
Subject Index

- abbreviated rule language (ARL) (*see* rule language)
acceptance, by user community (*see* human engineering)
acid-base disorders, 381
adaptive behavior, 52
agenda, 441–452, 525f, 561
algebra, 304
algorithm (*see also* therapy algorithm), 3, 125, 133, 134, 150, 185, 283
allergies (*see* drugs, contraindications)
anatomical knowledge (*see* knowledge, structural)
\$AND (*see also* predicates), 80, 97ff, 105
AND/OR goal tree, 49, 103–112
answers, to questions (*see* dialogue)
antecedent rules (*see* rules)
antecedents (*see also* rules; syntax), 4
architecture (*see* control; representation)
artificial intelligence, 3, 6, 86, 150, 331f, 360, 381, 424, 455, 663f, 687
 as an experimental science, 19, 672
ASKFIRST (LABDATA), 64, 89, 105, 120, 374
associative triples (*see* representation)
attitudes of physicians (*see also* human engineering), 57, 602f, 605, 635–652
attributes (*see* parameters)
automatic programming, 188, 193f, 520

backtracking, 82, 127, 410, 420, 697
backward chaining (*see* control)
batch mode (*see* patient data)
Bayes' Theorem, 79, 210, 211, 214, 215, 234ff, 263ff, 385, 386
belief (*see* certainty factors)
biases (*see* evaluation)
big switch, 13
blackboard model, 395, 563
blood clotting (*see* CLOT)
bookkeeping information, 433, 472, 516, 527, 676
bottom-up reasoning (*see* control, forward chaining)
breadth-first reasoning (*see* control)

CAI (*see* tutoring)
cancer chemotherapy (*see* ONCOCIN)
case library (*see also* patient data), 137, 156, 479, 583, 594, 602
case-method tutoring (*see* tutoring)
categorical reasoning (*see* certainty factors; knowledge, inexact), 56, 209

causal knowledge (*see* knowledge)
causal models, 374, 381, 456, 460, 484, 539, 548ff
certainty factors (*see also* inexact inference), 23, 61, 63, 65, 210ff, 81, 91–93, 112, 202, 209–232, 233, 247ff, 262, 267–271, 272ff, 321, 374, 434, 443f, 472, 485, 525, 540, 545, 582, 675, 679ff, 700
 assigning values to, 154f, 221ff, 252
 with associative triples, 70
 combining function, 116, 216, 219, 254ff, 277, 284
 gold standard for, 221ff
 justification for, 56, 221ff, 239ff, 681
 propagation of, 162, 212ff, 255, 444
 sensitivity analysis, 217ff, 582, 682f
 threshold, 94, 211, 283
CF's (*see* certainty factors)
chemistry (*see also* DENDRAL), 8, 26, 37, 149, 304
chunks of knowledge (*see* modularity)
circular reasoning, 63, 116ff
classification problems, 312, 426, 675, 697
clinical algorithms, 683
clinical parameters (*see* parameters)
closed-world assumption, 469, 675
CNTXT (*see* contexts)
code generation (*see* automatic programming)
cognitive modeling (*see also* psychology), 26, 211
combinatorial explosion, 524
commonsense knowledge (*see* knowledge)
 deductions (*see* unity path)
completeness (*see also* knowledge base; logic), 199f, 305, 656, 684
complexity, 335, 375, 377ff, 387
computer-aided instruction (*see* tutoring)
concept broadening (*see* diagnosis, strategies for)
concept identification (*see* knowledge acquisition, conceptualization)
conceptual framework, 374f, 391, 495, 684f
conceptualization (*see* knowledge acquisition, conceptualization)
conclude function, 113ff
confirmation (*see also* certainty factors), 57, 210, 218, 240, 241, 242, 243–245, 247, 272, 426, 681
conflict resolution, 22, 38, 43, 48, 50, 162
conflicts (*see* knowledge base, conflicts in)
consequents (*see also* rules), 4
consequent theorems (*see* rules, consequent)
consistency (*see also* rule checking; subsumption), 65, 77, 156, 159–170, 195, 202, 324, 432, 440, 456, 656, 686

