# Multiplication of two 8-bit numbers

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# MULTIPLICATION OF TWO 8-BIT NUMBERS

## AIM

To write an assembly language program to multiply the two 8-bit numbers

## ASSEMBLY LANGUAGE PROGRAM

```
C000 LDA  C100   3A ; Load the accumulator with the content of
C001             00 ; Multiplicand
C002             C1 ;
C003 MOV D A     57 ; Move the accumulator content(Multiplicand)
                    to D register
C004 LDA  C101   3A ; Load the accumulator with the content of
C005             01 ; Multiplier
C006             C1 ;
C007 MOV B A     47 ; Move the accumulator content(Multiplier)
                    to B register
C008 MVI E 00    1E ; Intialize E register with 00H
C009             00 ;
C00A MVI A 00    3E ; Clear the accumulator content
C00B             00 ;
C00C ADD D       82 ; Add the D register to accumulator
C00D JNC C011    D2 ; If carry =0, then jump to C011H
C00E             11 ;
C00F             C0 ;
C010 INR E       1C ; Increment the C register content
C011 DCR B       05 ; Decrement the B register content
C012 JNZ C00C    C2 ; If Z not equal to zero, then jump to C00CH
C013             0C ;
C014             C0 ;
C015 STA  C102   32 ; Store the content of accumulator(Lower byte
C016             02 ; of Product) to memory address C102H
C017             C1 ;
C018 MOV A E     7B ; Move the content of E register to
                    accumulator
C019 STA  C103   32 ; Store the accumulator content(Higher byte of
C01A             03 ; Product) to memory address C103H
C01B             C1 ;
C01C HLT         76 ; Halt the execution
```

## EXECUTION

```
C100 02 ; Multiplicand(Input data)
C101 03 ; Multiplier(Input data)
C102 06 ; LSB of Product(Output data)
C103 00 ; MSB of Product(Output data)
```

## PROGRAM TRACE

| Addr | MC | Mnemonic | A | B | C | D | E | H | L | SP | Flag Word |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C000 | 3A | LDA C100 | 02 | 00 | 00 | 00 | 00 | 00 | 00 | 0000 | 0000 0000 |
| C003 | 57 | MOV D A | 02 | 00 | 00 | 02 | 00 | 00 | 00 | 0000 | 0000 0000 |
| C004 | 3A | LDA C101 | 03 | 00 | 00 | 02 | 00 | 00 | 00 | 0000 | 0000 0000 |
| C007 | 47 | MOV B A | 03 | 03 | 00 | 02 | 00 | 00 | 00 | 0000 | 0000 0000 |
| C008 | 1E | MVI E 00 | 03 | 03 | 00 | 02 | 00 | 00 | 00 | 0000 | 0000 0000 |
| C00A | 3E | MVI A 00 | 00 | 03 | 00 | 02 | 00 | 00 | 00 | 0000 | 0000 0000 |
| C00C | 82 | ADD D | 02 | 03 | 00 | 02 | 00 | 00 | 00 | 0000 | 0000 0000 |
| C00D | D2 | JNC C011 | 02 | 03 | 00 | 02 | 00 | 00 | 00 | 0000 | 0000 0000 |
| C011 | 05 | DCR B | 02 | 02 | 00 | 02 | 00 | 00 | 00 | 0000 | 0001 0000 |
| C012 | C2 | JNZ C00C | 02 | 02 | 00 | 02 | 00 | 00 | 00 | 0000 | 0001 0000 |
| C00C | 82 | ADD D | 04 | 02 | 00 | 02 | 00 | 00 | 00 | 0000 | 0000 0000 |
| C00D | D2 | JNC C011 | 04 | 02 | 00 | 02 | 00 | 00 | 00 | 0000 | 0000 0000 |
| C011 | 05 | DCR B | 04 | 01 | 00 | 02 | 00 | 00 | 00 | 0000 | 0001 0000 |
| C012 | C2 | JNZ C00C | 04 | 01 | 00 | 02 | 00 | 00 | 00 | 0000 | 0001 0000 |
| C00C | 82 | ADD D | 06 | 01 | 00 | 02 | 00 | 00 | 00 | 0000 | 0000 0100 |
| C00D | D2 | JNC C011 | 06 | 01 | 00 | 02 | 00 | 00 | 00 | 0000 | 0000 0100 |
| C011 | 05 | DCR B | 06 | 00 | 00 | 02 | 00 | 00 | 00 | 0000 | 0101 0100 |
| C012 | C2 | JNZ C00C | 06 | 00 | 00 | 02 | 00 | 00 | 00 | 0000 | 0101 0100 |
| C015 | 32 | STA C102 | 06 | 00 | 00 | 02 | 00 | 00 | 00 | 0000 | 0101 0100 |
| C018 | 7B | MOV A E | 00 | 00 | 00 | 02 | 00 | 00 | 00 | 0000 | 0101 0100 |
| C019 | 32 | STA C103 | 00 | 00 | 00 | 02 | 00 | 00 | 00 | 0000 | 0101 0100 |
| C01C | 76 | HLT | 00 | 00 | 00 | 02 | 00 | 00 | 00 | 0000 | 0101 0100 |

## FLAG WORD

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

## REFERENCE


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