

INDEX

- Abdel-Hamid, Tarek, 4, 10, 25, 27, 47, 51, 221, 265, 362, 374, 378, 392, 460, 474, 496, 531, 533–535, 556
- Abdel-Hamid's integrated project dynamics model, *see* Integrated project dynamics model
- Acuña, Silvia, 221, 260, 265, 267, 273, 362, 482, 531, 535
- Acquisition models, 490
- Agile and hybrid processes, 235, 482, 488.
See also Hybrid process model
- Agile methods, 37
- Agile team size, 235
- Architecting, *see* Software architecting
- Artificial intelligence, 474
- Attribute averaging, 187
- Attribute tracking, 186
- Attrition, 257
- Auxiliaries 15, 57, 159
 - examples, 59, 159
 - model formulation, 89
- Balancing feedback model infrastructure, 175
- Barros, Márcio, 28, 157, 473, 476, 478, 491, 535, 536–539
- Boehm, Barry, 20, 25, 30, 32, 33, 35, 47, 140, 212, 218, 236, 238, 243, 245, 280, 282, 311, 327, 331, 337, 366, 396, 397, 399, 410, 422, 460, 474, 476, 479, 480, 481, 482, 484, 485, 486, 487, 490, 491, 494, 496, 499, 535, 550
- Brooks, Fred, 16, 20, 47, 426, 428, 441
- Brooks's Law, 10, 16, 426
 - model, 17, 152, 153, 154, 215, 259, 260, 264, 382, 464, 465, 565, 567
 - model behavior, 19
 - model equations, 18
 - team partitioning, 464, 465
- Burnout, 224. *See also* Exhaustion
- Business processes, 395, 490. *See also* Software business case analysis
- Capabilities of people, 260, 267
- Capability maturity models, 41, 327. *See also* Software process improvement
 - Capability Maturity Model-Integrated (CMMI), 41, 220, 364
 - key process areas, 42
 - FAA-iCMM, 41
 - key process area modeling, 354
 - level five and employee motivation, 252
 - model example for, 343–362
 - People Capability Maturity Model, 41, 220
 - simulation uses at CMM levels, 43
 - Software Acquisition Capability Maturity Model (SA-CMM), 41
 - Software Capability Maturity Model (CMM or SW-CMM), 7, 41, 220
- Causal (loop) diagram, 79
- Causal relations, 81
- Change
 - deferral, 241
 - organizational, 462

- Change (*continued*)
 - traffic, 239
 - rapid, 239, 479
- Christie, Alan, 28, 261, 262, 268, 542
- Closed system, 12
- Coincident flows (coflows), 96, 164
 - effort expenditure, 187
 - defects, 196, 397
- Collaboration, 261, 268
- Constructive Cost Model (COCOMO)
 - calibration for inspection model, 277, 288
 - cost driver derivation from simulation model, 285
 - detailed, 285
 - dynamic, 125, 239, 243, 397
 - dynamic modeling vs. COCOMO for learning, 263
 - experience factors in Brooks's Law model, 20
 - experience factors and learning curves, 231
 - job size for integrated project dynamics model, 386
 - people factors, 218
 - platform volatility factor, 243
 - process and product factors, 270
 - project and organization factors, 370
 - reliability factor in value-based product model, 399
 - reuse model, 300
 - static modeling vs. dynamic modeling, 25, 218
 - system dynamics and, 551
- Constructive Quality Model (COQUALMO), 331, 365
- Collofello, James, 28, 263, 338, 475, 540–541, 556, 558, 560
- Commercial off-the-shelf (COTS) software, 38, 238, 309, 484. *See also* COTS
- Communication overhead, 17, 303
 - Abdel-Hamid's integrated project model and, 382
 - Brooks's Law model and, 17, 19, 464, 465
 - COCOMO model and, 218
- Component-based model development, 476
- Confidence intervals, 525
 - calculation, 527
- Connectors and feedback loops, 160. *See also* Information links
- Conserved flows, 55
- Conserved versus nonconserved product flow, 194
- Construction iterations in the modeling process, 104
- Continuous model improvement, 131
- Continuous systems modeling, *see* System dynamics
- Control and operational management applications, 28
- Control systems theory, 11
- COTS and process concurrence, 437
- COTS glue code development and COTS integration application model (Kim, Wook), 310–317
 - application development, 315
 - COTS component factors, 314
 - glue code development, 312
 - model overview, 311