- checking, 41, 180
- contradictions, 308
- constraints, 135ff, 145
- constraint satisfaction, 133, 313, 685, 697
- consultation, 3, 201, 302, 360, 422, 426, 457, 610, 635ff, 671, 691, 701
 - example of, 69f, 298ff, 319f, 323f, 427–430, 533, 553, 704–711
 - subprogram in MYCIN, 5, 10, 67–73, 78–132, 184
- content-directed invocation (*see* control)
- contexts, 60, 64, 70–71, 82, 99, 163, 297, 344, 353, 360, 493, 670
 - context tree, 60, 62, 79, 82–86, 99, 104, 112, 118ff, 128, 132, 295, 324, 494–503, 675, 678
 - context types, 82ff, 495ff
 - instantiation, 62, 118ff, 495ff
 - in ONCOCIN's rules, 163ff, 659
- contextual information, 179, 185–198, 201, 203, 335, 393f, 396, 398, 410, 421ff, 471, 477, 677
- contradictions (*see* consistency)
- contraindications (*see* drugs, contraindications), 543
- control (*see also* control knowledge), 28, 32, 33, 43–45, 48–50, 60–65, 103–112, 220f, 358, 416, 435ff, 441–452, 493, 495, 526, 531f, 670, 673, 677ff, 696f
 - backward chaining, 5, 27, 40, 57, 60, 71ff, 104, 176, 187, 304, 346, 376, 395, 426, 447, 465, 511, 532, 539, 601, 659ff, 677, 681, 700
 - blocks, 659f
 - content-directed invocation, 527, 539
 - data-directed (*see* control, forward chaining)
 - demons, 29, 619
 - of dialogue, 71
 - exhaustive search, 56, 521
 - forward chaining, 4f, 13, 27, 57, 60, 195, 387, 419, 426, 449, 456, 461, 511, 539, 561, 601, 606, 626, 658, 659, 661ff, 677, 681
 - goal-directed (*see* control, backward chaining)
 - hypothesis-directed (*see* control, backward chaining)
 - message passing, 561
 - model-directed, 195
 - MONITOR function (*see* MONITOR)
 - prototypes for (*see* prototypes)
 - of search, 57, 220, 04, 521, 674
 - select-execute loop, 24
- control knowledge (*see also* rules, meta-rules), 134, 394ff, 677
 - explicitness, 394
 - correctness (*see* evaluation)
 - cost-benefit analysis, 62, 215, 217, 235, 246, 522, 565, 576, 578, 680
- COVERFOR, 222, 223, 474ff, 486, 554
- credit assignment (*see also* knowledge base, refinement), 177, 688
- critiquing model, 467, 692
- data:
 - acceptable values (*see* expectations)
 - collection, 398, 409f, 655
 - snapshot of, 313, 393, 675
 - time varying, 409f, 655ff
 - uncertainty in, 674, 684, 696
- data base (*see also* patient data), 22, 112, 386, 655, 692
- data-directed reasoning (*see* control, forward chaining)
- data structures (*see* representation)
- debugging (*see also* knowledge base, refinement), 51, 152, 159
- decision analysis (*see also* utilities), 217, 234, 332
- decision trees, 23f, 311
- declarative knowledge (*see* knowledge; representation)
- deep knowledge (*see* knowledge, causal)
- defaults (*see* knowledge)
- definitional rules (*see* rules)
- definitions (*see* knowledge, support)
- demand ratings, 637, 644–647
- demons (*see* control)
- Dempster-Shafer theory of evidence, 215, 272ff, 681
- depth-first reasoning (*see* control)
- design considerations, 3ff, 10, 19, 51, 57–59, 67, 78, 176, 238, 304, 331, 340, 342f, 349, 397f, 403f, 417, 421ff, 458, 467f, 505, 531, 576ff, 603, 605f, 636, 648, 649ff, 671ff
- diagnosis, 13–16, 234, 312, 441, 461, 545
 - strategies for, 426, 448f, 537, 552ff, 673, 679, 702
- dialogue (*see also* human engineering), 335, 467ff, 615, 670, 687
 - evaluation, 575
 - management of, 9, 60, 71, 105, 110, 119, 127, 260, 374, 395, 439f, 447, 456, 459, 465, 470ff, 480ff, 483ff, 601, 606ff, 613f, 618, 651, 656
 - mixed initiative, 455, 458
- dictionary (*see also* human engineering), 68, 73, 99, 193, 306, 349, 620
- disbelief (*see also* inexact inference), 247ff, 273
- disconfirmation (*see* confirmation)
- discourse (*see* dialogue)
- discrimination nets, 625
- disease hierarchies (*see* inference structure)
- documentation, 529
- domain independence (*see* generality)
- drugs:
 - allergies to (*see* drugs, contraindications)
 - antibiotics, 13ff, 122ff, 234, 363ff, 372, 395, 593, 600
 - contraindications, 15ff, 135
 - dosing, 17, 125f, 137, 163–170, 334, 363–370
 - optimal therapy (*see also* therapy), 137
 - overprescribing, 16ff
 - prophylactic use, 17

