

INDEX

*“Not everything that can be counted counts,
and not everything that counts can be counted.”
(Albert Einstein, 1879–1955)*

- _ (manual page) 373
- _last 94, 95
 - (manual page) 374
- _nr_pr (manual page) 376
- _pid (manual page) 377
- Abadi, M. 125, 545
- abstraction 104, 217, 264
 - table 227
- abstraction,
 - data type 235, 236
 - design 101
 - executable 103
 - predicate 235
- accept
 - state 84, 554
 - (manual page) 379
- acceptance,
 - definition Büchi 130
 - definition finite 128
 - omega 129
- accepting run 128
- acronym,
 - CTL 151
 - FIFO 473
 - LTL 135
 - PAN 31
 - POSIX 516
- POTS 301
- PROMELA 8
- PROTO 31
- PSL 31
- SPIN 7
- SS7 308
- UTS 333
- xr 70
- xs 70
- action, nil 130
- active
 - prefix 9
 - (manual page) 381
- Aho, A.V. xii
- allocation, memory 238
- Alpern, B. 100, 545
- alternating bit protocol 46
- alternative hash functions
 - 538
- Alur, R. xii
- always operator, definition
 - 136
- analysis, purpose of 495
- approximation and precision
 - 206
- Argos 31
- Aristotle 153
- arithmetic, Pressburger 242
- array bound checking,
 - disabling 530
- arrays 20, 42
 - (manual page) 383
- arrays, multidimensional
 - 384, 487
- assert (manual page) 385
- assertion
 - restrictions, channel 372
 - statement 15, 75
 - checking, disabling 78, 535
- assertion,
 - channel 70, 261, 329, 370
 - notrace 93
 - trace 92
 - xr 70, 261
 - xs 70, 261
- assertions,
 - embedded 225
 - exclusive use 260
- assignment
 - statement 11
 - (manual page) 388
- associativity of ltl operators
 - 434
- assumption,

- closed system 68
- finiteness 38, 102, 153
- asynchronous
 - product 192
 - product, definition 554
 - systems 570
- atomic
 - sequence 16, 55, 555
 - (manual page) 390
- automata product 553
- automata,
 - Büchi 131
 - Muller 132
 - Rabin 132
 - Streett 132
 - timeline 287
- automaton storage,
 - minimized 531
- automaton,
 - extended 134
 - finite 127
- avoiding redundancy 105
- Avrunin, G.S. 297, 547
- Babbage, C. 579
- backslash 504
- Ball, T. 243, 545
- Bandera tool 243
- Bang, K-S. 333, 545
- Bartlett, K.A. 545
- basic statements 363
- BCOMP 532
- BDD 203, 214, 566
- Beamarchais, P. de 563
- Bebop tool 243
- behavior, improbable 454
- Berard, B. 100, 545
- Berra, Y. viii
- BFS 528
 - and rendezvous 370
- Bidoit, M. 545
- BITSTATE 530
- bitstate
 - hashing 206
 - storage 530
- block, nested 40
- blocking, circular 2
- Bloom filter 209
- Bloom, B.H. 209, 215, 545
- bool type 20
- Bosnacki, D. 545, xii
- bounded
 - search 536
 - systems 38
- box operator 136
- branching time 563
- Brat, G. 243, 545
- breadth-first
 - restrictions 371
 - search 25, 177, 321, 528, 567
- break
 - statement 12, 51
 - (manual page) 393
- breakpoints, simulation 272, 452
- Brinksma, E. xii
- Brooks, F. 5
- brute force 124
- Büchi
 - acceptance, definition 130
 - automata 131
- Büchi, J.R. 546
- buffer
 - complexity 124
 - size 120
- buffers, unbounded 102
- C compilers 18
- caching, state space 190
- call setup 308
- call, procedure 346
- calling, three-way 311
- capacity, channel 156
- Carroll, L. v
- Carter, L. 546
- catch statement 490
- c_code statement 495
- C-code in error trails 249, 500
- c_code (manual page) 505
- C-code, embedded 363, 495
- c_decl
 - declaration 495
 - (manual page) 508
- c_expr
 - statement 495
 - (manual page) 511
- CFLAGS 513
- chan
 - type 27, 44
 - (manual page) 394
- channel
 - assertion 70, 261, 329, 370
 - assertion restrictions 372
 - capacity 156
 - constraint, empty 78, 539
 - creation, message 341
 - poll 48
 - assertion checking,
 - disabling 530
 - channel, STDIN 69, 234, 358
 - channels,
 - message 27, 44
 - rendezvous 370, 555
 - Chechik, M. 125, 546, xii
 - CHECK 532
 - check, syntax 248
 - checking options, syntax 521
 - Choi, J-Y. 545
 - Chou, C-T. 214, 546
 - Choueka flag construction 182
 - Choueka, Y. 182, 190, 546
 - circles, traffic 2
 - circular blocking 2
 - claim
 - negation 100
 - semantics, never 165
 - claims, never 85
 - Clarke, E.M. 100, 125, 214, 546
 - clause, provided 40, 109
 - client-server model 341
 - clocks 570