 - test results, 316
- COTS-based systems (CBSs), 309, 366
- COTS-Lifespan Model (COTS-LIMO), 317
- Cybernetics, 10–11
- Cyclic modeling process, 70
- Data collection, 134
- Decision structures, 188
- Defect analysis for process improvement, 327
- Defect coflows, 196, 397
- Defects and quality, 327
- Defects as levels, 158
- Defect dynamics example application model (Abdel-Hamid), 328–330
- Defect chain model infrastructures, 196, 327
 - amplification, 199, 365
 - categories, 200
 - chain examples, 200, 329
 - coflows, 196
 - detection (filters), 197
 - generation and propagation, 196, 365
 - multiplication, 199
 - rework, 197
- Defect removal techniques and Orthogonal Defect Classification (ODC) application model (Madachy), 330–337
- Defect rework policies, 191
- Defense Modeling and Simulation Office (DMSO), 8, 472, 473, 476

- Delays, 93, 169
 - cascaded, 173
 - higher-order, 173
 - hiring, 172
 - model structures, 93
- DeMarco, Tom, 219, 227, 255, 258, 261, 265, 267, 268, 499, 531, 542
- Desired staff model structure, 188
- Discrete event simulation, 24, 55, 469, 471
 - inspections, 275
 - product attributes, 269, 273
- Distributed global development, 480
- Dynamic COCOMO, 125, 239, 243, 397
- Dynamic process models, 7
- Dynamics, 5
- Earned value, 442
 - general project procedures, 449
- Earned value application model (Madachy), 450–460, 466
 - Litton applications, 460
 - testing, 452
 - usage, 456
- Effort expenditure instrumentation, 187
- Empirical data collection for simulation
 - models, 493
- Empirical research and theory building, 492
- Endogenous view, 79
- Error detection rate, 330
- Evolutionary development, 31
- Exhaustion model, 222–227, 567
- Experimental design, 523
- Exponential decay, 172
- Exponential growth, 166. *See also* Positive feedback
- Feedback loops, 11, 132
- Feedback opportunities in organizations, 371
- Feedback systems
 - concepts applied to software process, 10
- Fernández-Ramil, Juan, 238, 488. *See also* Ramil, Juan
- Fifth Discipline, 5, 9
- Flight simulation, 5, 23, 263
- Flow, *see* Rate
- Flow chains, 156
 - generic flows in model formulation, 85
 - identification of in modeling process, 84
 - infrastructures, 192
- Ford, David, 237, 322, 423, 424, 466
- Forrester, Jay, 4, 6, 47, 53, 54, 61, 118, 119, 134, 142, 145, 203, 488, 496
- Fourth-generation languages, 39, 301
- Game playing, 475, 479. *See also* training
- Generic flow processes, 155, 160
 - adjustment process, 163
 - coflow process, 164
 - compounding process, 162
 - cyclic loop, 165
 - draining process, 163
 - flow chain, 161
 - production process, 163
 - rate and level system, 160
 - split flow process, 165
 - stock and flow, 160
- Global (process) feedback, 13, 291
- Glue code, *see* COTS Glue code
- Goal–question–metric (GQM) framework, 135, 477
 - application to inspection modeling, 138
- Goal-seeking behavior, 61
- Goodness-of-fit tests, 521
- Heuristics, 60
 - modeling heuristic summary, 148
- Hiring delays, 256
- Hybrid process (agile and plan-driven)
 - application model (Madachy et al.), 235–252
 - model overview, 240
 - scalable spiral model, 238
 - scenarios and test results, 246
 - software value, 249
 - tradeoff functions, 243
- Houston, Dan, 27, 341, 473, 544–545
- Humphrey, Watts, 220, 253, 258, 265
- Hybrid modeling, 24, 469, 491, 551
- Hypotheses in the modeling process, 132
- Hypothesis testing, 525
- Incremental development, 30, 239
- Information links 15, 58, 160
 - equations, 90
 - examples, 58, 160
 - model formulation, 89
 - nonconservation of, 58
- Information smoothing, 63, 180

- Infrastructures, 155
 - examples, 59
- Infrastructures and behaviors, 166–192
 - balancing feedback, 175
 - delays, 169
 - exponential growth, 166
 - integrated production structure, 183
 - oscillation, 177
 - personnel learning curve, 183
 - production and rework, 182
 - smoothing, 180
