

# Index

## 8

8088  
    memory 124  
    segment override 140

## A

access mode of file 337  
additem in *ex6.c* 14  
address  
    segment:offset 21  
address space 21  
    map 23  
Agrawal, S. xxv  
allocation 125  
    buffer 273  
    index block 327  
    memory 271  
    pseudo-device 335, 341  
Arthur, S. xxvi  
ASCII 30  
asynchronous 166  
attributes  
    window 236

## B

backplane 20  
backspace 214  
base pointer 24  
bios.h 146  
Bishop, M. xxvi

block 33  
blocking 166  
Bondi, A. xxv  
bootstrap 220  
border  
    window 236  
Brown, D. xvii  
Brown, R. xxvi  
buffer 189, 267, 323  
    deallocation (release) 275  
    file 337  
buffer pool 268  
    creation 277  
    disk 309, 329  
    identifier 272  
    table 273  
    table initialization 278  
bufpool.h 273  
Burns, D. xxvi  
bus 20  
busy waiting 12, 99  
butler in *butler.c* 400  
butler.h 400  
byte stream 322  
bytes 21

## C

C language 4, 37, 421  
    calling conventions 38  
    external names 38  
    function 8

- module 268
- procedure 8
- storage layout 37
- carriage return 188
- cbreak mode 205
- cbrkint in *cbrkint.c* 402
- character 21
- character echo 188
- chprio in *chprio.c* 96
- circuit cards 20
- clkinit in *clkinit.c* 162
- clkint in *clkint.c* 158
- clock 149
  - deferred 160
  - interrupt 150
  - real-time 149
  - tick 150
- close 166
- close in *close.c* 176
- cold start 220
- Comer, C. xvii, xxvi
- commands 439
- compiler 3
- compiling programs 430
- concurrent program 5
- conf.c 178, 413
- conf.h 168, 413
- config program 411
- configuration 5, 20, 168, 411
  - input file 413
- cons2 in *ex5.c* 13
- CONSOLE 5
- consume in *ex4.c* 11
- context switch 67, 73
- control 166
- control in *control.c* 172
  - disk driver 315
  - tty driver 214
- control block 190, 415
  - disk 298
  - file 335
  - tty 190
- control.c 172
- cooked mode 205

- coordination 99
- count
  - port 289
- create 8
- create in *create.c* 92
- creation
  - buffer pool 277
  - port 283
  - process 90
  - semaphore 105
- Ctrl-Break 29, 401
- ctxsw in *ctxsw.asm* 74
- Cuny, J. xxvi
- current process state 70
- curripid 70
- CURSOR type 234

## D

- data block 324
- data segment 37, 124
- Datta, D. xvii
- deadlock 217
- deallocation 125
- deferred clock 160
- deferred clock processing 160
- delays 154, 156
- deletion
  - port 289
  - semaphore 107
- delta list 152
- Denning, P. xxvi
- dequeue in *queue.c* 60
- development 439
- device
  - class 417
  - disk 32
  - driver 165
  - initialization 228
  - minor number 416
  - name 416
  - pseudo 335
  - random access 297
  - tty 187
- device driver