 - closed
 - environment 68, 102, 358, 472
 - system 102, 358
 - system assumption 68
 - COLLAPSE 531
 - collapse
 - compression 197, 198
 - compression storage 531
 - counts 543
 - statistics 201
- collision, hash 208
- commands, guarded 407, 425
- comment filter 358

-
- comments 34
 - (manual page) 396
 - commercial license, SPIN 579
 - compilation, separate 261, 523
 - compile-time options 513, 527
 - compiling verifiers 253
 - completeness,
 - definition logical 231
 - logical 230
 - complexity profiling 534
 - complexity,
 - buffer 124
 - computational 104
 - controlling 119, 300
 - LTL 340, 564
 - quadratic 172, 567
 - compression storage,
 - collapse 531
 - compression,
 - collapse 197, 198
 - hash-compact 212
 - minimized automaton 202
 - computation and
 - coordination 102
 - computation, square root 348
 - computational complexity 104
 - computing variable range 535
 - concurrency, true 571
 - cond_expr (manual page) 398
 - condition
 - statement 11
 - (manual page) 400
 - conditional
 - expression 53
 - rendezvous 398, 415
 - Confucius 573
 - connection, Galois 236
 - constraint, empty channel 78, 539
 - constraints, timeline 286, 289
 - construction, Choueka flag 182
 - consumer, producer 11
 - control, data and 102
 - control-flow 363
 - graph 221
 - controllability 6, ix
 - controlling complexity 119, 300
 - convention, quoting 141, 434
 - conversion,
 - Fahrenheit 219
 - LTL 524
 - coordination, computation and 102
 - Corbett, J.C. 297, 546, 547
 - correlation 138
 - counterexample 82, 121, 165, 170, 237, 247, 496, 567, 568
 - counterexample, shortest 25
 - counters 105
 - counts, collapse 543
 - Courcoubetis, C. 190, 546, xii
 - Cousot, P. 125, 546
 - coverage estimate 532, 543
 - COVEST 532
 - CPP 513
 - CRC hash function 534
 - creation, message channel 341
 - CSP 28, 31, 407, 425
 - c_state declaration 495
 - CTL
 - acronym 151
 - logic 533
 - c_track declaration 495
 - cycle
 - detection 178, 257
 - detection, non-progress 560
 - cycles, non-progress 118, 130, 539
 - cycling, stack 257, 531
 - Cyrene 325
 - Damm, W. 297, 551
 - Dams, D. 125, 242, 546, xii
 - Das, S. 547
 - data
 - dependence 193
 - hiding 231
 - hiding, selective 231, 232
 - record 43
 - structures 44
 - transfer 27
 - type abstraction 235, 236
 - types 41
 - and control 102
 - data,
 - referencing external 496
 - tracking 501
 - data-flow optimization 522
 - datatypes (manual page) 403
 - deadlock detection 561
 - deadly embrace 4
 - death, process 39, 346, 427, 470
 - debugging verifiers 532
 - declaration,
 - c_decl 495
 - c_state 495
 - c_track 495
 - init 9
 - inline 16
 - proctype 9
 - typedef 44
 - declarators 363
 - defects, residual 6
 - deferring file inclusion 503
 - defining properties 580
 - definition
 - always operator 136
 - asynchronous product 554
 - Büchi acceptance 130
 - determinism 128
 - eventually operator 136
 - finite acceptance 128
 - finite run 128
 - finite state automaton 127
 - inline 65
 - logical completeness 231
 - logical equivalence 138
 - logical implication 138
 - logical soundness 231
 - macro 65
 - message 156
 - message channel 156
 - next operator 136
 - process 156
 - recurrence 136

- semantics engine 157
- stability 137
- strong fairness 181
- strong until 136
- stutter invariance 140
- stutter extension 131
- symbols 278
- synchronous product 556
- system state 157
- transition 156
- variable 155
- weak fairness 181
- weak until 135
- well-formed temporal formulae 135
- Dekker, T.J. 19
- dependence 193
- dependence, data 193
- depth,
 - maximum search 539
 - search 256
- depth-first
 - search 167, 567
 - search, nested 179, 568
 - search, Tarjan 568
- depth-limited search 171
- design abstraction 101
- detail, reducing 122
- detection,
 - cycle 178, 257
 - deadlock 561
 - invalid end state 561
 - non-progress cycle 560
- determinism, definition 128
- diamond operator 136
- Dijkstra, E.W. 19, 31, 407, 425, 479, 547, 569
- Dill, D.L. 125, 215, 547, 550, 552
- Dillon, L.K. 297, 547
- Ding, W. 125, 546
- disabling
 - array bound checking 530
