

## INDICE

<b>Chapter 1</b>	
<b>Introduction to computer structure: the IBM system/370</b>	1
1.1. Decimal binary, and hexadecimal numbers	
1.2. Subsystems of a Stored-program digital computer	8
1.3. Structure of the IBM system/370	18
1.4. Representation of information	23
Main ideas	28
Problems for review and imagination	29
References	30
<b>Chapter 2</b>	31
<b>Introduction to IBM system/370 machine language</b>	
2.1. The nature of machine language	
2.2. Operand addressing in machine language	32
2.3. Machine language instruction formats	36
2.4. An example of a program segment	41
Main ideas	
Problems for review and imagination	43
Reference	44
<b>Chapter 3</b>	
<b>Introduction to assembler language</b>	46
3.1. A first look at assembler language	
3.2. Format of an assembler language program	47
3.3. An example	49
3.4. Addressing of operands in assembler language	54
Main ideas	61
Problems for review and imagination	
References	63
<b>Chapter 4</b>	
<b>Information move and binary integer arithmetic</b>	64
4.1. General structure	
4.2. Information move instructions	66
4.3. Binary integer add and subtract instructions	72
4.4. Binary integer multiplication	74
4.5. Binary integer division	78
4.6. The LM and STM instructions	81
4.7. The LA instruction	83
4.8. Generation of pseudo-random numbers	85
Main ideas	88
Problems for review and imagination	90
References	91
<b>Chapter 5</b>	93
<b>Writing a complete program</b>	
5.1. Introduction	
5.2. Register conventions	94
5.3. Definition of constants in assembler language	95
5.4. The DS (Define storage) and EQU (Equate symbol) statements	104
5.5. Assembler control statements	106

5.6. Completing a program with ASSIST facilities	108
5.7. Running a complete program: batch mode and job control language	112
5.8. Running a program under CMS	116
Main ideas	120
Problems for review and imagination	121
References	123
<b>Chapter 6</b> <b>Conversions and subroutines</b>	124
6.1. Introduction	
6.2. The BR and BLR instructions	125
6.3. An implied base registers. The USING pseudo-operation	126
6.4. Subroutine implementation	130
6.5. Passing parameters to a subroutine	135
6.6. Number conversions	138
6.7. Examples of complete subroutine. Pseudo-random number generation	142
Main ideas	146
Problems for review and imagination	147
References	151
<b>Chapter 7</b> <b>Elementary control structures</b>	153
7.1. The program status word and the condition code	
7.2. Setting the condition code	
7.3. The compare instructions	156
7.4. The BC and BCR instructions	157
7.5. IF -THEN and IF -THEN-ELSE instructions	159
7.6. Extended Mnemonics	161
7.7. Looping structures	164
7.8. Example: insertion in a linked list	167
7.9. Style and control structure summary	171
Main ideas	172
Problems for review and imagination	173
References	178
<b>Chapter 8</b> <b>Looping and address modification</b>	179
8.1. The anatomy of a loop. Address modification	
8.2. Address modification: changing and testing contents of a base register	184
8.3. Address modification: use of index registers	187
8.4. The BXH and BXLE instructions	190
8.5. The programming process: a sequential search	195
8.6. The BCT and BCTR instruction	197
8.7. Ordered lists and binary search	199
Main ideas	203
Problems for review and imagination	204
References	207
<b>Chapter 9</b> <b>Debugging</b>	208
9.1. Exceptions and interrupts	

9.2. Indicative dumps	214
9.3. Error messages	216
9.4. Fuller dumps	217
9.5. Advance preparation	222
9.6. Partial dumps	223
9.7. Trace features	225
9.8. Interactive debugging in CMS	226
9.9. A last few on programming and debugging	230
Main ideas	
Problems for review and imagination	232
References	233
<b>Chapter 10</b>	234
<b>Character or byte operations</b>	
10.1. Byte transfer or move instructions	
10.2. Character compare operations	238
10.3. An example: searching for a name	241
10.4. Control sections	242
10.5. An example: character set conversion	244
10.6. An example: counting digits	246
10.7. An example: generating a symbol table	247
Main ideas	254
Problems for review and imagination	255
References	257
<b>Chapter 11</b>	258
<b>Bit operations</b>	
1.1. Logical instructions: arithmetic on unsigned numbers	
1.2. Shift instructions	260
1.3. An example: hexadecimal conversion	267
11.4. Taking a square root	268
11.5. Logical instructions: AND and OR	269
11.6. Generating moves in checkers	278
Main ideas	
Problems for review and imagination	285
References	289
<b>Chapter 12</b>	
<b>Input and output through the operating system</b>	291
12.1 Basic structure of input and output processing	
12.2. Organization of a data set	295
12.3. Buffering and exit options	299
12.4. Using QSAM macros in a program	302
12.5. Survey of job control language	312
12.6. Examples of specific data-set operations	321
12.7. Sorting by merging	329
Main ideas	334
Problems for review and imagination	336
References	340
<b>Chapter 13</b>	
<b>Floating-point arithmetic</b>	378
13.1. Packed decimal representations: internal and assembler language	

13.2. Floating-point registers, load and store instructions	345
13.3. Floating-point add, subtract, and compare instructions	350
13.4. Floating-point multiply and divide	353
13.5. Unnormalized add and subtract operations	356
13.6. Exceptions and interrupts	358
13.7. A example: a regression calculation	359
13.8. Extended-precision instruction	365
13.9. Conversions	367
Main ideas	371
Problems for review and imagination	372
References	376
<b>Chapter 14</b>	
<b>Decimal arithmetic</b>	378
14.1. Packed decimal representations: internal and assembler language	
14.2. General structure of the decimal instructions set	379
14.3. Add, subtract, and compare instructions	380
14.4. Moving a packed decimal number	382
14.5. Multiply and divide instructions	384
14.6. Exception	
14.7. Examples	386
Main ideas	392
Problems for review and imagination	393
References	395
<b>Chapter 15</b>	
<b>Translate, edit, and execute instructions</b>	396
15.1. Translate instructions	
15.2. Editing	399
15.3. The execute instruction	405
Main ideas	407
Problems for review and imagination	408
Reference	410
<b>Chapter 16</b>	
<b>Macro definition and conditional assembly</b>	412
16.1. Outline of facilities	
16.2. Definition and use of a macro	413
16.3. Set symbols, system variable symbols, and attributes	418
16.4. Conditional assembly	425
16.5. Substrings and other macro features	429
Main ideas	431
Problems for review and imagination	432
References	435
<b>Chapter 17</b>	
<b>System control functions</b>	438
17.1. Dynamics address translation and virtual storage	
17.2. The program status word and control registers	444
17.3. Instructions pertaining to PSW and advanced features	448
17.4. Interrupt handling	452
17.5. The basic structure of input and output processing	455
17.6. Input and output instructions and states of the systems	456

17.7.Channel programming	458
17.8. Interrupts and the channel status word	462
Main ideas	463
Problems for review and imagination	464
References	466
<b>Appendix A representation of characters</b>	467
<b>Appendix B notation for action description of instructions</b>	470
<b>Appendix C IBM system/370 instructions</b>	472
<b>Selected problem solutions</b>	483
<b>Index</b>	517