 - S-shaped growth and S-curves, 167
- Inspection model (Madachy), 195, 196, 199, 200, 202, 203, 210, 279, 365, 413
 - calibration, 277
 - demonstration and evaluation, 281
 - derivation of detailed cost driver, 285
 - industrial data collection and analysis for, 276
 - modification for walk-throughs, 289
 - overview, 277
 - validation, 287
- Inspection process data calibration, 289
- Inspection-based process, modeling, 275
- Integrated measurement and simulation, 136
- Integrated project dynamics model (Abdel-Hamid), 109, 152, 182, 195, 199, 200, 202, 203, 205, 217, 221, 234, 255, 264, 281, 328, 341, 372, 373–395, 414, 424, 450, 461, 462, 465, 466, 477, 489, 567, 568
 - control sector, 385
 - exhaustion model, 222–227
 - follow-ons to Abdel-Hamid's work, 393
 - human resources sector, 374, 567
 - insights and implications, 392–393
 - manpower allocation sector, 378
 - personnel sector 222–224, 267
 - planning sector, 375
 - quality assurance and rework sector, 328, 382
 - software development productivity subsector, 380
 - software development sector, 379
 - software production sector, 378
 - system testing sector, 384
- ISO 9000, 44
- ISO/IEC 15504, 44
- Iterative development, 32
 - compared to waterfall life-cycle process, 39
- Iterative modeling process, 68
- Johnson, Margaret, 265, 267, 373, 394, 395, 477, 545, 567, 568
- Kellner, Marc, 22, 23, 24, 26, 28, 29, 47
- Knowledge diffusion example model, 169
- Knowledge-based simulation, 474
- Learning, 227
- Learning curves, 229, 267, 302
 - comparison with COCOMO experience data, 231
 - fixed learning functions, 234
 - language levels and, 302
 - models, 231
- Lehman, Manny, 13, 27, 29, 210, 291, 292, 293, 295, 488, 535, 540, 546, 547–548, 561
- Levels (stocks) 15, 57, 157
 - examples, 58, 157
 - initialization and equilibrium, 101
 - model formulation, 86
 - oscillation and, 86
 - state variables, 59
- Lin, Chi, 234, 393, 394, 550
- Litton, 209, 263, 276, 277, 288, 460
- Madachy, Raymond, 28, 32, 47, 136, 138, 195, 235, 263, 264, 273, 274, 275, 276, 277, 281, 282, 284, 285, 287, 288, 327, 363, 365, 474, 475, 483, 535, 549–550. *See also* Inspection model
- Martin, Robert, 24, 27, 553
- Mental models, 9, 10, 118
- Meta-models (general modeling techniques), 491–492
- Metamodels (system dynamics), 478, 491
- Mission control centers, analysis, and training facilities, 494, 500
- Model analysis, 473
- Model assessment, 116
- Model building principles, 101
- Model conceptualization, 75
 - endogenous view, 79

- Model elements, 155, 157
 - auxiliaries, 159
 - connectors, 160
 - feedback loops, 160
 - flows, 159
 - levels, 157
 - sources and sinks, 159
 - rates, 159
 - stocks, 157
- Model formulation and construction, 83
 - accuracy, 99
 - addition and multiplication of effects, 95
 - assigning parameter values, 99
 - auxiliaries, 89
 - basic patterns, 90
 - bounds, 100
 - coincident flows (coflows), 96
 - connectors, 90
 - feedback loops, 90
 - generic flows, 85
 - graph and table functions, 96
 - overtime multiplier function, 97
 - level initialization and equilibrium, 101
 - levels, 86
 - major flow chains, 84
 - model sectors, 84
 - negative (balancing) feedback, 94
 - oscillation, 86
 - parameters and validity, 100
 - plumbing, 85
 - positive (reinforcing) feedback growth or decline, 92
 - rate equations, 90
 - constant rate with a level, 91
 - variable rate with a level, 91
 - rates, 89
 - snapshot test, 87
 - sources and sinks, 88
 - time delays, 93
 - time horizon considerations, 87
 - top-level, 84
- Model infrastructures, *see* Infrastructures
- Model integration, 103, 489
 - common unified models, 489
 - meta-model integration, 491
 - related disciplines and business processes, 490
- Model refinement, when to stop, 133
- Model response surface, 524
- Model sensitivity analysis, 121
- Model structures, *see also* Infrastructures and general behaviors, 65