 - assertion checking 78, 535
 - channel assertion checking 530
 - end state checking 78, 538
 - fairness checking 530
 - liveness checking 530
 - partial order reduction 530
 - reachability checking 539
 - stutter extension 534
- disk, using 257
- disk-head scheduling 114
- distribution, SPIN 579
- do (manual page) 406
- Doran, R.W. 547
- dot tool 281, 580
- doubt 104
- downloading
 - MODEX 580
 - SPIN 579
 - timeline editor 580
- d_step
 - sequence 56
 - (manual page) 401
- Du, V. xii
- dubious use of else 408
- Dwyer, M.B. 243, 297, 546, 547, xii
- editor tool, timeline 283
- efficiency 449
- Eigen, M. 513
- Einstein, A. 585
- else
 - statement 12, 59, 157
 - (manual page) 408
- else, dubious use of 408
- embedded
 - assertions 225
 - C-code 363, 495
 - embrace, deadly 4
- Emerson, E.A. 151, 546, 547
- emptiness 132
- empty
 - channel constraint 78, 539
 - operator 47
 - (manual page) 410
- enabled
 - function 94, 370
 - (manual page) 412
- end
 - state 77, 554
 - (manual page) 413
 - state detection, invalid 561
 - state checking, disabling 78, 538
 - state, invalid 413
- environment, closed 68, 102, 358, 472
- eqtl tool 150, 580
- equivalence,
 - definition logical 138
 - logical 280
- equivalent runs 194
- Eratosthenes 325
- error
 - trail 64
 - path, shortest 175, 321
 - trails, C-code in 249, 500
 - trails, multiple 538
- estimate, coverage 532, 543
- Etessami, K. 150, 151, 547, 580, xii
- Euclid 59
- eval
 - function 46
 - (manual page) 415
- evaluation order, unless 490
- events and states 569
- eventually operator,
 - definition 136
- evolution, model 300
- exclusion, mutual 20
- exclusive use assertions 260
- executability 51, 157, 159
- executable abstraction 103
- execution priorities 490
- execution,
 - relative speed of 479
 - speed of 74
- expanded product 557
- experimental options 532
- explicit verification 566
- exponential growth 120
- expression statement 51, 154
- expression,
 - conditional 53
 - regular 131
- expressiveness 564
 - of timelines 294
- extended automaton 134
- extension, stutter 130, 159, 164
- external data, referencing 496
- Fahrenheit conversion 219
- failure timeline events 285
- fairness 140, 338, 370
 - restrictions 371

-
- checking, disabling 530
 - fairness,
 - definition strong 181
 - definition weak 181
 - scheduling 84
 - selection 84
 - strong 82, 182
 - weak 82, 94, 182, 258, 538
 - false 18
 - negatives 237
 - (manual page) 416
 - Ferguson, M. xii
 - FIFO acronym 473
 - file
 - name, trail 23
 - operations 238
 - server 122
 - inclusion, deferring 503
 - files, include 504
 - filter process 106
 - filter,
 - Bloom 209
 - comment 358
 - final states 554
 - finite
 - acceptance, definition 128
 - automaton 127
 - run, definition 128
 - state automaton, definition 127
 - finiteness assumption 38, 102, 153
 - Finkel, A. 545
 - flag construction, Choueka 182
 - float (manual page) 417
 - floating point numbers 222
 - Floyd, R. 546
 - force, brute 124
 - Ford, H. 127, 191
 - format, pan output 540
 - formulae, LTL 91
 - FreeBSD 513
 - full
 - operator 47
 - (manual page) 419
 - function pointers 238
 - function,
 - CRC hash 534
 - enabled 94, 370
 - eval 46
 - hash 208
 - pc_value 94
 - Printf 222
 - provided 370
 - functions,
 - alternative hash 538
 - predefined 363
 - future 240
 - Galileo, G. 7
 - Galois connection 236
 - Gastin, P. 151, 547, 580
 - generating
 - postscript 521
 - verifiers 252, 522
 - Gerth, R. 125, 151, 442, 546, 547, xii
 - Gill, J. 546
 - GLOB_ALPHA 533
 - Godefroid, P. 190, 548, xii
 - Gödel, K. 240, 242, 548
 - Goethe, J.W. von 297
 - golden rule 479
 - Goldstein, H.W. 75, 548
 - goto
 - statement 12, 59
 - (manual page) 420
 - Graf, S. 125, 548
 - grammar, PROMELA 364
 - graph, control-flow 221
 - growth, exponential 120
 - Grumberg, O. 125, 214, 546
 - guarantee 138
 - guard statement 11
 - guarded commands 407, 425
 - guided simulation 248, 258
 - Hajek, J. xii
 - halting problem 240, 240
 - handshake 555
 - hardware verification 565
 - Harel, D. 297, 548
 - hash
 - collision 208
 - function 208
