEMBLY LANGUAGE PROGRAM

```
C200 LDA  1000    3A ; Load the Accumulator with Addend(Input data)
C201              00 ; (1000) => (A) = 08
C202              10 ;
C203 MOV B A      47 ; Move Accumulator content (Addend) to B
                       Register
                    (A)  => (B) = 08
C204 LDA  1001    3A ; Load the Accumulator with Augend(Input data)
C205              01 ; (1001) => (A) = 07
C206              10 ;
C207 ADD B        80 ; Add the Accumulator content with B register
                       Content
                      (A)  + (B) => (A)
                       07  + 08 => 0F
C208 STA  1400    32 ; Store the sum in the Accumulator
C209              00 ;  (A) => (1400) = 0F
C20A              14 ;
C20B HLT          76 ; Halt the execution
```

EXECUTION

```
1000 08 ; Addend(Input data)
1001 07 ; Augend(Input data)
1400 0F ; Sum(Output data)
```

PROGRAM TRACE

Addr	MC	Mnemonic	A	B	C	D	E	H	L	SP	Flag Word
			00	00	00	00	00	00	00	0000	0000 0000
C200	3A	LDA 1000	08	00	00	00	00	00	00	0000	0000 0000
C203	47	MOV B A	08	08	00	00	00	00	00	0000	0000 0000
C204	3A	LDA 1001	07	08	00	00	00	00	00	0000	0000 0000
C207	80	ADD B	0F	08	00	00	00	00	00	0000	0000 0100
C208	32	STA 1400	0F	08	00	00	00	00	00	0000	0000 0100
C20B	76	HLT	0F	08	00	00	00	00	00	0000	0000 0100

FLAG WORD

S	Z	x	Ac	x	P	x	Cy
0	0	0	0	0	1	0	0

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