- disk 307
  - device independent I/O 165
  - device switch table 168, 334, 416
  - devtab 170, 178
  - dfalloc in *dfalloc.c* 340
  - dfckmd in *dfckmd.c* 338
  - dfdsrch in *dfdsrch.c* 339
  - Dickey, K. xxvi
  - dio.c 50
  - dir.h 334
  - direct memory access 34
  - directory 307, 321, 333
  - directory organization 432
  - disable in *kernel.h* 89
  - disk 297
    - block 297
    - control block 298
    - data block 324
    - driver 297, 298
    - driver routines 307
    - files 322
    - hardware 32
    - index block 324
    - initialization 305
    - partition 324
    - read operation 298
    - request list 300
    - server 323
    - server process 313
    - sync operation 318
  - disk.h 299
  - dispatch
    - interrupt 134
    - system call 418
    - table 135
  - DMA 34, 297
  - doprint in *doprnt.c* 390
  - doscall in *doscall.c* 363
  - dos\_close in *doscall.c* 363
  - dos\_creat in *doscall.c* 363
  - dos\_lseek in *doscall.c* 363
  - dos\_open in *doscall.c* 363
  - dos\_read in *doscall.c* 363
  - dos\_write in *doscall.c* 363
  - dread in *dio.c* 50
  - driver
    - disk 297
    - pseudo-device 335
    - tty 187
  - dscentl in *dscentl.c* 316
  - dsdirec in *disk.h* 299
  - dsinit in *dsinit.c* 306
  - dsinter in *dsinter.c* 314
  - dskbcpy in *dskbcpy.c* 346
  - dskenq in *dskenq.c* 302
  - diskint in *diskio.asm* 48
  - diskio in *diskio.asm* 48
  - diskio.h 47
  - dskqopt in *dskqopt.c* 304
  - dsksync in *dsksync.c* 316
  - dsn timer in *dsn timer.c* 408
  - dsopen in *dsopen.c* 342
  - dsread in *dsread.c* 308
  - dsseek in *dsseek.c* 312
  - dssync in *disk.h* 299
  - dswrite in *dswrite.c* 310
  - Duchesneau, R. xvii
  - dump 386
  - dwrite in *dio.c* 50
- ## E
- echo buffer 204
  - endi.asm 83
  - enable in *kernel.h* 89
  - enqueue in *queue.c* 60
  - error 385
    - see exception
  - ex0.c 5
  - ex1.c 5
  - ex2.c 7
  - ex3.c 8
  - ex4.c 11
  - ex5.c 13
  - ex6.c 14
  - exception 26, 385
  - exception vector 385
  - executive 1

**F**

fault  
     *see* exception  
 fgetc in *io.h* 136  
 file 321  
     access mode 337  
     buffer 337  
     control block 335  
     data block 324  
     index 324  
     index block 324  
     index manager 325  
     input 350  
     local 323  
     name 321  
     operations 321, 341  
     position 337  
     pseudo-device 335, 341  
     seek operation 349  
     server 323  
     structure 322  
 file system 321  
 file.h 336  
 firstid in *q.h* 58  
 firstkey in *q.h* 58  
 Flags  
     processor 23  
 FLAGS word 24  
 floppy disk 29  
 floppy disks 432  
 formatted output 389  
 formatting  
     disks 52  
 Fossum, E. xvii  
 fprintf in *fprintf.c* 398  
 fputc in *io.h* 136  
 fragmentation 129  
 free memory 126  
 freebuf in *freebuf.c* 276  
 freemem in *freemem.c* 130  
 full-duplex mode 188

**G**

getbuf in *getbuf.c* 274  
 getc 166  
 getc in *getc.c* 172  
 getchar in *io.h* 136  
 getdev in *getdev.c* 175  
 getfirst in *getitem.c* 62  
 getlast in *getitem.c* 62  
 getmem in *getmem.c* 128  
 getpid 10  
 getpid in *getpid.c* 95  
 getprio in *getprio.c* 94  
 Ginosar, R. xxvi

**H**

half-duplex mode 188  
 halt in *kernel.h* 89  
 heap 124  
 HLT instruction 228  
 how to use 430

**I**

I/O 166  
 ibclear in *ibclear.c* 327  
 ibdisp in *iblock.h* 326  
 ibget in *ibget.c* 328  
 iblfree in *iblfree.c* 332  
 iblock.h 326  
 ibnew in *ibnew.c* 330  
 ibput in *ibput.c* 329  
 ibtodb in *iblock.h* 326  
 identifier  
     buffer pool 272  
     port 283  
     process 69  
     semaphore 102  
 included files 5  
 index 323, 324  
 index block 324  
     address 326  
     allocation 327  
     layout 326  
     operations on 327

index manager 325  
 init 166  
 init in *init.c* 173  
 initiali.c 222  
 initialization 219  
     buffer pool table 278  
     disk 305  
     port table 281  
     pseudo-device 357  
 input 165, 194  
 input-output  
     non-blocking 309  
     primitives 166  
     to a file 350  
 insert in *insert.c* 62  
 insertd in *insertd.c* 153  
 interprocess communication  
     see message  
 interrupt 133  
     PC vectors 146  
     clock 150  
     dispatch 134  
     dispatch table 135  
     instruction 27  
     keyboard handling 212  
     processing 144  
     return 26  
     revector 28  
     software 27  
     tty 202  
     type 25  
     unexpected 386  
     vector 22  
     vector configuration 416  
     vector initialization 182  
 interval timer 163  
 intmap 135, 178  
 intmap.asm 137  
 io.h 136  
 ioerr 177  
 ioerr in *ioerr.c* 177  
 ionull 177  
 ionull in *ionull.c* 177  
 isbaddev in *io.h* 136

isbadpid in *proc.h* 68  
 isbadport in *ports.h* 280  
 isbadsem in *sem.h* 102  
 isempty in *q.h* 58  
 isodd in *kernel.h* 89  
 ISR 25