- sensitivities, 15, 133, 135
toxicity (*see* drugs, contraindications)
- editor (*see also* rule editor; rule language), 180, 307, 391, 670
- education (*see also* tutoring), 337, 450, 575
- efficiency, 48, 576, 578
- electronics, 396
- ELSE clauses, 61, 79ff, 115
- English understanding (*see* dialogue; human engineering; natural language)
- entrapment, 483ff
- error checking (*see* rule checking)
- EVAL, 71
- evaluation, 67, 137, 155ff, 337, 439f, 450, 571–588, 589ff, 602, 651, 674, 694f, 701
of acceptability, 575, 578, 602, 636
of attitudes, 610f, 635–652
gold standard, 572, 579
methodology, 573, 579, 581, 588, 590
of MYCIN, 571–577, 583–588, 589–596
of ONCOCIN, 606, 610
of performance, 218, 574, 644
sensitivity analysis, 217–219, 582
- events, representation of, 500
- evidence, 498, 550
evidence gathering (*see also* control; confirmation), 5, 176, 460, 469, 674f, 696, 700
evidential support (*see* inexact inference)
hard and soft evidence, 152
- exhaustive search, 505, 534
- EXPECT (attribute of parameters), 88ff, 350
- expectations, 177, 182f, 188, 195, 203, 401f, 411, 417–419, 450, 511, 637ff
- expertise, 580ff, 636
nature of, 233, 373, 456, 459f, 467f
transfer of (*see* knowledge acquisition)
use in explanation, 378ff
- experts, 158, 170, 234, 236, 242, 262, 264, 580, 686
agreement among, 584ff, 592
disagreement among, 582, 584–588, 682
evaluations of, 582, 584–588
interactions with (*see* knowledge engineering)
- expert systems, 3ff, 7, 25, 247, 272, 282, 385, 455f, 460, 530, 568, 574, 577ff, 634
building (*see also* knowledge acquisition), 150, 387, 577, 670, 686ff
validating (*see* evaluation)
- explanation (*see also* question-answering; reasoning status checker; natural language), 27, 31, 42, 65, 133, 161, 171, 233, 331–337, 338–362, 363–370, 371–388, 394, 451, 457, 465, 475, 493, 531–568, 575, 599f, 644, 651, 664, 670, 674, 677, 688ff, 693, 695, 705, 707f
of drug dosing, 363–370
of meta-rules, 526, 528
of rules, 38, 72, 132, 133, 238, 305f
subprogram in MYCIN, 4, 7, 10, 57, 67, 73ff, 79, 111, 112, 339, 371f, 458, 532, 537
of therapy (*see* therapy, explanation of)
- user models in (*see* user models)
- WHY?/HOW?, 75f, 111, 173, 310, 373, 533f, 601, 689f
- explicitness (*see also* knowledge; transparency; understandability; modularity), 545, 564f
- extensibility (*see* flexibility)
- facets, 617, 619
- facts (*see* representation, of facts)
- fear of computers, 648
- feedback, 9f, 204, 459, 513, 551, 577, 686, 702
- FINDOUT (*see also* rule interpreter), 105–110, 116f, 121, 125f, 130, 132
- flexibility (*see also* knowledge base, refinement), 3, 6, 50, 149, 296, 311, 342, 450, 465, 470, 488, 493, 559f, 565, 669f, 687
inflexibility, 503, 520
- focus of attention (*see also* control), 179, 186, 441, 447, 471, 479
- FOREACH, 223
- formal languages, 6
- formation problems (*see* synthesis problems)
- forward chaining (*see* control)
- frames, 60, 63, 394ff, 425, 431ff, 437, 441–452, 505, 613ff, 617, 633, 672, 676
- function templates (*see* templates; predicates)
- funding, 599, 698
- fuzzy logic, 210, 214, 245–247
- game-playing, 150
- generality (*see also* EMYCIN), 451, 465, 656, 674, 677, 695f, 701
- generate and test, 135ff, 145, 674, 697
- geography (*see* SCHOLAR)
- geology (*see* PROSPECTOR)
- glaucoma (*see* CASNET)
- global criteria, 135
- goal-directed reasoning (*see* control)
- goal rule, 104, 554f
- goal tree (*see* rule invocation, record of)
- gold standard (*see* evaluation; certainty factors)
- grain size (*see* modularity)
- grammar, 22, 80f, 620–624
- graphics and graphical presentations, 336, 368, 399f, 419, 608ff
- GRID/GRIDVAL, 102f
- handcrafting (*see* knowledge acquisition)
- hardware, 575, 578, 612, 659, 665
- help facilities, 64, 111f, 310, 474, 480f, 599, 704f
- HERSTORY list (*see* rule invocation, record of)
- heuristics, 3, 48, 50, 133, 144, 150, 211, 482, 524, 550f, 676, 681
- heuristic search (*see* control)
- hierarchical organization of knowledge (*see* knowledge)
- Hodgkin's disease (*see also* ONCOCIN), 656
- HOW? (*see* explanation)
- human engineering, 19, 42, 146, 156, 308, 309f, 331–337, 338, 349, 411, 439, 599–