 - function, CRC 534
 - functions, alternative 538
 - factor 543
 - table size, setting the 539
 - hash, Jenkins 215
 - hash-compact 215
 - compression 212
 - stack 533
 - storage 530
 - hashing,
 - bitstate 206
 - hybrid 533
 - single-bit 539
 - Hatcliff, J.C. 243, 546, xii
 - Havelund, K. 243, 545, 548, xii
 - HC 530
 - Heijenoort, J. van 242, 548
 - Hein, P. 266
 - hello world 8, 9
 - Hesse, W. 243, 547
 - hidden
 - prefix 71, 265
 - (manual page) 422
 - hiding,
 - data 231
 - selective data 231, 232
 - hierarchy (manual page) 423
 - hints, verification 247, 264
 - Hoare, C.A.R. 28, 31, 407, 425, 548
 - Hofmann, H. 267
 - Holenderski, L. xii
 - Huth, M. 100, 549
 - hybrid hashing 533
 - HYBRID_HASH 533
 - if (manual page) 424
 - implementation
 - independence 74
 - implication,
 - definition logical 138
 - logical 280
 - improbable behavior 454
 - include files 504
 - incompatibilities 370
 - independence,
 - implementation 74
 - index of manual pages 369
 - information, symbol table 524
 - init
 - declaration 9
 - (manual page) 426
 - inline
 - declaration 16
 - parameter substitution 521

- (manual page) 428
- inline, definition 65
- interactive simulation 251
- interfaces, module 102
- interleaving 192
 - semantics 571
- interleaving,
 - message 124
 - statement 555
- intersection, language 132
- invalid
 - end state 413
 - end state detection 561
- invariance 138
 - property 278
- invariance,
 - definition stutter 140
 - stutter 139, 322, 435, 515
- invariant 86
- invariant, system 74, 86
- Ip, C.N. 125, 550
- iterative search 538
- Java 490
- Jenkins hash 215
- Jenkins, B. 215, 550
- Johnson, S. 215
- Jones, F. P. 545
- Joubert, J. ix
- Kernighan, B.W. 31, 218, 550
- Kesten, Y. 125, 243, 550
- Kleene star 363, 364
- Kupferman, O. 550
- Kurshan, R. 125, 550, xii
- Kutty, G. 297, 547
- Kwiatkowska, M. 214, 550
- labels 12
 - (manual page) 430
- labels, meta 76
- Lakatos, I. 104, 495, 550
- Lampert, L. 31, 100, 125, 151, 545, 550
- language intersection 132
- large models, verifying 261, 523
- Laubach, S. 546
- LC 533
- leash, short 301
- Lec, S. 553
- Leeuwen, J. van 551, 552
- len
 - operator 47
 - (manual page) 432
- Leroy, D. 215, 552
- Levitt,
 - J. 242
 - J.R. 550
- libraries, verifying LTL 261, 523
- Libya 325
- license, SPIN commercial 579
- lifting variables 469
- Lincoln, A. 167
- Linden, P. van der 245
- linear time 563
- liveness 74, 554
 - properties 136, 178
 - checking, disabling 530
- local
 - prefix 71
 - (manual page) 433
- logic,
 - CTL 533
 - temporal 134
- logical
 - completeness 230
 - completeness, definition 231
 - equivalence 280
 - equivalence, definition 138
 - implication 280
 - implication, definition 138
 - soundness 230
 - soundness, definition 231
- Long,
 - D. 125
 - D.E. 546
- lookup table, MODEX 228
- loops 58
- LTL
 - acronym 135
 - complexity 340, 564
 - conversion 524
 - formulae 91
 - libraries, verifying 261, 523
 - next operator 140, 371
 - property manager 278
 - syntax 135, 142
 - and never claims 90
- ltl
 - (manual page) 434
 - operators, associativity of 434
- ltl2ba 145, 297
 - tool 580
- LTL, timelines and 294
- Lubbock, Sir J. 33
- MA 531
- macro, definition 65
- macros (manual page) 436
- Majumdar, R. 243, 545
- makefile 513
- Makowsky, G. 546
- manager, LTL property 278
- Manna, Z. 100, 550
- manual pages, index of 369
- mapping table 227
- Mars 108
- matching, timeline 286
- maximum search depth 539
- MAXQ 513
- Mazurkiewicz, A. 214, 550
- McIlroy, M.D. 215, 550, xii
- Melliard-Smith, P.M. 547
- MEMCNT 528
- memcnt 528
- memcpy() 449
- memlim 528
- MEMLIM 529
- memory
 - allocation 238
 - use 530
- merging, statement 195, 260, 523
- Merino, P. xii
- message
 - channel creation 341
 - channels 27, 44
 - interleaving 124
 - channel, definition 156
- message, definition 156
- meta labels 76
- meta-terms 363
- Miller, A. xii
- Millstein, T. 243, 545
- minimized
 - automaton storage 531
 - automaton compression 202

-
- model
 - evolution 300
 - extraction 1, 218
 - extraction, MODEX 580
 - model,
 - client-server 341