## K

kbdgetc in *kbdio.asm* 41  
 kbdint in *kbdio.asm* 41  
 kbdio.h 40  
 Kent, C. xxvi  
 kernel 1, 411  
 kernel.h 89  
 Kernighan, B. xxvi  
 keyboard 29  
     interrupt handling 212  
     key code 30  
     scan code 30  
     server process 402  
     special key 30  
 kgetc in *kgetc.c* 43  
 kill 10  
 kill in *kill.c* 87  
 killing a process 86  
 Knautz, T. xvi  
 kprintf in *kprintf.c* 398  
 kputc in *kputc.c* 46  
 Krieg, A. xvii

## L

Lai, G. xvii  
 language 3  
 lastkey in *q.h* 58  
 layering 17  
 layers 2  
 lfclose in *lfclose.c* 356  
 lfgetc in *lfgetc.c* 351  
 lfinit in *lfinit.c* 357  
 lfputc in *lfputc.c* 352  
 lfread in *lfread.c* 354  
 lfsdfree in *lfsdfree.c* 345  
 lfseek in *lfseek.c* 350

lfsetup in *lfsetup.c* 348  
 lfsflush in *lfsflush.c* 347  
 lfsnewd in *lfsnewd.c* 344  
 lfwrite in *lfwrite.c* 355  
 library 480  
 Lien, E. xxvi  
 line feed 188  
 linked lists 56  
 lists  
     of processes 56  
 local files 323  
 logical sector number 35  
 lower-half 188  
 lwattr in *lwattr.c* 242  
 lwbord in *lwbord.c* 240  
 lwcclose in *lwcclose.c* 254  
 lwcntl in *lwcntl.c* 252  
 lwgetc in *lwgetc.c* 250  
 lwinit in *lwinit.c* 264  
 lwoproc in *lwoproc.c* 256  
 lwputc in *lwputc.c* 246  
 lwread in *lwread.c* 251  
 lwwrite in *lwwrite.c* 248

## M

machine 19  
 main 221  
 main in *initiali.c* 222  
 manual 429  
 map.c 182  
 mapinit in *map.c* 182  
 maprestore in *map.c* 182  
 mark in *mark.c* 270  
 mark.h 270  
 marks 269  
 mem.h 126  
 memlist 126  
 memory 21, 125, 125, 125  
     allocation 125, 271  
     data segment 37, 124  
     fragmentation 129  
     heap 124  
     manager 123  
     marking 269

    on the 8088 124  
     partition 272  
     release 129  
     release (deallocation) 125  
     text segment 37, 124  
 memory management 267  
 message 113, 267  
     operations on 114  
     receiving 118  
     sending 115, 285  
 mfalloc in *mfalloc.c* 371  
 mfcclose in *mfcclose.c* 381  
 mfdsrch in *mfdsrch.c* 370  
 mffile.h 368  
 mfgetc in *mfgetc.c* 376  
 mfininit in *mfininit.c* 382  
 mfputc in *mfputc.c* 378  
 mfred in *mfread.c* 376  
 mfseek in *mfseek.c* 380  
 mfsetup in *mfsetup.c* 374  
 mfsflush in *mfsflush.c* 374  
 mfwrite in *mfwrite.c* 378  
 minor device number 416  
 mkinit in *mark.c* 270  
 mkpool in *mkpool.c* 277  
 module 268  
     self-initializing 268  
 monitor 1  
 motherboard 20  
 mscntl in *mscntl.c* 382  
 msopen in *msopen.c* 372  
 multiprogramming 6  
 Murtagh, T. xxvi  
 mutual exclusion 14

## N

name  
     device 416  
 NDEVS 418  
 NEWLINE 188  
 newpid in *create.c* 92  
 newqueue in *newqueue.c* 64  
 newsem in *screate.c* 106  
 non-selfreferential 500

nonempty in *q.h* 58  
 NPROC 55, 68  
 NQENT 58  
 null process 75, 100  
 numproc 86