- 612, 674, 678, 688ff, 691ff
- acceptance, 332f, 337, 371ff, 578, 595, 599, 637, 688, 695
- dictionary of terms and synonyms (*see* dictionary)
- English understanding (*see also* natural language), 67, 73, 76, 693f, 701
- I/O handling (*see also* dialogue), 68, 110f, 297, 600
- models of interaction, 671, 691f, 701
- preview (*see* preview mechanism)
- unity path (*see* unity path)
- hypothesis-directed reasoning (*see* control)
- hypothesis formation, 8
- hysteresis, 406, 422
- I/O (*see* dialogue)
- ICAI (*see* tutoring)
- IDENT, 93, 107, 116, 123, 222, 223
- ill-structured problems, 9, 209, 683, 686
- importance (*see also* CF's), 335, 375, 377ff, 387, 432, 438, 442, 449
- incompleteness (*see* completeness)
- inconsistency (*see* consistency)
- independence, 258f, 263, 267, 270, 386, 685
- indexing, 13, 416, 441, 524, 538f, 557, 562, 565, 670, 677, 679, 697
- indirect referencing (*see also* control, content-directed invocation), 563
- induction, 174, 201, 687f
- inexact inference (*see also* certainty factors), 50, 56, 63, 162, 209, 233ff, 255f, 392, 416, 433, 442ff, 482, 664, 679–685
- vs. categorical reasoning, 56, 295, 317
- combining function, 93, 116, 211, 216, 277
- one-number calculus, 214
- precision, 210, 680, 682, 700
- inexact knowledge (*see* knowledge)
- infectious diseases, 13ff, 55, 104, 214, 217, 234, 260, 370, 591
- inference (*see also* control):
 - deductive (*see* logic)
 - engine (*see also* rule interpreter), 175f, 295ff
 - structure (*see also* contexts, context tree), 55, 314, 316f, 321f, 326f, 374ff, 392, 407f, 448f, 485f, 534ff, 542ff, 554f, 567
- inheritance, 515, 563, 676f
- INITIALDATA (MAINPROPS), 56, 60, 119, 120, 705
- intensive care unit (ICU), 393, 397–423
- interaction (*see* models of interaction)
- interdisciplinary research, 8ff
- interface (*see* human engineering)
- Interlisp (*see* LISP)
- Interviewer (in ONCOCIN), 605, 653, 656
- iteration, 313
- jaundice, 273ff
- key factors, in rules, 477, 543, 550, 702
- keyword matching (*see* parsing)
- knowledge:
 - algorithmic, 57, 66, 124
 - causal, 335, 374ff, 377ff, 385ff, 396, 460, 503, 552ff, 672, 676, 702
