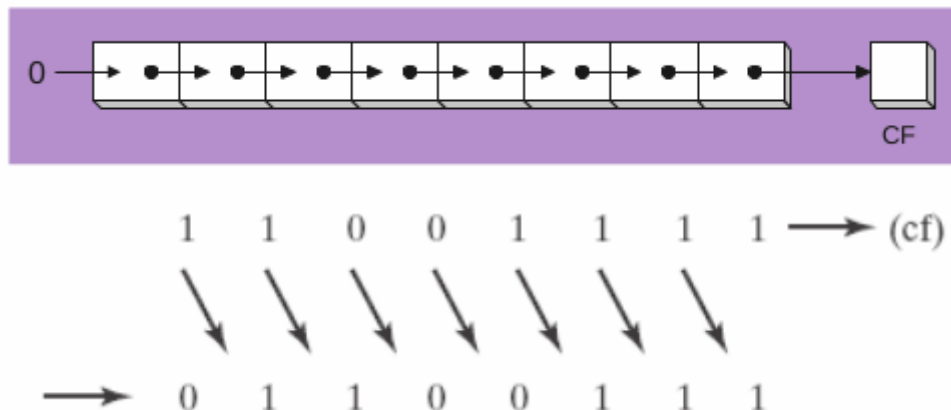# CH7 Integer Arithmetic

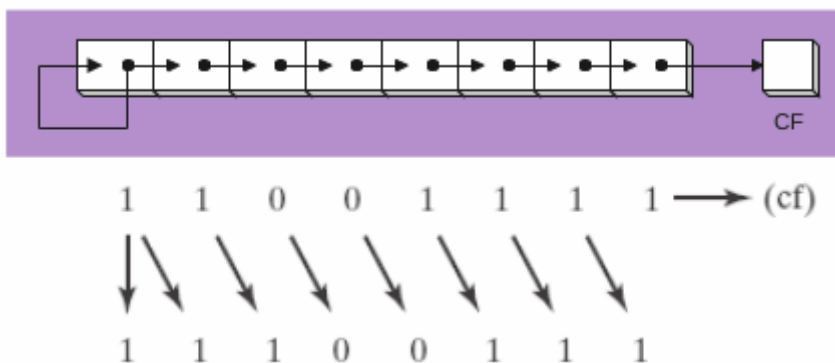## Shift and Rotate Instructions

Logical shift

A logical shift fills the newly created bit position with zero:

Arithmetic shift

An arithmetic shift fills the newly created bit position with a copy of the number's sign bit:

SHL instruction

The SHL (shift left) instruction performs a logical left shift on the destination operand, filling the lowest bit with 0.

```
MOV DL, 5    ; 00000101
SHL DL, 2    ; 00010100 = 20
```

SAL & SAR instructions

> SAL (shift arithmetic left) is identical to SHL. SAR (right arithmetic right) performs a right arithmetic shift on the destinaion operand.

```
MOV DL, -80
SAR DL, 1    ; >>1 in C,  DL = -40
SAR DL, 2    ; >>2 in C,  DL = -10
```

Shift instruction

instruction	intro
SHL	Shift Left
SHR	Shift Right
SAL	Shift Arithmetic Left
SAR	Shift Arithmetic Right