## O

OK 82  
 open 166  
 open in *open.c* 176  
 operating system 1  
 output 165, 389

## P

P and V operations 111  
 paging 123  
 panic in *panic.c* 386  
 Parathasarathy, B. xxvi  
 partition of memory 272  
 pause in *kernel.h* 89  
 PC 19  
   I/O devices 29  
   interrupt vectors 146  
   physical construction 20  
 PC-Xinu 4, 429  
   layers 17  
   library 417, 480  
   system calls 443  
 pcount in *pcount.c* 290  
 pcreate in *pcreate.c* 284  
 pscreen.c 260  
 pcxconf 413  
 pdelete in *pdelete.c* 291  
 pinit in *pinit.c* 282  
 pool identifier 272  
 poolinit in *poolinit.c* 278  
 port 30, 268  
   identifier 283  
 ports  
   count 289  
   creation 283  
   deletion 289  
   initialization 281

operations on 279  
   receiving 288  
   reset 289  
   sending to 285  
   table 280  
 ports.h 280  
 prA in *ex2.c* 7  
 prB in *ex2.c* 7  
 preceive in *preceive.c* 288  
 preempt 151  
 preemption 151  
 preset in *preset.c* 292  
 primitives  
   input-output 166  
 printf in *printf.c* 397  
 priority 61  
 priority queue 61  
 prntr in *ex3.c* 8  
 proc.h 68  
 process 6, 55, 228  
   blocking 13  
   code 9  
   compared to program 6  
   coordination 99  
   creation 8, 90  
   current state 70  
   execution 8  
   exit 10, 90  
   identifier 8, 55, 94  
   null 75  
   output 189  
   priority 61, 94  
   ready state 70  
   receiving state 114  
   sleeping state 152, 154  
   state 69  
   suspended state 79  
   synchronization 99  
   termination 86  
   variables 9, 10  
   waiting state 100  
 process table 67  
 processor  
   FLAGS register 23

- Instruction Pointer 23
- interrupt flag 24
- proctab 68
- prod2 in *ex5.c* 13
- produce in *ex4.c* 11
- producer-consumer 12
- program
  - compared to process 6
  - concurrent 5
  - sequential 5
  - xmain 7
- psend in *psend.c* 286
- pseudo-call 90
- pseudo-device 335
  - initialization 357
- pseudo-disk 323
- psnap in *psnap.c* 402
- ptclear in *ptclear.c* 293
- putc 4, 166
- putc in *putc.c* 173
- putchar in *io.h* 136
- putchr in *pcscreen.c* 260
- putcsrcpos in *pcscreen.c* 260

## Q

- q structure 56
- q.h 58
- QUANTUM 151
- queue routines
  - see* linked list
- queue.c 60

## R

- random access 297
- raw mode 205
- re-entrant 27
- read 166
- read in *read.c* 171
- readcopy in *readcopy.c* 198
- ready in *ready.c* 76
- ready list 70
- ready process state 70
- ready.c 76

- real-time clock 29, 149
- receive in *receive.c* 119
- receiving
  - from ports 288
  - message 118
- receiving process state 114
- recvclr in *recvclr.c* 120
- reentrant code 140
- registers 23
  - in dump 386
  - segment 24
- release 125
  - memory 129
  - storage 129
- release of allocated memory 271
- releasing
  - buffers 275
- resched in *resched.c* 72
- rescheduling
  - during interrupt 145
- restart
  - see also* bootstrap
- restore in *kernel.h* 89
- resume 8
- resume in *resume.c* 81
- RETURN 188
- Ritchie, D. xxvi
- Round-robin 70
- roundew in *mem.h* 126
- running PC-Xinu 430

## S

- Salisbury, S. xxvi
- scheduler 70, 71
- Schrader, D. xxvi
- scout in *scout.c* 108
- screate 12
- screate in *screate.c* 106
- scrollup in *pcscreen.c* 260
- sdelete in *sdelete.c* 107
- secondary storage
  - see* disk
- sector 297
- sectors 33