 - common sense, 73, 150, 540, 559, 651
 - compiled, 503f, 541, 551, 566, 679, 690
 - default, 61, 164f, 376, 432, 509, 559, 620, 659
 - domain-specific (*see also* vocabulary), 149
 - hierarchic organization (*see also* contexts, context tree), 274f, 292, 403f, 515ff, 678
 - inexact (*see also* certainty factors), 67, 209ff, 416f, 673, 683ff
 - interactions, 582
 - intermediate concepts, 551, 560
 - judgmental, 3, 236ff, 316, 525, 540, 663, 682
 - about knowledge (*see* meta-level knowledge)
 - meta-level (*see also* rules, meta-rules), 172–205, 328, 336, 342, 396, 458, 461, 464, 474, 476ff, 488, 493–506, 507–530
 - multiple uses of, 468f, 477, 507, 529, 673
 - pedagogical (*see also* tutoring), 464, 691
 - procedural, 57, 64, 341, 446, 528, 554, 557, 619, 677
 - separation from inference procedure, 6, 174, 175, 295–301, 464, 527, 678, 696
 - separation of types, 134, 437, 457, 460f, 493, 506, 508, 531, 670, 676, 679, 691
 - strategy (*see also* rules, meta-rules), 19, 56, 73, 315, 336, 407, 467, 470, 503, 504ff, 508, 521ff, 531, 537ff, 551–559, 564f, 678, 691, 702
 - structural, 316, 496, 504ff, 516, 538ff, 562ff, 676, 691
 - support, 126, 372, 385, 464, 469, 474, 475f, 504ff, 539, 556, 565
 - of syntax (*see* templates)
 - taxonomic, 396, 425, 670, 676
 - temporal, 406f, 416, 420, 658
 - textbook, 456
 - knowledge acquisition (*see also* ROGET; TEIRESIAS; knowledge engineering), 33, 50f, 55f, 59, 76f, 149–158, 159ff, 159f, 168, 171–205, 225ff, 297ff, 306ff, 314, 318, 325ff, 372, 387, 411, 461, 462, 493, 507, 510ff, 517ff, 560, 670, 673, 676f, 682, 686ff, 700
 - advice taking, 670
 - conceptualization, 155, 161, 170, 314, 326f, 503, 686
 - debugging (*see* knowledge base, refinement), 160ff
 - hand crafting, 151, 171, 513, 687
 - learning, 33, 52, 152f, 186f, 203, 205, 513, 644, 651
 - models of, 150ff, 687f
 - subprogram in MYCIN, 4, 7, 10, 67, 76f
- knowledge base, 342, 343, 465, 697, 700
- completeness, 156, 159ff, 159–170
- conflicts in, 162, 559, 582
- construction (*see* knowledge acquisition)
- czar, 221–228, 687
- display of (*see also* explanation), 160, 169
- maintenance, 309, 519, 521, 582, 644, 686ff

