# Condition Codes (Explicit Setting: Compare)

- **Explicit Setting by Compare Instruction**
  - `cmpl/cmpq` Src2, Src1
  - `cmpl b,a` like computing `a-b` without setting destination

  - CF set if carry out from most significant bit (used for unsigned comparisons)
  - ZF set if `a == b`
  - SF set if `(a-b) < 0` (as signed)
  - OF set if two's-complement (signed) overflow

```
(a>0 && b<0 && (a-b)<0) || (a<0 && b>0 && (a-b)>0)
```

# Condition Codes (Explicit Setting: Test)

- **Explicit Setting by Test instruction**
  - `testl`/`testq` Src2, Src1
    `testl b,a` like computing `a&b` without setting destination
  - Sets condition codes based on value of Src1 & Src2
  - Useful to have one of the operands be a mask
  - ZF set when `a&b == 0`
  - SF set when `a&b < 0`

# Jumping

- **jX Instructions**
  - Jump to different part of code depending on condition codes

| jX | Condition | Description |
|---|---|---|
| `jmp` | `1` | Unconditional |
| `je` | `ZF` | Equal / Zero |
| `jne` | `~ZF` | Not Equal / Not Zero |
| `js` | `SF` | Negative |
| `jns` | `~SF` | Nonnegative |
| `jg` | `~(SF^OF)&~ZF` | Greater (Signed) |
| `jge` | `~(SF^OF)` | Greater or Equal (Signed) |
| `jl` | `(SF^OF)` | Less (Signed) |
| `jle` | `(SF^OF)\|ZF` | Less or Equal (Signed) |
| `ja` | `~CF&~ZF` | Above (unsigned) |
| `jb` | `CF` | Below (unsigned) |