- seek 166
- seek in *seek.c* 174
- self-initializing 268
- sem.h 102
- semaphore 12, 99
  - P and V operations 111
  - count 104
  - creation 105
  - deletion 107
  - multiple signals 109
  - operations 99, 102
  - reset 109
  - returning the count 108
  - table 101
  - use by drivers 190
- send in *send.c* 116
- sendf in *sendf.c* 117
- sending
  - message 115
- sendn in *sendn.c* 118
- sequential
  - program 5
- server 323
- Shen, V. xxvi
- signal 12
- signal in *signal.c* 104
- signaln in *signaln.c* 109
- sleep in *sleep.c* 156
- sleep.h 156
- sleeping process queue 152
- sleeping process state 152, 154
- sleept in *sleept.c* 155
- Sorensen, P. xvii
- sreset in *sreset.c* 110
- ssclock.c 160
- stack 26, 68, 73, 124, 386
- stack frame 38
- stack.asm 230
- startup message 432
- stopclk in *ssclock.c* 160
- storage
  - see* memory, disk
- strtclock in *ssclock.c* 160
- support routines 385

- suspend in *suspend.c* 85
- suspended process state 79
- swapping 123
- symbolic constant 40
- synchronization 12
  - process 99
- synchronous 166
- SYSErr 50, 82
- sysinit in *initiali.c* 222
- system
  - library 480
- system call 4, 82, 411, 443
- system reboot 220
- sys\_disabl in *eidid.asm* 83
- sys\_enabl in *eidid.asm* 83
- sys\_hlt in *eidid.asm* 83
- sys\_restor in *eidid.asm* 83
- sys\_stkinit in *stack.asm* 230
- sys\_stknrb in *stack.asm* 230
- sys\_wait 228
- sys\_wait in *eidid.asm* 83
- sys\_xdisabl in *xeidid.asm* 142
- sys\_xrestor in *xeidid.asm* 142

## T

- table
  - buffer pool 273
  - device switch 168
  - ports 280
  - process 67
- task 6
- task manager 1
- terminal
  - device driver 187
- terminating a process 86
- text segment 37, 124
- Thomas, A. xvi
- Thompson, K. xxvi
- tick rate 150
- time-of-day clock 149
- timed delay 151
- timed delays 154
- timer
  - see also* clock

timesharing systems 6  
 trap 385  
 Trudrung, E. xvii  
 truncate in *mem.h* 126  
 tsnap in *tsnap.c* 406  
 tty 187, 194  
   device 187  
   initialization 212  
   input interrupts 202  
   input modes 205  
   input server 202  
   output 198  
   output server 202  
 tty.h 191  
 ttycntl in *tycntl.c* 214  
 ttygetc in *tygetc.c* 194  
 tyyiin in *tyiin.c* 212  
 ttyinit in *tyinit.c* 212  
 ttyiproc 402  
 ttyiproc in *tyiproc.c* 206  
 ttyopen in *tyopen.c* 236  
 ttyoproc in *tyoproc.c* 202  
 ttyputc in *typutc.c* 199  
 ttyread in *tyread.c* 196  
 ttywrite in *tywrite.c* 200  
 Tubis, C. xvi  
 TURBOC 431

## U

unmarked in *mark.h* 270  
 upper-half 188  
 userret in *userret.c* 94

## V

Valdes, J. xxvi  
 variables  
   shared 10  
 vector  
   exception 385  
 vectors  
   PC interrupt 146  
 video  
   character attributes 31

video display 29, 31  
 vidint in *vidio.asm* 44  
 vidio.h 44  
 virtual address 123  
 virtual machine 27

## W

wait 12  
 wait in *wait.c* 103  
 waiting process state 100  
 wakeup 151  
 wakeup in *wakeup.c* 159  
 watermark processing 205  
 Wegner, M. xvii  
 window  
   attributes 236  
   border 236  
 window.h 234  
 word 21  
 wputcsr in *wputcsr.c* 262  
 writcopy in *writcopy.c* 201  
 write 166  
 write in *write.c* 174  
 wtty in *vidio.asm* 44

## X

xdone 402  
 xdone in *xdone.c* 88  
 xeidi.asm 142  
 xinu.lib 417  
 xmain in *ex1.c* 5  
 xmain in *ex2.c* 7  
 xmain in *ex3.c* 8  
 xmain in *ex4.c* 11  
 xmain in *ex5.c* 13