 - operational 155
 - Pathfinder 108
 - refutation 108
 - smallest sufficient 104
 - models,
 - sample 325
 - verifying large 261, 523
 - MODEX
 - lookup table 228
 - model extraction 580
 - tool 226
 - MODEX, downloading 580
 - module interfaces 102
 - modules 102
 - Moore, J.S. 300
 - Morris, R. 208, 215, 550
 - Moser, L.E. 297, 547
 - MSC: prefix 272, 327
 - MSCs, text in 272
 - mtype
 - type 11, 46
 - (manual page) 438
 - Muller automata 132
 - multidimensional arrays
 - 384, 487
 - multiple error trails 538
 - mutual exclusion 20
 - name, trail file 23
 - negation, claim 100
 - negatives, false 237
 - nempty 493
 - operator 47
 - (manual page) 440
 - nested
 - block 40
 - depth-first search 179, 568
 - Neumann, J. von 75, 548
 - never
 - claim semantics 165
 - claims 85
 - claim, restricting behavior 90, 97
 - claims and safety properties 561
 - claims, LTL and 90
 - claims, search restriction with 441
 - (manual page) 441
 - next
 - operator 515
 - operator, definition 136
 - operator, LTL 140, 371
 - NFAIR 531
 - nfull 261, 493
 - operator 47
 - (manual page) 446
 - NIBIS 534
 - nil action 130
 - NOBOUNDCHECK 530
 - NOCLAIM 529
 - noclaim 529
 - NOCOMP 534
 - NOFAIR 530
 - nominal states 542
 - non-determinism 12, 33, 55, 84, 128
 - non-determinism,
 - process 140
 - scheduling 140
 - non-emptiness 132
 - non-progress 82, 529
 - cycle detection 560
 - cycles 118, 130, 539
 - no-op operation 130
 - NO_OPT 513
 - NOREDUCE 530
 - NOSTUTTER 534
 - notrace
 - assertion 93
 - (manual page) 483
 - NOVSZ 534
 - NP 529
 - np_
 - variable 94
 - (manual page) 447
 - numbers,
 - floating point 222
 - pid 16, 36
 - state 259, 524
 - NXT 513
 - objective property 278
 - observability 6, ix
 - obstacles 127
 - Oddoux, D. 151, 547, 580
 - odds 73
 - Oestreicher, A.B. xii
 - OHASH 534
 - omega
 - acceptance 129
 - run 129
 - omega-regular properties 284
 - ON_EXIT 529
 - on-exit 529
 - on-the-fly verification 169
 - operation, no-op 130
 - operational model 155
 - operations, file 238
 - operator,
 - box 136
 - definition always 136
 - definition eventually 136
 - definition next 136
 - diamond 136
 - empty 47
 - full 47
 - len 47
 - LTL next 140, 371
 - nempty 47
 - next 515
 - nfull 47
 - run 36
 - shift 349
 - operators, predefined 363
 - optimization, data-flow 522
 - optional timeline events 285
 - options,
 - compile-time 513, 527
 - experimental 532
 - order of 89
 - PAN 527, 535
 - simulation 516
 - syntax checking 521
 - order
 - reduction, partial 191, 260
 - of options 89
 - output format, pan 540
 - PAN
 - acronym 31
 - options 527, 535
 - pan output format 540
 - PAN
 - option -A 535
 - option -a 535

- option -b 536
- option -c 536
- option -d 536
- option -E 538
- option -e 538
- option -f 538
- option -h 538
- option -I 538
- option -i 538
- option -J 539
- option -l 539
- option -m 539
- option -n 539
- option -q 539
- option -s 539
- option -V 539
- option -w 539
- option -X 540
- option -Y 540
- parameter substitution,
 - inline 521
- parameters,
 - simulation 271
 - verification 275
- Park, S. 125, 243, 545, 547
- parse tree 218, 219
- parsimony 30
- partial
 - order reduction 191, 260
 - order reduction, disabling 530
- Pasareanu, S. 546
- path
 - properties 74
 - quantification 97
- Pathfinder
 - model 108
 - tool 243
- PC 513
- pc_value
 - function 94
 - (manual page) 448
- PEG 534
- Peled, D. 151, 214, 546, 547, 549, 551, xii
- performance requirements 290
- Perrin, D. 151, 551
- Peterson algorithm 26
- Peterson, G.L. 26, 551
- Petri net 577
- pid numbers 16, 36
- Pike, R. 31, 215, 333, 550, 551, xii
- Pirotin, D. 548
- Pirottin, D. 190, 548
- Plan9 333
- Pnueli, A. 100, 125, 134, 151, 243, 550, 551, xii
- Poel, W.L. van der 283
- point numbers, floating 222
- pointers 226
 - (manual page) 449
- pointers, function 238
- poll (manual page) 450
- poll, channel 48
- Polybius 1, 299
- Porta, G. della 363
- Posix acronym 516
- possibility 570
 - and probability 454
- postscript, generating 521
- POTS acronym 301
- practice, theory and 245
- precedence 138
 - property 278
