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extern printf
global main

section .data
author_fmt:
    db "Author: %s", 10, 0
title_fmt:
    db "Title: %s", 10, 0
completed_fmt:
    db "Completed: %c", 10, 0
read_time_fmt:
    db "Read Time: %.2f hours", 10, 0
bookmark_fmt:
    db "Bookmark %d: %d", 10, 0
modify_msg:
    db 10, "After modification:", 10, 0

struc Book
    b_author resb 30
    b_title resb 50
    b_completed resb 1
    b_read_time resq 1 ; 8 bytes for double
    b_bookmarks resd 8 ; 8 integers, 4 bytes each, array
endstruc

book1 istruc Book
    at b_author, db 'Seth Richter', 0
    at b_title, db 'In Clawed Grasp', 0
    at b_completed, db 'T'
    at b_read_time, dq 5.5
    at b_bookmarks, dd 30, 68, 75, 84, 113, 0, 0, 0
iend

section .text
main:
    push rbp
    mov rbp, rsp

    ; Print original struct
    call print_struct

    ; Modify and print
    call modify_and_print

    mov rsp, rbp
    pop rbp
    mov rax, 60 ; syscall: exit
    xor rdi, rdi ; status: 0
    syscall

modify_and_print:
    push rbp
    mov rbp, rsp

    ; Add a new bookmark (page 212)
    mov dword [book1 + b_bookmarks + 20], 212 ; Add to the 6th position (5 * 4
bytes)

    ; Print modification message

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mov rdi, modify_msg
xor rax, rax
call printf

; Call print_struct to display modified struct
call print_struct

mov rsp, rbp
pop rbp
ret

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print_struct:
    push rbp
    mov rbp, rsp

    ; Print author
    mov rdi, author_fmt
    mov rsi, book1 + b_author
    xor rax, rax
    call printf

    ; Print title
    mov rdi, title_fmt
    mov rsi, book1 + b_title
    xor rax, rax
    call printf

    ; Print completed
    mov rdi, completed_fmt
    movzx rsi, byte [book1 + b_completed]
    xor rax, rax
    call printf

    ; Print read time
    mov rdi, read_time_fmt
    movsd xmm0, [book1 + b_read_time]
    mov rax, 1 ; 1 float/double argument
    call printf

    ; Print bookmarks
    mov r12, 0 ; Counter for bookmarks
print_bookmarks:
    mov rdi, bookmark_fmt
    mov rsi, r12
    inc rsi ; Bookmark number (1-based)
    mov edx, [book1 + b_bookmarks + r12*4]
    cmp edx, 0
    je end_bookmarks ; If bookmark is 0, end printing
    xor rax, rax
    call printf

    inc r12
    cmp r12, 8
    jl print_bookmarks

    jmp end_bookmarks

end_bookmarks:
    mov rsp, rbp

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pop rbp  
ret
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; nasm -felf64 book_struct.asm && gcc -no-pie -o book_struct book_struct.o
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