- refinement, 9, 72, 137, 150, 152ff, 159, 161, 172ff, 187f, 297ff, 310f, 327f, 331, 337, 391, 439, 528, 582, 644, 686
- structure of, 493–506
- validation (*see also* evaluation), 129, 152, 594
- knowledge-based system (*see* expert system)
- knowledge engineering, 5–7, 55f, 145f, 149–158, 159f, 170, 202, 567, 672, 686, 700
- tools for, 152–158, 170, 171, 295–301, 302–313, 324, 655, 686ff, 699
- knowledge sources, 557, 560ff
- KNOWN (*see* predicates)
- LABDATA (*see* ASKFIRST)
- language:
 - formal, 22
 - understanding (*see* natural language)
- learning (*see* knowledge acquisition)
- least commitment, 565
- lesson plan, 471, 479
- LHS (*see also* rules), 4
- linguistic variables (*see* fuzzy logic)
- logic, 65, 392, 212, 343, 345, 672, 681
 - completeness, 156
 - conflict, 162
 - consistency, 41, 42, 43, 238
 - contradiction, 41, 230, 238
 - modus ponens, 21, 65
 - nonmonotonic (*see also* backtracking), 558, 681
 - predicate calculus, 28, 233
 - quantification, 62, 65
 - redundancy, 162
 - subsumption, 41, 156, 162, 230, 259
- LOOKAHEAD, 89f, 115, 355
- LTM (*see also* memory), 33
- MAINPROPS (*see* INITIALDATA)
- maintenance (*see* knowledge-base maintenance)
- management (*see* project management)
- man-machine interface (*see* dialogue)
- mass spectrometry (*see* DENDRAL)
- matching (*see also* predicates), 186
- mathematical models, 316, 334, 335, 396
- mathematics, 151
- MB/MD (*see also* certainty factors), 211, 215, 247ff, 265ff, 288, 679
- medicine, use of computers in, 304, 640, 652
- memory, 22, 26, 31, 33, 44, 613
- meningitis, 217
- message passing (*see* control)
- meta-rules (*see* rules)
- mineral exploration (*see* PROSPECTOR)
- missing rules (*see also* knowledge base, completeness), 162f, 511
- models (*see* rule models)
- models of interaction (*see also* consultation; critiquing model; monitoring), 30ff, 692
- modifiability (*see* design considerations; flexibility)
- modularity, 10, 47f, 56, 305, 361, 458, 529, 670, 676, 684, 702
- chunks of knowledge, 27, 39, 42, 52, 55, 71, 72, 85, 154, 224, 238, 242, 438
- global, 30, 32
- grain size, 503f, 672
- modus ponens (*see* logic)
- MONITOR (*see also* rule interpreter), 105–110, 116f, 121f, 125f, 130, 132
- monitoring, 9, 393, 397–423, 675
- MYCIN gang, 222–232, 699, 703
- natural language (*see also* human engineering), 57, 67, 73, 76, 144, 176, 179f, 182, 188–196, 202, 210, 306, 331, 333, 335, 340, 342, 348ff, 422, 458, 601, 605, 613–634, 693f
- nonmonotonic reasoning (*see* logic)
- object-centered programming, 56
- oncology (*see* ONCOCIN)
- opportunistic control (*see* blackboard model)
- optimization (*see also* constraints, satisfaction), 133
- ordering (*see also* control):
 - of clauses/questions (*see also* dialogue, management of), 61, 63, 72, 130f, 395, 535, 554, 678f
 - of rules (*see also* rules, meta-rules), 130, 535, 679
- organisms (*see* infectious diseases)
- overlay model (*see* student models)
- parallel processing, 82
- parameters, 70, 86–90, 118, 163f, 297, 298ff, 321, 353, 374, 376, 407ff, 496, 659
- multi-valued, 87, 108, 283, 534, 619
- properties of, 88–90, 408
- single-valued, 87, 282, 619
- symbolic values for, 403, 418f
- types, 87, 408
- typical values for, 445
- yes-no, 87, 93f, 534
- parsing, 73, 76, 188, 193ff, 333, 349–354, 412, 480, 511, 616, 620ff, 693, 701
- part-whole relations (*see also* contexts, context tree), 498, 545, 677
- patient data, 65, 79, 112–115, 127–129, 445f, 583
- pattern matching, 73
- patterns, in rules (*see* rule models)
- pedagogical knowledge (*see* knowledge)
- performance (*see* evaluation)
- pharmacokinetics, 334, 363ff
- philosophy of science, 210, 239ff
- planning, 136, 313, 336, 534, 563
- poker, 8, 46
- precision, 210, 680, 682, 700
- predicates (*see also* templates), 37, 62, 65, 70, 72, 80, 87, 93–99, 182, 192, 324, 412–415, 420, 510
- presentation methods (*see* dialogue)
- preview mechanism, 61, 63, 72, 131, 395, 493, 678, 679
- probabilities (*see also* inexact reasoning; Bayes' Theorem), 70, 79, 91, 234ff, 239–242, 259, 263–271, 385–387, 680

