

Bitwise Operations (Part 3)

§6.2, §7.2

Administrivia



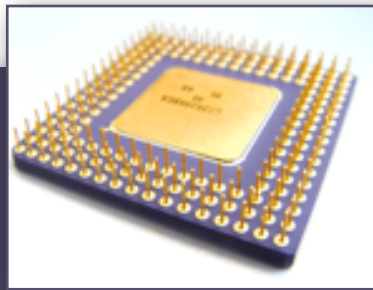
- ▶ **Exam 2** Wednesday, November 5
 - ▶ Make-up exams must be scheduled **before** the exam is given in class; no make-ups afterward
- ▶ **Homework 5** out due Friday at 11 a.m.
- ▶ Reading:
 - ▶ §6.2 Boolean and Comparison Instructions
 - ▶ §7.2 Shift and Rotate Instructions
 - ▶ Pay attention to *rotations* (not covered in lecture)
 - ▶ Be able to fill out the instruction template (like we've been doing in class) for ROL, ROR
 - ▶ §7.3 Shift and Rotate Applications

Topics Covered in Notes:

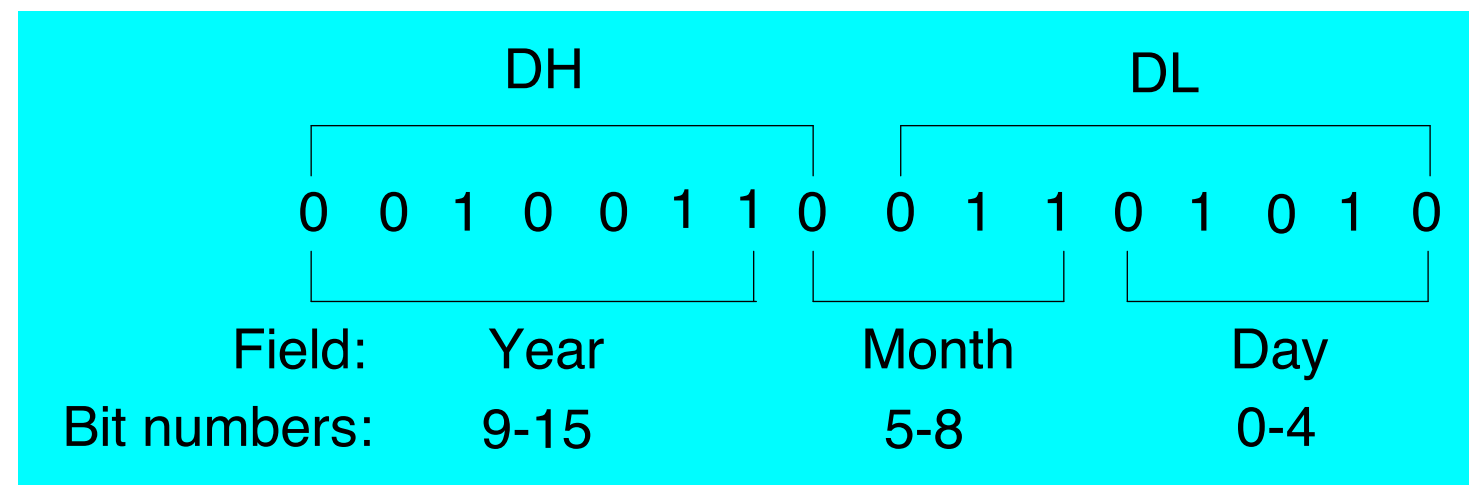


- ▶ SHL, SHR, SAL, SAR instructions

Application: Isolating a Bit String



- ▶ The MS-DOS file date field packs the year, month, and day into 16 bits:



- ▶ We want to “extract” the month field and store its value in AL, so AL = 00000011b

```
mov ax,dx      ; Copy DX into AX, so AX = 0010011001101010
shr ax,5       ; Shift right 5 bits, so AX = 0000000100110011
and al,00001111b ; Clear bits 4–7 in AL AL = 00000011
mov month,al   ; save in month variable
```

Topics Covered in Notes:



► Example: Converting binary numbers to strings

```
► push OFFSET buffer
   push 42
   call BinToStr ; Now buffer contains the null-terminated string "00000000000000000000000000000000101010"
```

*; (STDCALL) Stores a null-terminated string with the binary representation of a
; 32-bit unsigned integer value.*

; Receives: [ebp+8] DWORD value to convert

; [ebp+12] Pointer to buffer to store string (≥ 33 bytes)

; Returns: (none)

BinToStr PROC

TODO: Fill this in

BinToStr ENDP

Topics Covered in Notes:



- ▶ Converting binary numbers to strings
- ▶ Multiplication by 2
- ▶ Multiplication by 2^n
- ▶ Division by 2^n , rounding toward $-\infty$