 - and component-based model development, 476
- Model types, 7
- Model validation, 117
 - tests, 119, 120, 121
- Modeling communication, 139
- Modeling documentation and presentation, 141
- Modeling heuristics, *see* Heuristics
- Modeling tools, 142
- Model-Based Systems Architecting and Software Engineering (MBASE), 32, 36, 70, 319, 466
- Monte Carlo analysis, 125, 262, 474, 515
 - inverse transform, 515
- Motivation, 252
 - overtime function, 253
- Motorola, 45, 263, 327
- NASA, 234, 330, 331, 343, 346, 393
- Negative feedback, *see also* Balancing feedback
 - as balancing feedback, 175
 - general behavior, 62, 63, 67
 - in personnel hiring, 172
 - model structure, 63, 94, 175
- Negotiation, 261
- Networked simulations, 475, 498
- Nonconserved information, 55
- Object-oriented
 - framework for model structures, 156
 - methods, 478
- Open source software development, 486
- Open system, 11, 12
- Open-source software, 38, 486–488
- Opportunity trees, 212
 - people, 219
 - process and product, 271
 - project and organization, 370
- Orthogonal defect classification (ODC), 200, 328, 330
 - example model for, 330–333
- Oscillation, 61, 177
 - and multiple levels, 86
 - model structures for, 178

- Osterweil, Leon, 22, 23, 24, 25, 47
- Overtime, 253, 267
 - multiplier, 97, 253
- Peer reviews, 274, 276. *See also* Inspections, Walk-throughs
- People, *see also* Personnel
 - applications, 217–268
 - COCOMO cost model factors, 218–219
 - model infrastructures for, 200–203
- People maturity model, 41, 220
- People subsystem, 352
- Peopleware, 219, 258, 261, 265, 268
- Perceived quality, 181
- Personnel chain model infrastructures, 200
 - chain examples, 203
- Personnel hiring and retention, 256
- Personnel learning curve, 183
- Personnel pools, 201
- Personnel (resource) allocation, 15, 411
 - allocation policy, 411
 - contention models, 411
 - dynamic resource allocation with initially fixed levels, 413
 - parameterized allocation profiles, 413
 - project contention, 414
 - squeaky wheel gets the grease, 411
- Personnel sector model (Abdel-Hamid), 222–223, 267
- Personnel talent supply and demand, 488. *See also* Workforce
- Personnel training, simulation for, 263. *See also* Software manager training, Training
- Pfahl, Dietmar, 27, 28, 137, 138, 263, 273, 337, 346, 475, 476, 477, 535, 551–554, 561
- Planning applications, 26
- Policy analysis, 126
- Policy parameter changes, 127
- Policy structural changes, 128
- Policy suitability and feasibility, 130
- Policy validity and robustness, 129
- Positive feedback
 - exponential growth, 92, 166
 - general behavior, 62, 63, 67
 - model structure, 63, 92
- Powell, Anthony, 27, 237, 238, 555
- Probability, 502
- Probability distributions, 503
 - empirical, 513
 - gamma, 511
 - interpreting, 505
 - lognormal, 509
 - measures of location, variability, and symmetry, 506
 - normal, 509
 - PERT, 509
 - triangular, 508
 - uniform, 508
- Problem definition, 73
- Process and product modeling applications, 269
- Process and product opportunity tree, 271
- Process concurrence, 322, 423–442, 466
 - architecting, 322
 - COTS, 437
 - external process concurrence, 428
 - internal process concurrence, 426
 - phase leverage analysis with process concurrence, 432
 - RAD example of external process concurrence, 432
 - systems engineering staffing considerations, 433
 - trying to accelerate software development, 425
- Process flight simulation, *see* Flight simulation
- Process improvement, *see also* Software process improvement
 - capability maturity models, 41
 - ISO 9000, 41
 - ISO/IEC 15504, 41
 - overview, 40
 - Six Sigma, 41
 - technology adoption applications and, 28
- Process improvement model, 274
- Process life-cycle models, 29
- Process model types, 23
- Process performance, 213
- Process and product applications, 269–368
- Production structure, 182–183