- precision, approximation and 206
- predefined
 - functions 363
 - operators 363
 - system variables 157
 - variables 93
- predicate abstraction 235
- prefix,
 - active 9
 - hidden 71, 265
 - local 71
 - MSC: 272, 327
 - show 71
- Presotto, D. 551
- Pressburger arithmetic 242
- Pressburger, T. 243, 548
- print statement 9
- PRINTF 513, 534
- Printf function 222
- printf
 - (manual page) 451
 - output, suppressing 452
- printm 42, 439, 451
- Prior, A.N. 551
- priorities, execution 490
- priority 109, 111, 490
 - (manual page) 453
- probabilities (manual page) 454
- probability 73, 570
- probability, possibility and 454
- problem, halting 240
- procedure call 346
- procedures (manual page) 455
- process
 - death 39, 346, 427, 470
 - non-determinism 140
 - scheduling 13, 40, 332
 - termination 39
- process,
 - definition 156
 - filter 106
 - sink 106
 - source 106
- proctype
 - declaration 9
 - (manual page) 458
- producer consumer 11
- product,
 - asynchronous 192
 - automata 553
 - definition asynchronous 554
 - definition synchronous 556
 - expanded 557
- profiling, complexity 534
- program slicing 231
- progress
 - state 79
 - (manual page) 459
- project, SLAM 243
- PROMELA
 - acronym 8
 - grammar 364
 - semantics 160
- properties,
 - defining 580
 - liveness 136, 178
 - omega-regular 284
 - path 74
 - safety 170

- state 74
- property
 manager, LTL 278
 templates 278
- property,
 invariance 278
 objective 278
 precedence 278
 reduction 121
 response 278
 vacuous 139, 239, 243
- Proto acronym 31
- protocol,
 alternating bit 46
 supermarket 2
- PROV 529
- provided
 clause 40, 109
 function 370
 (manual page) 461
- provisioning 264, 529
- pruning,
 random 535
 search 441, 561
- PSL acronym 31
- Puri, A. 214, 549, xii
- purpose of analysis 495
- quadratic complexity 172,
 567
- quantification, path 97
- quoting convention 141, 434
- Rabin automata 132
- Rajamani,
 S. 243
 S.K. 243, 545
- Ramakrishna, Y.S. 547
- Ramsey, N. xii
- rand (manual page) 462
- random
 pruning 535
 simulation 248, 249
- RANDSTOR 535
- range, computing variable
 535
- Raynal, M. 31, 551
- REACH 535
- reachability 153
 checking, disabling 539
- reachable states 255
- realtime verification 569
- real-time (manual page) 464
- receive
 statement 45
 (manual page) 466
- record, data 43
- recurrence, definition 136
- reducing detail 122
- reduction property 121
- reduction,
 disabling partial order 530
 partial order 191, 260
- redundancy, avoiding 105
- Reeds, J. 215, xii
- references, remote 94, 96,
 496
- referencing external data
 496
- refutable statements 104
- refutation 495
 model 108
- regular expression 131
- relation, transition 154
- relative speed of execution
 479
- remote references 94, 96,
 496
- remoterefs (manual page)
 468
- rendezvous
 channels 370, 555
 restrictions 371
 semantics 159
 and BFS 370
 and unless 370
- rendezvous, conditional 398,
 415
- repetition structure 11, 58
- reproducibility 6
- required timeline events 285
- requirements, performance
 290
- Rescher, N. 551
- residual defects 6
- resources, shared 4
- response 138
 property 278
- restricting behavior never
 claim 90, 97
- restriction with never
 claims, search 441
- restriction,
 search 561
 selective 235
- restrictions,
 breadth-first 371
 channel assertion 372
 fairness 371
 rendezvous 371
- reverser, thrust 5
- right of way 2
- Ritchie, D.M. 31, 215, 218,
 550
- roadmap 247
- Robby 546
- Roever, W.P. De xii
- Romijn, J. xii
- Ruane, L.M. 333, 551
- run
 operator 36
 (manual page) 470
- run,
 accepting 128
 definition finite 128
 omega 129
- runs, equivalent 194
- Russell, B. 217, 240, 242,
 551
- Ruys, T.C. 72, 100, 551, xii
- Ryan, M. 100, 549
- safety 74
- SAFETY 530
- safety 554
 properties 170
 properties, never claims
 and 561
- Saidi, H. 548
- sample models 325
- sbrk() 516
- SC 531
- scanf (manual page) 472
- Scantlebury, R.A. 545
- scatter table 208
- scheduling
 fairness 84
 non-determinism 140
- scheduling,
 disk-head 114
 process 13, 40, 332
- Schlor, R. 297, 551
- Schneider, F.B. 100, 545

-