- problem difficulty, 675
- problem solving (*see* control; evidence gathering)
- production systems, 6ff, 12f, 20ff, 672, 675, 700
 - appropriate domains, 28
 - pure, 20, 30
 - taxonomy, 21, 45
- programming:
 - environment, 306–311
 - knowledge programming, 153, 670, 688
 - style, 529f
- program understanding, 528
- project management, 674
- PROMPT, 88, 110, 118, 210, 617, 619
- prompts, 64, 88
- propagation of uncertainty (*see* certainty factors; knowledge, inexact)
- protocols, 604ff, 654
- prototypes (*see also* frames; rule models), 56, 189f, 424–440, 505
- prototypical values (*see* knowledge, default)
- psychology, 25, 47, 52, 210, 338, 388, 439, 448, 451, 461, 566, 613, 651
- psychopharmacology (*see* BLUEBOX; HEADMED)
- pulmonary physiology (*see* PUFF; VM)
- QA (*see* question-answering)
- quantification (*see* logic)
- question-answering (*see also* explanation), 73, 138ff, 198ff, 306, 333, 340, 342, 348–362, 457, 601
 - examples, 74, 143, 348, 349, 350f, 355ff, 361, 711–713
- randomized controlled trials, 579
- Reasoner (in ONCOCIN), 606, 653, 657
- reasoning network, 103ff, 108
- reasoning status checker (RSC) (*see also* explanation), 73, 75, 340ff, 346ff
- recursion, 524
- redundancy, 157, 162, 684f
- refinement (*see* control; knowledge acquisition)
- reliability (*see* robustness)
- relevancy tags, 377
- renal failure (*see also* drugs, dosing), 332, 365ff
- representation (*see also* frames; logic; prototypes; rules; schemata; semantic networks), 8, 19, 161, 173, 323ff, 391ff, 406f, 424–440, 441–452, 514ff, 527ff, 531–568, 651, 673, 675ff, 697
 - associative triples, 23, 68, 76, 86, 87, 190, 209, 282, 304, 509, 516
 - explicitness of (*see* explicitness)
 - expressive power of, 134, 670, 676f, 686
 - of facts (*see also* representation, associative triples), 431, 434
 - lists, 99
 - procedures, 20, 28, 57, 64, 392, 446, 557, 566
 - tabular knowledge, 99f
 - uncertainty (*see* knowledge, inexact)
 - uniform, 52, 396, 441, 526, 532, 568, 675
- REPROMPT, 210
- resource allocation, 505
- response time (*see* human engineering)
- restart (*see also* backtracking), 129
- RHS (*see also* rules), 4
- risks (*see* utilities)
- robustness, 67, 685, 692
- rule-based system, 672
- rule checking (*see also* knowledge base, completeness), 180, 183, 197f, 307f, 324, 513
- rule compilation, 311
- rule editor, 180, 195f, 493, 512
- rule interpreter (*see also* inference engine), 24, 31, 61, 71ff, 212, 304f, 310, 341, 524, 534
- rule invocation, record of, 65, 74, 115, 133, 138ff, 160, 187, 333, 345, 354, 358, 458, 469
- rule language, 153, 297
- rule model, 76, 156, 165, 168, 189–200, 202, 355, 477, 508, 509ff, 520, 539
- rule network (*see* inference structure)
- rule pointers, 374
- rules, 4, 6, 12f, 55–66, 79–103, 134, 209, 297, 305, 375–377, 410–413, 431–434, 675–677
 - advantages, 72, 238, 669f
 - annotations in, 62, 367
 - antecedent, 60, 678
 - Babylonian, 12f
 - causal, 383, 540f
 - circular (*see* circular reasoning)
 - consequent, 49, 103
 - default, 164
 - definitional, 164, 295, 383, 541, 676, 678
 - domain fact, 541
 - examples of, 71, 100, 164, 238, 296, 317, 322, 344, 432, 447, 543ff, 660
 - grain size (*see* modularity)
 - identification, 540
 - independence of (*see* modularity)
 - indexing, 164
 - initial, 164
 - justifications for, 367, 475, 506, 531ff, 540ff, 675, 690
 - mapping, 62
 - meta-rules, 19, 48, 56, 63, 65, 73, 130, 212, 383, 395, 521–527, 535, 556ff, 676, 678f
 - ordering of clauses in (*see* ordering)
 - predictive, 462
 - premises of, 496
 - production rules, 21ff, 55ff, 59ff, 70ff, 70f, 136, 161, 391f, 700
 - refinement rules, 434
 - restriction clauses, 550
 - schemata (*see* schemata)
 - screening, 661
 - screening clauses in, 61, 394f, 544f, 549, 566, 679
 - self-referencing, 42, 61, 115, 130, 383, 385, 394, 558f, 680, 682
 - statistics, 157f, 218, 688

