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; UINSTALL.ASM
; -----
; RETRO UNIX v0.1 'fd0' formatting procedures
; Last Update: 09/07/2013
; (new /dev directory format
; according to Retro UNIX 8086 v1 kernel)
; 21/04/2014 (tty8, tty9)
; 05/03/2013 (ALIGN)
; 31/10/2012, 16/12/2012 (unixproc.asm -> sioreg)
; ERDOGAN TAN [ 14-15-16-21-27/7/2012, 4-5-12-13-14-15-21/8/2012 ]
; These procedures will be located in UNIXFDFS.ASM file
; when they are completed.
; (NOTE: only for (R)UFS initialization of FD0 1.44MB floppy disk

SIZE_FREE_MAP equ 360
SIZE_INODE_MAP equ 32

DISK_SIZE equ 2880 ; in blocks
INODE_COUNT equ SIZE_INODE_MAP * 8
INODE_LIST_BLOCKS equ (INODE_COUNT / 16)

ROOT_DIR_INODE equ 41

SIZE_Reserved1 equ 512 - (2+SIZE_FREE_MAP+2+SIZE_INODE_MAP)

SuperBlock struc

sb_FreeMapSize      dw ?
sb_FreeMap          db SIZE_FREE_MAP dup(?)
sb_InodeMapSize     dw ?
sb_InodeMap         db SIZE_INODE_MAP dup(?)
sb_Reserved1       db SIZE_Reserved1 dup(?)
sb_Reserved2       db 512 dup(?)

SuperBlock ends

; UNIX v1 I-node Flags:
; 1000000000000000b i-node is allocated (8000h)
; 0100000000000000b directory (4000h)
; 0010000000000000b file has been modified (2000h)
; 0001000000000000b large file (1000h)
; 0000000000010000b set user id on execution (20h)
; 0000000000001000b executable (10h)
; 0000000000000100b read, owner (8)
; 0000000000000010b write, owner (4)
; 0000000000000001b read, non-owner (2)
; 0000000000000000b write, non-owner (1)

unix_fs_install proc near
; 8086 code by Erdogan Tan
; 31/10/2012
; 21/08/2012
; 15/08/2012
; 14/08/2012
; 13/08/2012
; 05/08/2012
; 04/08/2012
; Derived from (original) UNIX v1 source code
; PRELIMINARY release of Unix Implementation Document,
; 20/6/1972
; RETRO UNIX v1 FS
; initialization/format version
; NOTE:
; The "cold" unix (u0, PDP-11) code is modified for fd0
; -> 1.44 MB floppy disk (Retro UNIX v1, 8086) fs

mov byte ptr [buff_d], dl ; 14/8/2012, drive number

mov word ptr [systm.sb_FreemapSize], SIZE_FREE_MAP ; 360
mov word ptr [systm.sb_InodeMapSize], SIZE_INODE_MAP ; 32
mov ax, DISK_SIZE ; 2880 blocks/sectors
uinstall_1:
; set bit AX/R1 in free storage map in core/memory
dec ax ; R1
call free

cmp ax, INODE_LIST_BLOCKS + 4 ; 15/8/2012
ja short uinstall_1
```

```
uinstall_2:
; zero i-list
dec ax
; AX (R1) = Block number
call clear
jc short uinstall_10 ; rw_error

and ax, ax
jnz short uinstall_2

uinstall_3:
; initialize inodes for special files (1 to 40)
mov bx, 40 ; BX = R1, 41 = root directory i-number
uinstall_4:
call iget
jc short uinstall_10 ; rw_error

mov word ptr [i_flgsl], 800Fh ; 1000000000000111b
mov byte ptr [i_nlksl], 1
mov byte ptr [i_uid], 0
call setimod
dec bx
jnz short uinstall_4