- Schoot, H. van der 551
 - Schuller, R. 547
 - scope, variable 40, 156
 - scratch variable 92
 - SDUMP 532
 - search
 - depth 256
 - depth, maximum 539
 - pruning 441, 561
 - restriction 561
 - restriction with never claims 441
 - stack 169
 - coverage 543
 - search,
 - bounded 536
 - breadth-first 25, 177, 321, 528, 567
 - depth-first 167, 567
 - depth-limited 171
 - iterative 538
 - nested depth-first 179, 568
 - stateless 176
 - Tarjan depth-first 568
 - selection
 - fairness 84
 - statement 12
 - structure 56
 - selective
 - data hiding 231, 232
 - restriction 235
 - semantics engine, definition 157
 - semantics,
 - interleaving 571
 - never claim 165
 - PROMELA 160
 - rendezvous 159
 - send (manual page) 473
 - separate compilation 261, 523
 - separators (manual page) 475
 - sequence (manual page) 476
 - sequence,
 - atomic 16, 55, 555
 - d_step 56
 - valuation 139
 - server, file 122
 - Sethi, R. xii
 - setting the hash table size 539
 - setup, call 308
 - Shankar, N. 125, 552
 - shared resources 4
 - shift operator 349
 - short leash 301
 - shortest
 - counterexample 25
 - error path 175, 321
 - show
 - prefix 71
 - (manual page) 477
 - side effect 21, 37, 47, 51, 53, 90, 496
 - sieve 325
 - simplicity 101, 299
 - simulation
 - breakpoints 272, 452
 - options 516
 - parameters 271
 - simulation,
 - guided 248, 258
 - interactive 251
 - random 248, 249
 - single-bit hashing 539
 - sink process 106
 - Sistla, A.P. 546, 552
 - size, buffer 120
 - skip
 - statement 20, 51, 54
 - (manual page) 478
 - SLAM project 243
 - sleep wakeup 332
 - slicing 232, 270
 - slicing, program 231
 - smallest sufficient model 104
 - Smith, M.H. 243, 549, xii
 - software verification 1, 240
 - SOLARIS 513
 - soundness,
 - definition logical 231
 - logical 230
 - source process 106
 - space caching, state 190
 - speed 530
 - of execution 74
 - of execution, relative 479
 - SPIN
 - acronym 7
 - commercial license 579
 - distribution 579
 - structure 245
 - version number 249, 539
 - workshops 579
 - option -A 521
 - option -a 521, 522
 - option -B 517
 - option -b 517
 - option -c 517
 - option -C 525
 - option -d 524
 - option -D 526
 - option -E 526
 - option -F 524
 - option -f 524
 - option -g 518
 - option -i 518
 - option -I 521
 - option -J 518
 - option -j 518
 - option -l 518
 - option -m 518
 - option -M 521
 - option -n 519
 - option -N 522
 - option -o 522
 - option -p 519
 - option -P 526
 - option -q 519
 - option -r 519
 - option -s 520
 - option -S 523
 - option -T 520
 - option -t 520
 - option -u 520
 - option -v 520
 - option -V 526
 - option -w 521
 - option -X 526
 - option -Y 526
 - option -Z 521
 - SPIN, downloading 579
 - square
 - root 417
 - root computation 348
 - SS7 acronym 308
 - stability, definition 137
 - stack cycling 257, 531

- stack,
 - hash-compact 533
 - search 169
- star, Kleene 363, 364
- state
 - numbers 259, 524
 - properties 74
 - space caching 190
 - vector 497, 531, 541
 - space 168
 - tables 536
 - vector 449
- state,
 - accept 84, 554
 - definition system 157
 - end 77, 554
 - progress 79
- stateless search 176
- statement
 - interleaving 555
 - merging 195, 260, 523
- statement,
 - assertion 15, 75
 - assignment 11
 - break 12, 51
 - c_code 495
 - c_expr 495
 - condition 11
 - else 12, 59, 157
 - expression 51, 154
 - goto 12, 59
 - guard 11
 - print 9
 - receive 45
 - selection 12
 - skip 20, 51, 54
 - unless 61, 160
- statements,
 - basic 363
 - refutable 104
- states,
 - events and 569
 - final 554
 - nominal 542
 - reachable 255
- statistics, collapse 201
- STDIN
 - channel 69, 234, 358
 - (manual page) 480
- Stern, U. 215, 532, 552
- storage,
 - bitstate 530
 - collapse compression 531
 - hash-compact 530
 - minimized automaton 531
- Strachey, C. 240, 242, 527, 552
- Streett automata 132
- strong
 - fairness 82, 182
 - fairness, definition 181
 - until, definition 136
- structure,
 - repetition 11, 58
 - selection 56
 - SPIN 245
- structures, data 44
- stutter
 - extension 130, 159, 164
 - invariance 139, 322, 435, 515
 - invariance, definition 140