- strategy, 47, 56, 387, 396, 556ff
- syntax of (*see also* predicates), 4, 35, 46f, 70, 76, 79, 157, 212, 392, 401, 410–412
- summary rules, 434ff
- tabular, 62, 217, 546ff
- therapy, 136, 140
- translations of, 71, 90, 102f, 238
- triggering, 434, 441, 444
- tutoring (*see* tutoring)
- uncertainty in, 674
- world fact, 540
- rule types, 383

- SAME (*see* predicates)
- scene analysis (*see* vision)
- schemata, 476, 508, 514–520, 613ff, 616ff, 624, 627, 633
- screening clauses (*see* rules)
- scripts, 548ff, 615, 617
- search (*see* control)
- second-guessing (*see* expectations)
- semantic nets, 9, 55, 374, 392, 425, 545
- sensitivity analysis (*see* evaluation, sensitivity analysis)
- signal understanding, 343
- simplicity, 323f, 392, 670, 676f
- simulation, of human problem solving, 313, 315, 327, 439, 461
- smart instruments, 345
- Socratic dialogue, 455, 484
- speech understanding (*see also* HEARSAY), 201, 692f
- spelling correction (*see* human engineering, I/O handling)
- spirometer (*see* PUFF)
- state transition network (*see also* representation), 134, 138, 404–407, 421
- statistics (*see also* rules, statistics) 209, 210, 234, 239, 509, 591, 603, 639 671
- STM (*see also* memory), 22ff
- strategies (*see* knowledge, strategy)
- structural analysis (*see* SACON)
- structured programming, 35
- student models, 466, 471, 473, 478, 483ff
- subsumption, 156, 162, 308, 324, 685
- summaries of conclusions, 399, 419, 430
- symbolic reasoning (*see* artificial intelligence)
- synonyms (*see* dictionary)
- syntax (*see also* rules, syntax of), 35, 508, 521, 529, 620ff

- tabular data, 62, 482
- tabular knowledge (*see* representation)
- TALLY (*see also* certainty factors), 98, 114, 211
- taxonomy (*see* knowledge, taxonomy)
- teaching (*see* tutoring)
- technology transfer, 395, 698f
- templates, for functions or predicates, 37, 72, 157, 164f, 188, 194, 305, 344 477, 508, 520f
- terse mode, 64
- test cases (*see* case library)
- testing (*see* evaluation)
- theorem proving (*see* logic)

- theory of choice, 246
- therapy, 9, 13–18, 57, 133–146, 234, 336, 399–407, 411, 593, 671, 713–715
 - algorithm, 57, 63, 66, 122ff, 132, 133ff, 261–262, 685
 - comparison, 141–144
 - explanation of, 133, 138–141, 144f, 333, 715
 - protocols, 163–170, 654f
- threshold, in CF model (*see also* certainty factors), 211, 216, 220, 222–232, 681
- time (*see* knowledge, temporal)
- top-down refinement (*see also* control), 555, 562, 565
- topic shifts, 615ff
- toxicity (*see* contraindications)
- trace, of reasoning (*see* rule invocation, record of)
- tracing, of parameters, 64, 108, 304, 345
- TRANS, 90, 102f, 119, 210, 617, 619
- transfer of expertise (*see* knowledge acquisition)
- transition network, 138ff, 145, 348, 404ff, 421
- transparency (*see* understandability)
- trigger (*see* control, forward chaining), 387
- triples (*see* representation)
- Turing machines, 21, 52
- Turing's test (*see* evaluation)
- tutoring (*see also* GUIDON), 19, 58, 126, 145, 238, 328, 335, 371, 372, 396, 455–463, 464–489, 494, 531–568, 670, 674, 676, 688ff, 701
 - case method, 457, 467ff
 - rules, 372, 463, 472ff, 690

- uncertainty (*see* certainty factors; knowledge, inexact)
- understandability (*see also* explanation), 3, 9, 41, 56, 150, 174, 176, 331f, 334, 337, 403, 437–440, 450f, 493, 503, 506
- uniformity, of representation (*see* representation)
- unity path, 63, 73, 130, 377, 396, 493
- UPDATED-BY, 90, 105, 229, 231, 355, 679
- user interaction (*see* human engineering)
- user models (*see also* student models), 335, 373ff, 387, 466
- utilities (*see* cost-benefit analysis)

- validation (*see* evaluation)
- verification/checking, 159, 161, 184
- vision, 189, 201, 613
- vocabulary, of a domain, 73, 150, 210, 442ff, 467, 503, 564, 684, 686, 702
- volunteered information (*see also* control, forward chaining), 602, 613ff, 678, 691, 693
 - examples, 628ff

- weight of evidence (*see* inexact inference)
- what-how spectrum, 315
- WHY? (*see* explanation)
- workstations (*see* hardware)
- world knowledge (*see* knowledge, common sense)