- Product(s), *see* Software product(s)
- Product quality, *see* Quality
- Project and organization applications, 369–468
- Project feedback (using simulation for), 13

- Project management in the modeling process, 138
- Project workforce modeling, 222
- Project rescoping framework, 14
- Prototyping, 36
- Putnam, Larry, 419, 425, 466
- Quality
 - defects and, 327
 - lost, 367
 - perceived, 181, 400
 - representative attributes of, 272
- Quality assurance tradeoffs, 330
- Quality assurance model sector, 382
- Quality modeling and value functions, 399
- Ramil, Juan, 27, 273, 291, 293, 296, 484, 549, 558. *See also* Fernández-Ramil, Juan
- Raffo, David, 24, 47, 275, 475, 481, 493, 551, 555
- Rates (flows) 15, 57, 159
 - equations, 90
 - examples, 58, 159
 - model formulation, 89
- Rational Unified Process (RUP), 32, 319, 466
- Rayleigh curve models, 366, 418–422
 - calibrated to COCOMO, 397
 - defect modeling, 333, 422
 - model enhancements, 422, 465, 466
 - Rayleigh curve generator, 185
 - Rayleigh manpower distribution model, 418
 - system dynamics implementation, 419
- Rayleigh curves for staffing profiles, 397, 417, 418
 - dynamic requirements changes, 422
 - incremental development, 422
 - Rayleigh curve versus flat staffing, 422
- Reengineering, 38
- Reference behavior, 76, 115, 282
 - patterns, 74
- Reliability
 - attribute of quality, 272
 - required software reliability cost factor, 270
 - modeling, 399, 400
 - sweet spot, 409
- Requirements
 - evolution and volatility, 337
 - process inputs, 11
 - volatility, 333, 466
- Requirements volatility application model (Ferreira), 337–343
 - causal model, 340
 - results, 342
 - simulation model, 341
- Resource allocation, *see also* Personnel resource allocation
 - model infrastructures for, 190
- Reuse, 38. *See also* Software reuse
- Rework model structure, 182
- Richardson, George, 53, 54, 64, 69, 74, 80, 119, 127, 142, 146, 227
- Richmond, Barry, 9, 53, 64, 146, 204, 227
- Risk analysis, 502
- Risk management, 140
- Royce, Walker, 30, 32, 36, 47, 460
- Rubin, Howard, 28, 258, 264, 265, 394, 557
- Rus, Ioana, 27, 478, 558
- Sample size, 525
- Scacchi, Walt, 24, 487, 488, 490, 499
- Scalable spiral model, 238
- Scheduled completion date model structure, 190
- S-curves, 167. *See also* S-shaped growth
- Sensitivity analysis, 123
- Simulation
 - definition of, 8,
 - introduction, 4
 - knowledge-based, 474
 - modeling process and, 110
 - networked, 475
 - personnel training and, 263
 - statistics of, 501
- Simulation environments and tools, 472
- Simulation input, analysis of, 521
- Simulation output, analysis of, 525
- Simulation report, 143
- Six Sigma, 44, 367
- Skills, 260
- Slack (time), 227, 255, 267
- Smoothing of information, 63, 180
- Snapshot test, 87
- Software Acquisition CMM (SA-CMM), 41

- Software architecting application model (Fakharzadeh, Mehta) , 319–327
 - empirical reference data, 320
 - model overview, 321
- Software business case analysis, 395
- Software Capability Maturity Model (CMM or SW-CMM), 41. *See also* Capability Maturity Models
- Software Engineering Institute (SEI), 7, 24, 41, 309, 339, 343
- Software evolution, 291. *See also* Global process feedback
 - open-source systems and, 488
- Software evolution progressive and anti-regressive application model (Ramil), 293–299
 - model overview 295
 - calibration and experimentation, 296
- Software entropy, 167, 367
- Software life-cycle phases and modeling steps, 69
- Software manager training, 263, 264, 460
- Software metrics, 134
 - etiquette, 463
- Software process, 7
- Software process chain infrastructures, 192
- Software process control system, 13
- Software process improvement (SPI), *see also* Capability maturity models, Process improvement
 - simulation in support of, 343
- Software process improvement application model (Ho), 346–362, 367
 - high-level feedback, 347
