Bitwise Operations (Part 3)

§6.2, §7.2

Administrivia

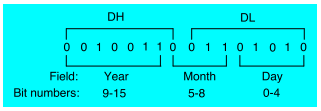
- **Exam 2** Wednesday, November 5
  - Make-up exams must be scheduled **before** the exam is given in class; no make-ups afterward
- **Homework 5** out due Friday at 11 a.m.
- Reading:
  - §6.2 Boolean and Comparison Instructions
  - §7.2 Shift and Rotate Instructions
    - Pay attention to *rotations* (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
```

Activity 13 #4

Topics Covered in Notes:

- Example: Converting binary numbers to strings
  - `push OFFSET buffer`
    `push 42`
    `call BinToStr` *; Now buffer contains the null-terminated string "00000000000000000000000000101010"*

```
; (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 $-\infty$