ASC Self-learning - 12/10/2021

ADD/SUB Operations

ADD and SUB operations are used for performing calculations of binary data in the following sizes:

- Byte (8-bit)
- Word (16-bit)
- Doubleword (32-bit)

Syntax

- ADD/SUB [destination], [source]

These operations can take place between:

- Register -> register
- Memory -> register
- Register -> memory
- Register -> constants
- Memory -> constants

MUL/IMUL Operations

- The MUL operation deals with unsigned data
- The IMUL operation deals with signed data

There are a number of different scenarios when multiplying 2 values of different sizes:

- Byte * byte:
    - The multiplicand resides in the AL register and the multiplier is a byte in the memory (or in another register)
    - The actual product of the 2 resides in the AX register

- Word * word:

- The multiplicand resides in the AX register and the multiplier is a word in the memory (or in another register)
- The actual product of the 2 resides in DX:AX, as the result is a doubleword, which requires 2 registers

- Doubleword * doubleword:
  - The multiplicand resides in the EAX register and the multiplier is a doubleword in the memory (or in another register)
  - The actual product of the 2 resides in EDX:EAX

Syntax

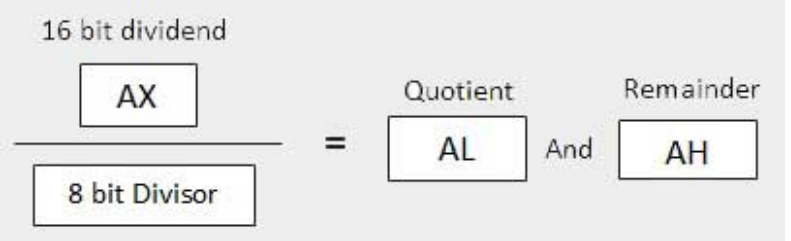
- MUL/IMUL [multiplier]

DIV/IDIV Operations

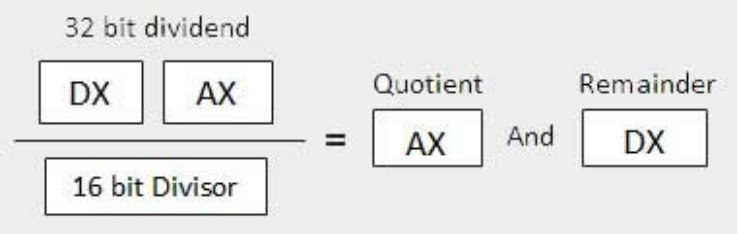
- The DIV operation deals with unsigned data
- The IDIV operation deals with signed data

There are a number of different scenarios when the divisor is of different sizes:

- 1 Byte:
  - The dividend resides in the AX register. The quotient goes to the AL register and the remainder goes to the AH register



- 1 Word:
  - The dividend resides in DX:AX. The quotient goes to the AX register and the remainder goes to the DX register



- 1 Doubleword:
    - The dividend resides in EDX:EAX. The quotient goes to the EAX register and the remainder goes to the EDX register