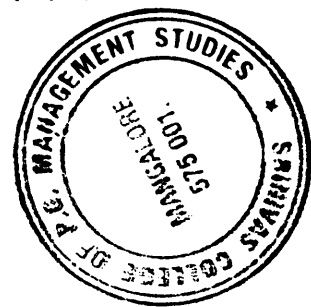


CONTENTS

PREFACE	xi
CHAPTER 1 GENERAL OVERVIEW OF THE SYSTEM	1
1.1 HISTORY	1
1.2 SYSTEM STRUCTURE	4
1.3 USER PERSPECTIVE	6
1.4 OPERATING SYSTEM SERVICES	14
1.5 ASSUMPTIONS ABOUT HARDWARE	15
1.6 SUMMARY	18



CHAPTER 2 INTRODUCTION TO THE KERNEL	19
2.1 ARCHITECTURE OF THE UNIX OPERATING SYSTEM	19
2.2 INTRODUCTION TO SYSTEM CONCEPTS	22
2.3 KERNEL DATA STRUCTURES	34
2.4 SYSTEM ADMINISTRATION	34
2.5 SUMMARY AND PREVIEW	36
2.6 EXERCISES	37
CHAPTER 3 THE BUFFER CACHE	38
3.1 BUFFER HEADERS	39
3.2 STRUCTURE OF THE BUFFER POOL	40
3.3 SCENARIOS FOR RETRIEVAL OF A BUFFER	42
3.4 READING AND WRITING DISK BLOCKS	53
3.5 ADVANTAGES AND DISADVANTAGES OF THE BUFFER CACHE	56
3.6 SUMMARY	57
3.7 EXERCISES	58
CHAPTER 4 INTERNAL REPRESENTATION OF FILES	60
4.1 INODES	61
4.2 STRUCTURE OF A REGULAR FILE	67
4.3 DIRECTORIES	73
4.4 CONVERSION OF A PATH NAME TO AN INODE	74
4.5 SUPER BLOCK	76
4.6 INODE ASSIGNMENT TO A NEW FILE	77
4.7 ALLOCATION OF DISK BLOCKS	84
4.8 OTHER FILE TYPES	88
4.9 SUMMARY	88
4.10 EXERCISES	89

CHAPTER 5 SYSTEM CALLS FOR THE FILE SYSTEM	91
5.1 OPEN	92
5.2 READ	96
5.3 WRITE	101
5.4 FILE AND RECORD LOCKING	103
5.5 ADJUSTING THE POSITION OF FILE I/O – LSEEK	103
5.6 CLOSE	103
5.7 FILE CREATION	105
5.8 CREATION OF SPECIAL FILES	107
5.9 CHANGE DIRECTORY AND CHANGE ROOT	109
5.10 CHANGE OWNER AND CHANGE MODE	110
5.11 STAT AND FSTAT	110
5.12 PIPES	111
5.13 DUP	117
5.14 MOUNTING AND UNMOUNTING FILE SYSTEMS	119
5.15 LINK	128
5.16 UNLINK	132
5.17 FILE SYSTEM ABSTRACTIONS	138
5.18 FILE SYSTEM MAINTENANCE	139
5.19 SUMMARY	140
5.20 EXERCISES	140
CHAPTER 6 THE STRUCTURE OF PROCESSES	146
6.1 PROCESS STATES AND TRANSITIONS	147
6.2 LAYOUT OF SYSTEM MEMORY	151
6.3 THE CONTEXT OF A PROCESS	159
6.4 SAVING THE CONTEXT OF A PROCESS	162
6.5 MANIPULATION OF THE PROCESS ADDRESS SPACE	171
6.6 SLEEP	182

6.7 SUMMARY	188
6.8 EXERCISES	189
CHAPTER 7 PROCESS CONTROL	191
7.1 PROCESS CREATION	192
7.2 SIGNALS	200
7.3 PROCESS TERMINATION	212
7.4 AWAITING PROCESS TERMINATION	213
7.5 INVOKING OTHER PROGRAMS	217
7.6 THE USER ID OF A PROCESS	227
7.7 CHANGING THE SIZE OF A PROCESS	229
7.8 THE SHELL	232
7.9 SYSTEM BOOT AND THE INIT PROCESS	235
7.10 SUMMARY	238
7.11 EXERCISES	239
CHAPTER 8 PROCESS SCHEDULING AND TIME	247
8.1 PROCESS SCHEDULING	248
8.2 SYSTEM CALLS FOR TIME	258
8.3 CLOCK	260
8.4 SUMMARY	268
8.5 EXERCISES	268
CHAPTER 9 MEMORY MANAGEMENT POLICIES	271
9.1 SWAPPING	272
9.2 DEMAND PAGING	285
9.3 A HYBRID SYSTEM WITH SWAPPING AND DEMAND PAGING	307
9.4 SUMMARY	307
9.5 EXERCISES	308

CHAPTER 10 THE I/O SUBSYSTEM	312
10.1 DRIVER INTERFACES	313
10.2 DISK DRIVERS	325
10.3 TERMINAL DRIVERS	329
10.4 STREAMS	344
10.5 SUMMARY	351
10.6 EXERCISES	352
CHAPTER 11 INTERPROCESS COMMUNICATION	355
11.1 PROCESS TRACING	356
11.2 SYSTEM V IPC	359
11.3 NETWORK COMMUNICATIONS	382
11.4 SOCKETS	383
11.5 SUMMARY	388
11.6 EXERCISES	389
CHAPTER 12 MULTIPROCESSOR SYSTEMS	391
12.1 PROBLEM OF MULTIPROCESSOR SYSTEMS	392
12.2 SOLUTION WITH MASTER AND SLAVE PROCESSORS	393
12.3 SOLUTION WITH SEMAPHORES	395
12.4 THE TUNIS SYSTEM	410
12.5 PERFORMANCE LIMITATIONS	410
12.6 EXERCISES	410
CHAPTER 13 DISTRIBUTED UNIX SYSTEMS	412
13.1 SATELLITE PROCESSORS	414
13.2 THE NEWCASTLE CONNECTION	422
13.3 TRANSPARENT DISTRIBUTED FILE SYSTEMS	426
13.4 A TRANSPARENT DISTRIBUTED MODEL WITHOUT STUB PROCESSES	429

13.5 SUMMARY	430
13.6 EXERCISES	431
APPENDIX – SYSTEM CALLS	434
BIBLIOGRAPHY	454
INDEX	458