 - extension 460
 - extension, definition 131
 - extension, disabling 534
 - subscriber, telephone 301
 - substitution, inline
 - parameter 521
- sufficient model, smallest 104
- supermarket protocol 2
- supertrace 215
- suppressing printf output 452
- SVDUMP 532
- switch, telephone 299, 301
- symbol table information 524
- symbolic verification 566
- symbols, definition 278
- symmetry 345
- synchronous
 - product, definition 556
 - systems 570
- syntax
 - check 248
 - checking options 521
- syntax, LTL 135, 142
- system
 - invariant 74, 86
- state, definition 157
- variables, predefined 157
- system, closed 102, 358
- systems,
 - asynchronous 570
 - synchronous 570
- table information, symbol 524
- table,
 - abstraction 227
 - mapping 227
 - scatter 208
- Tarjan depth-first search 568
- Tarjan, R.E. 190, 552, 567
- Tauriainen, H. xii
- Tcl/Tk toolkit 267
- Telcordia 552
- telephone
 - subscriber 301
 - switch 299, 301
- templates, property 278
- temporal
 - logic 134
 - formulae, definition
 - well-formed 135
- termination, process 39
- testability 103
- text in MSCs 272
- theory and practice 245
- Thomas,
 - L.K. 547
 - W. 151, 552
- Thompson, K.L. 215, 551, xii
- three-way calling 311
- thrust reverser 5
- time,
 - branching 563
 - linear 563
- timeline
 - automata 287
 - constraints 286, 289
 - editor tool 283
 - matching 286
 - editor, downloading 580
 - events, failure 285
 - events, optional 285
 - events, required 285
- timelines and LTL 294
- timelines, expressiveness of 294

- timeout
 - variable 60, 157
 - (manual page) 481
- timesharing 464
- Tip, F. 552
- tool,
 - Bandera 243
 - Bebop 243
 - dot 281, 580
 - eqtl 150, 580
 - ltl2ba 580
 - MODEX 226
 - Pathfinder 243
 - timeline editor 283
 - Xspin 267
- toolkit, Tcl/Tk 267
- trace
 - assertion 92
 - (manual page) 483
 - tracking data 501
- traffic circles 2
- trail file name 23
- trail, error 64
- transfer, data 27
- transition relation 154
- transition, definition 156
- tree, parse 218, 219
- Trickey, H. xii
- true
 - concurrency 571
 - (manual page) 486
- truncation, value 404
- Tukey, J. 206
- tuning, verification 254
- Turing, A.M. x, 240, 242, 552
- Twain, M. 325
- type abstraction, data 235, 236
- type,
 - bool 20
 - chan 27, 44
 - mtype 11, 46
- typedef
 - declaration 44
 - (manual page) 487
- types, data 41
- unbounded buffers 102
- unless 539
 - evaluation order 490
 - statement 61, 160
 - and rendezvous 370
 - (manual page) 490
- until,
 - definition strong 136
 - definition weak 135
- Ural, H. 551
- Urquhart, A. 551
- using disk 257
- UTS acronym 333
- vacuous property 139, 239, 243
- valuation sequence 139
- value truncation 404
- Vardi, M.Y. 151, 243, 546, 547, 550, 552, 566, xii
- variable
 - range, computing 535
 - scope 40, 156
 - ordering 566
- variable,
 - definition 155
 - np_ 94
 - scratch 92
 - timeout 60, 157
 - write-only 92
- variables,
 - lifting 469
 - predefined 93
 - predefined system 157
- VAR_RANGES 535
- vector, state 497, 531, 541
- VECTORSZ 531
- VERBOSE 532
- verifiability 104
- verification
 - hints 247, 264
 - parameters 275
 - tuning 254
- verification,
 - explicit 566
 - hardware 565
 - on-the-fly 169
 - realtime 569
 - software 1, 240
 - symbolic 566
- verifiers,
 - compiling 253
 - debugging 532
 - generating 252, 522
 - verifying LTL libraries 261, 523
- verifying large models 261, 523
- version number, SPIN 249, 539
- Villiers, P.J.A. 125, 552
- visibility 194
- Visser, W. 243, 545
- wakeup, sleep 332
- weak
 - fairness 82, 94, 182, 258, 538
 - fairness, definition 181
 - until, definition 135
- Wegman, M. 546
- well-formed temporal formulae, definition 135
- Whitehead, A.N. 101
- Wilke, T. 151, 547, 551
- Wilkinson, P.T. 545
- Winterbottom, P. xii
- Wolper, P. 151, 212, 215, 546, 547, 551, 552, xii
- workshops, SPIN 579
- write-only variable 92
- xr
 - acronym 70
 - assertion 70, 261
 - (manual page) 493
- xs
 - acronym 70
 - assertion 70, 261
 - (manual page) 493
- Xspin tool 267
- XUSAFE 530
- Yannakakis, M. 214, 546, 549, xii
- Yigit, O. xii
- Yoo, C. 545