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; *****
; CAT.ASM (Retro Unix 8086 v1 - /bin/cat - concatenate files)
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; RETRO UNIX 8086 (Retro Unix == Turkish Rational Unix)
; Operating System Project (v0.1) by ERDOGAN TAN (Beginning: 11/07/2012)
; Retro UNIX 8086 v1 - /bin/cat file
;
; [ Last Modification: 16/07/2015 ]
;
; Derivation from UNIX Operating System (v1.0 for PDP-11)
; (Original) Source Code by Ken Thompson (Bell Laboratories, 1971-1972)
; *****
; Derived from 'cat.s' file of original UNIX v1
;
; CAT2.ASM, 16/07/2015
; CAT1.ASM, 02/12/2013
; *****

.8086

; UNIX v1 system calls
_rele equ 0
_exit equ 1
_fork equ 2
_read equ 3
_write equ 4
_open equ 5
_close equ 6
_wait equ 7
_creat equ 8
_link equ 9
_unlink equ 10
_exec equ 11
_chdir equ 12
_time equ 13
_mkdir equ 14
_chmod equ 15
_chown equ 16
_break equ 17
_stat equ 18
_seek equ 19
_tell equ 20
_mount equ 21
_umount equ 22
_setuid equ 23
_getuid equ 24
_stime equ 25
_quit equ 26
_intr equ 27
_fstat equ 28
_emt equ 29
_mdate equ 30
_stty equ 31
_gtty equ 32
_ilgins equ 33

sys macro syscallnumber, arg1, arg2, arg3
; Retro UNIX 8086 v1 system call.
ifnb <arg3>
    mov dx, arg3
endif
ifnb <arg2>
    mov cx, arg2
endif
ifnb <arg1>
    mov bx, arg1
endif
mov ax, syscallnumber
int 20h
endm

; Retro UNIX 8086 v1 system call format:
; sys syscall (ax) <arg1 (bx)>, <arg2 (cx)>, <arg3 (dx)>
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;ibuf equ offset bss
;obuf equ offset bss + 512
;fin equ offset bss + 1024
; 16/07/2015
iobuf equ offset bss
fin equ offset bss + 512

UNIX SEGMENT PUBLIC 'CODE'
    assume cs:UNIX,ds:UNIX,es:UNIX,ss:UNIX

START_CODE:
    ;; / cat -- concatenate files

    sys _write, 1, nl, 2

    pop bp
    pop dx
    mov si, fin
    ;mov di, obuf
    dec bp
    jnz short @f
    ;AX = 2 (written byte count)
    xor al, al
    jmp short cat_3
    ;;mov (sp)+,r5
    ;;tst (sp)+
    ;;mov $obuf,r2
    ;;cmp r5,$1
    ;;beq 3f

cat_1:
    ;;loop:
    dec bp
    ;jz short cat_6
    ; 16/07/2015
    jnz short @f
    sys _exit

@@:
    pop bx
    cmp byte ptr [BX], '-'
    jne short cat_2
    xor ax, ax ; 0
    mov word ptr [SI], ax ;0
    jmp short cat_3
    ;;dec r5
    ;;ble done
    ;;mov (sp)+,r0
    ;;cmpb (r0),'-'
    ;;bne 2f
    ;;clr fin
    ;;br 3f

cat_2:
    ;;2:
    ; bx = file name offset
    xor cx, cx ; 0
    sys _open
    jc short cat_1
    mov word ptr [SI], ax
    ;;mov r0,0f
    ;;sys open; 0:...; 0
    ;;bes loop
    ;;mov r0,fin

cat_3:
    ;;3:
    sys _read, ax, iobuf, 512 ; 16/07/2015
    ;sys _read, ax, ibuf, 512
    jc short cat_5
    ; NOTE: If input file is a tty (keyboard)
    ; only 1 byte will be read, by ignoring
    ; byte count (512).
    ; Retro UNIX 8086 v1 kernel ('rtty')
    ; has been modified fot that.
    ; Erdogan Tan (16/07/2015)
    ;
    and ax, ax ; AX = 1 for tty (keyboard)
    jz short cat_5
    ;
    push si
    ;mov si, iobuf
    ;
    mov si, cx ; offset ibuf

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;      mov     cx, ax
;      ;;mov   fin,r0
;      ;;sys   read; ibuf; 512.
;      ;;bes   3f
;      ;;mov   r0,r4
;      ;;beq   3f
;      ;;mov   $ibuf,r3
;      ; 16/07/2015
;      mov     dx, ax
;      ;add    dx, obuf
;cat_4:
;      ;;4:
;      lodsb
;      ;call   putc
;      ; 16/07/2015
;      sys     _write, 1, iobuf, ax
;      jc      short cat_5
;
;      loop    cat_4
;      pop     si
@@:
;      mov     ax, word ptr [SI]
;      jmp     short cat_3
;      ;;movb  (r3)+,r0
;      ;;jsr   pc,putc
;      ;;dec   r4
;      ;;bne   4b
;      ;;br    3b
cat_5:
;      ;;3:
;      mov     bx, word ptr [SI]
;      or      bx, bx
;      jz      short cat_1
;      sys     _close
;      jmp     short cat_1
;      ;;mov   fin,r0
;      ;;beq   loop
;      ;;sys   close
;      ;;br    loop
;cat_6:
;      ;;done:
;      sub     di, obuf
;      jz      short cat_7
;      sys     _write, 1, obuf, di
;      ;;sub   $obuf,r2
;      ;;beq   1f
;      ;;mov   r2,0f
;      ;;mov   $1,r0
;      ;;sys   write; obuf; 0:...
;cat_7:
;      ;;1:
;      sys     _exit
;      ;;sys   exit
;putc:
;      ;;putc:
;      stosb
;      cmp     di, dx ; 16/07/2015
;      ;cmp    di, obuf + 512
;      ;jb     short @f
;      ;push   cx
;      ; 16/07/2015
;      mov     di, obuf
;      sub     dx, di ; byte (char) count
;
;      sys     _write, 1, obuf
;      ;sys    _write, 1, obuf, 512
;      ;mov    di, obuf
;      ;;movb  r0,(r2)+
;      ;;cmp   r2,$obuf+512.
;      ;;blo   1f
;      ;;mov   $1,r0
;      ;;sys   write; obuf; 512.
;      ;;mov   $obuf,r2
;
;      pop     cx
;@@:
;      ;;1:
;      retn
;
;      ;;rts   pc

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```
nl:      db 0Dh, 0Ah, 0

EVEN

bss:
;ibuf: db 512 dup(0)
;obuf: db 512 dup(0)
;fin:  dw 0

        ;;.bss
        ;;ibuf: .+.512.
        ;;obuf: .+.512.
        ;;fin:  .+.2
        ;;.text

UNIX      ends

        end      START_CODE
```