uinstall_5:
;push di
;push si
mov si, offset idata ; base address of assembled dirs
mov di, offset dirs ; directory data for assembled dirs
mov bx, 41
uinstall_6:
call imap
xchg bx,dx ; 13/8/2012
; 21/8/2012 (AX -> AL, word ptr [BX] -> byte ptr [BX])
or byte ptr [BX], al ; BX/DX = R2, ax = mq
; set the bit to indicate the i-node
; is not available/free
xchg bx, dx ; 13/8/2012
call iget
;jnc short uinstall_7
jc short uinstall_10 ; rw_error
@@:
;pop si
;pop di
;jmp short uinstall_10 ; rw_error

uinstall_7:
; SI, DI registers are not modified
; in imap, iget, setimod and writei procedures
lodsw
mov word ptr [i_flgsl], ax
lodsb
mov byte ptr [i_nlksl], al
lodsb
mov byte ptr [i_uid], al
call setimod
lodsw
mov word ptr [u_count], ax

add si, 26 ; now, si points 1st word of next inode

mov word ptr [u_base], di
add di, ax

mov word ptr [u_fofp], offset u_off ; 31/10/2012

mov word ptr [u_off], 0

call writei
;jc short @b
jc short uinstall_10 ; rw_error

cmp bx, 46
jnb short uinstall_8

inc bx
jmp short uinstall_6
```

```
uinstall_8:
    ;pop si
    ;pop di

uinstall_9:
    call sync ; write modified super block and buffer to disk
    ;jc short rw_error

uinstall_10:
    retn

unix_fs_install endp

sync    proc near
    ; 12/8/2012
    ; updates super block and the last i-node on disk
    ; if modified
    ; e.g. smod = 1, imod = 1, buffer_m = 1
    ;
    ; RETRO UNIX v1 FS
    ; initialization/format version

    xor bx, bx ; mov bx, 0
    call iget
    jc short sync_2

    xor ax, ax
    cmp byte ptr [smod], al ; 0
    jna short sync_3

sync_1:
    mov byte ptr [smod], al ; 0

    mov cx, 256
    mov si, offset System
    mov di, offset Buffer
    rep movsw

    inc al

    mov word ptr [buff_s], ax ; 1 ; superblock sector number
    mov byte ptr [buff_w], al

    call poke

sync_2:
    mov ax, word ptr [Error]

sync_3:
    retn

sync    endp

align 2

buff_d: db 0
buff_s: dw 0FFFFh ; Buffer sector
buff_m: db 0 ; buffer daha changed/modified (dirty) flag
buff_w: db 0 ; read/write flag (write=1, read=0)

align 16

system: ; superblock
db 512 dup(0)
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```
; 5/8/2012
; 14/7/2012
dirs:
root_dir: ; root directory
    dw 41
    db "...", 0,0,0,0,0,0
    dw 41
    db ".", 0,0,0,0,0,0,0
    dw 42
    db "dev",0,0,0,0,0
    dw 43
    db "bin",0,0,0,0,0
    dw 44
    db "etc",0,0,0,0,0
    dw 45
    db "usr",0,0,0,0,0
    dw 46
    db "tmp",0,0,0,0,0

size_root_dir equ $ - offset root_dir

dev_dir: ; device directory
    dw 41
    db "...", 0,0,0,0,0,0
    dw 42
    db ".", 0,0,0,0,0,0,0
    dw 1
    db "tty",0,0,0,0,0
    dw 2
    db "mem",0,0,0,0,0
    dw 3
    db "fd0",0,0,0,0,0
    dw 4
    db "fd1",0,0,0,0,0
    dw 5
    db "hd0",0,0,0,0,0
    dw 6
    db "hd1",0,0,0,0,0
    dw 7
    db "hd2",0,0,0,0,0
    dw 8
    db "hd3",0,0,0,0,0
    dw 9
    db "lpr",0,0,0,0,0
    dw 10
    db "tty0",0,0,0,0
    dw 11
    db "tty1",0,0,0,0
    dw 12
    db "tty2",0,0,0,0
    dw 13
    db "tty3",0,0,0,0
    dw 14
    db "tty4",0,0,0,0
    dw 15
    db "tty5",0,0,0,0
    dw 16
    db "tty6",0,0,0,0
    dw 17
    db "tty7",0,0,0,0
    dw 18
    db "COM1",0,0,0,0 ; 09/07/2013
    dw 19
    db "COM2",0,0,0,0 ; 09/07/2013
    dw 18
    db "tty8",0,0,0,0 ; 21/04/2014
    dw 19
    db "tty9",0,0,0,0 ; 21/04/2014