 - KPA processing subsystem, 354
 - life-cycle subsystem, 351
 - model changes, 357
 - people subsystem, 352
 - sensitivity analysis, 360
 - test runs, 359
 - Xerox adaptation, 354
- Software process model types, 23
- Software process modeling overview, 22–26
 - characterization, 26
 - characterization matrix, 27
 - discrete, 24
 - hybrid, 24
 - major models, 27
 - modeling approaches, 23
- Software process simulation technology, 469
- Software process technology, 22
- Software product chain infrastructures, 193
 - chain examples, 195
- Software production rate, 14
- Software project management simulator, 337
- Software project dynamics, 4, 5, 10. *See also* Abdel-Hamid, Tarek
- Software Project Management Simulator (SPMS) model, 338
- Software reliability, *see* Reliability
- Software reuse, 299
- Software reuse and fourth-generation languages application model (Lo), 301–309
 - model description, 302
 - results, 304
- Spiral model, 33
 - modeling process usage, 70
 - scalable spiral model, 238
 - WinWin spiral model, 35
- Spreadsheets, 26
- S-shaped growth and S-curves, 167
- Staffing, *see also* Personnel
 - applications, 416
 - calculation parameters, 245
 - desired staff model structure, 188
 - Dynamic COCOMO, 125, 243, 397
 - integrating Rayleigh curves, process concurrence, and Brooks's interpretations, 441
 - process concurrence modeling for staffing profiles, 423–442. *See also* Process concurrence
 - Rayleigh curves for staffing profiles, 417, 418–422
- Stallinger, Friedrich, 268, 559
- State variables, 6, 59
- Static versus dynamic modeling, 25
- Steady-state behavior, 113
- Steady-state conditions, 112
- Sterman, John, 53, 121, 146, 237, 322, 423, 424, 466, 476, 502
- Stock, *see* Level
- Stock and flow representation, 14
- Strategic management applications, 26
- Sweet spot (determination of), 405
- System boundary, 70, 78, 148, 149

- System dynamics, 3, 5, 8, 11, 14, 16, 24, 25, 54
 - background, 54
 - continuous view, 55
 - heuristics, 60
 - mathematical formulation, 56
 - structure of a model, 59
 - model element summary, 15
 - model elements, 56, 57
 - auxiliaries, 57
 - information linkages, 58
 - level, 57
 - rate, 57
 - sources and sinks, 57
 - notation, 56
 - numerical integration, 59
 - potential pitfalls, 60
- System feedback, *see* Feedback
- Systems (definition of), 6
 - closed (closed loop), 6, 11
 - combined, 6, 7
 - continuous, 6, 7
 - discrete, 6, 7
 - dynamic, 6, 7
 - open (open loop), 6, 11
 - static, 6
 - variables, 6
- Systems of systems, 236, 483
 - software-intensive, 235, 236, 483
- Systems thinking, 3, 8, 10
 - compared to system dynamics, 9
- Team communication, 260
- Team composition, 234
- Team issues, 139
- Team partitioning, 464, 465
- Team size, 235
- Test functions, 113
- Time horizon, 87
- Training
 - game playing and, 475
 - software project management, 263, 264, 460
 - simulation for, 4, 263
 - Training and learning applications, 28
 - Training overhead in Brooks's Law model, 17, 19
- Tvedt, John, 138, 195, 196, 210, 237, 275, 341, 365, 544, 560
- U.S. Defense Modeling and Simulation Office (DMSO), 8, 472
- Usability of simulation tools, 473, 498
- User- and people-oriented focus, 482
- Value-based product application model (Madachy), 396–411
 - applications, 402
 - model overview, 397
 - quality modeling and value functions, 399
- Value-based software engineering, 396
- Walk-throughs, 288. *See also* Peer reviews
- Waterfall (life-cycle) process, 29
 - compared to iterative process, 39
- Weinberg, Gerry, 10, 47, 51, 152, 220, 265, 268, 416, 467
- Wernick, Paul, 27, 291, 292, 293, 547, 561–562
- WinWin spiral model, 35, 70, 262
- Work breakdown structure for modeling, 142, 144
- Workforce modeling, 222
 - desired workforce levels, 223
- Workforce shortage, 258, 268, 499
 - causal loop, 259
- Xerox Corporation, 354, 357, 361
- Yourdon, Ed, 265, 393, 563