size_dev_dir equ $ - offset dev_dir

bin_dir: ; binary directory
    dw 41
    db "...", 0,0,0,0,0,0
    dw 43
    db ".", 0,0,0,0,0,0,0
```

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size_bin_dir equ $ - offset bin_dir

etc_dir: ; etcetra directory
        dw 41
        db "...", 0,0,0,0,0,0
        dw 44
        db "...", 0,0,0,0,0,0,0

size_etc_dir equ $ - offset etc_dir

usr_dir: ; user directory
        dw 41
        db "...", 0,0,0,0,0,0
        dw 45
        db "...", 0,0,0,0,0,0,0

size_usr_dir equ $ - offset usr_dir

tmp_dir: ; temporary directory
        dw 41
        db "...", 0,0,0,0,0,0
        dw 46
        db "...", 0,0,0,0,0,0,0

size_tmp_dir equ $ - offset tmp_dir

align 2

;dw 0

; 31/10/2012
u_off: dw 0

; 12/08/2012
u_count: dw 0
u_base: dw 0
u_fofp: dw 0
u_nread: dw 0

; 17/08/2012
; 05/08/2012
; 14/07/2012
inode:
i_flg: dw 800Fh ; special (device) files flags
i_nlnk: db 1 ; Number of links
i_uid: db 0 ; user id
i_size: dw 0 ; file size
i_dskp: dw 8 dup(0) ; direct or indirect blocks
i_ctim: dd 0 ; creation time
i_mtim: dd 0 ; last modification time
i_reserved: dw 0 ; reserved (not in use)

; 05/08/2012
; 14/07/2012
idata:
inodes:

root_inode: ; 41
        dw 0C00Eh ; Flags (1100000000001110b)
        db 7 ; number of links
        db 0 ; user ID (0 = root)
        dw size_root_dir ; initial size = 70 bytes
        dw 8 dup(0) ; indirect or contents blocks
        dd 0 ; creation date & time
        dd 0 ; modification date & time
        dw 0 ; unused
dev_inode: ; 42
        dw 0C00Eh ; Flags (1100000000001110b)
        db 2 ; number of links
        db 0 ; user ID (0 = root)
        dw size_dev_dir ; 200
        dw 8 dup(0) ; indirect or contents blocks
        dd 0 ; creation date & time
        dd 0 ; modification date & time
        dw 0 ; unused
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```
bin_inode: ; 43
    dw 0C00Eh ; Flags (1100000000001110b)
    db 2      ; number of links
    db 0      ; user ID (0 = root)
    dw size_bin_dir ; 20
    dw 8 dup (0) ; indirect or contents blocks
    dd 0      ; creation date & time
    dd 0      ; modification date & time
    dw 0      ; unused

etc_inode: ; 44
    dw 0C00Eh ; Flags (1100000000001110b)
    db 2      ; number of links
    db 0      ; user ID (0 = root)
    dw size_etc_dir ; 20
    dw 8 dup (0) ; indirect or contents blocks
    dd 0      ; creation date & time
    dd 0      ; modification date & time
    dw 0      ; unused

usr_inode: ; 45
    dw 0C00Eh ; Flags (1100000000001110b)
    db 2      ; number of links
    db 0      ; user ID (0 = root)
    dw size_usr_dir ; 20
    dw 8 dup (0) ; indirect or contents blocks
    dd 0      ; creation date & time
    dd 0      ; modification date & time
    dw 0      ; unused

tmp_inode: ; 46
    dw 0C00Fh ; Flags (1100000000001111b)
    db 2      ; number of links
    db 0      ; user ID (0 = root)
    dw size_tmp_dir ; 20
    dw 8 dup (0) ; indirect or contents blocks
    dd 0      ; creation date & time
    dd 0      ; modification date & time
    dw 0      ; unused

align 16

Buffer:
sector_buffer:
db 512 dup (0)
```