
INDEX

- Abstraction, 356
- Activity diagram, 230
- Adaptive software development (ASD), 372
- Advanced development, 78, 317
- Advanced technology, 154
- Agile software models, 367
- Analysis of alternatives, 177
- Analysis pyramid, 156
- Analytical hierarchy process (AHP), 300
- Application software, 360
- Architecture frameworks, 226
- Automobile, 12, 30, 54, 150
- Availability, 430

- Balanced system, 30
- Block definition diagram, 239
- Boundaries, 51
- Building blocks, 41, 45
- Built-in test equipment, 429

- Capability maturity model integrated (CMMI), 397
- Career development models, 18
- Careers, 13
- Class diagram, 229
- Coding, 385
- Commercial aircraft, 56, 75, 183, 278, 469
- Communication diagram, 230
- Competition, 142
- Complex systems, 3, 11, 60
- Component design, 336, 420
- Component diagram, 229
- Component knowledge base, 497
- Components, 48

- Composite structure dDiagram, 229
- Computer-aided design (CAD), 422
- Computer system configuration items (CSCI), 374
- Concept development phase, 76
- Concept definition, 77, 197
- Concept exploration, 77, 165, 185
- Concept of operations (CONOPS), 174
- Concept selection, 214
- Concept validation, 217
- Concurrent development model, 370
- Concurrent engineering, 336, 486
- Configuration baselines, 437
- Configuration items, 437
- Configuration management, 436, 492
- Constraints, 189
- Context diagram, 52, 266
- Cost-benefit analysis, 303
- Cost control, 116
- Cost estimating, 220
- Critical design review (CDR), 72, 422
- Critical experiments, 218
- Critical path method (CPM), 117

- Data flow diagram, 268, 380
- Data-intensive computing systems, 363
- Decision analysis, 255
- Decision framework, 259
- Decision making, 256
- Decision trees, 301
- Demonstration testing, 345
- Department of Defense (DOD) acquisition model, 71
 - Architecture Framework (DODAF), 226

- Deployment diagram, 229
- Design
 - detailed, 421
 - specialist, 44
 - testing, 338
 - validation, 99, 432
- Development testing, 340, 433, 454, 462
- DOD acquisition model, 71
- DODAF, 226

- EIA-632, 91
- Embedded software, 360
- Engineering
 - design, 409
 - design phase, 79
 - development, 78
 - disciplines, 4
 - for production, 485
 - simulation, 278
 - specialty, 9
- Enterprise systems engineering, 63
- Entity-relationship diagram (ERD), 380
- Environment, 51
- Evolutionary software models, 366
- Extreme programming (XP), 372

- Feature-driven development, 373
- Field service support, 514
- Functional allocation, 152, 179, 212
- Functional analysis, 96, 151, 206, 327, 416
- Functional block diagram (FBD), 209
 - tools, 208
- Functional-class decomposition, 384
- Functional definition, 96
- Functional elements, 46
- Functional flow block diagram (FFBD), 267, 380
- Functional flow process diagram, 268
- Functional requirements, 145

- Games, 273

- Hardware-in-the-loop simulation, 277
- Hardware software allocation, 210
- Hierarchy of complex systems, 42

- IEEE-1220, 90
- IEEE Std 610.12, 223

- IEEE software systems engineering process, 357
- INCOSE, 245
- Incremental software models, 366
- Installation, 505
- Integrated definition (IDEF), 208, 268
- Integrated product teams (IPTs), 184
- Integration, 443
 - and evaluation phase, 80
 - test planning, 453
- Interaction overview diagram, 230
- Interfaces, 9, 58, 98
- ISO/IEC 15288, 72, 92

- Life cycle, 37, 69
- Linear software models, 366
- Logical view, 224
- Logistics support, 515

- Maintainability, 428
- Management, 111
- Mathematical models, 270
- Measures of effectiveness (MOE), 155
- Measures of performance (MOP), 157
- MIL-STD-499B, 90
- Ministry of Defense architecture framework (MODAF), 227
- Mission simulation, 275
- Model/modeling, 262
 - agile software models, 367
 - based systems engineering, 243
 - career development models, 18
 - of a complex system, 42
 - concurrent development model, 370
 - DOD acquisition model, 71
 - evolutionary software models, 366
 - incremental software models, 366
 - life cycle model, 73
 - linear software models, 366
 - mathematical models, 270
 - operational effectiveness model, 155
 - physical models, 271
 - schematic models, 264
 - spiral life cycle model, 103, 204
 - spiral model, 370
 - system effectiveness model, 217
 - system performance model, 465
 - T model, 20
 - waterfall model, 367

- Modernization, 516
- Modular partitioning, 378
- Multiattribute utility theory, 299
- Multidisciplinary knowledge, 21

- Needs analysis phase, 76, 139, 374
- Needs validation, 155
- Nondisruptive installation, 510
- NSPE, 72

- Object diagram, 229
- Object-oriented analysis, 228, 270, 382
- Objectives, 149
 - analysis, 149
 - tree, 150
- Obsolescence, 148
- Open Group Architecture Framework, The (TOGAF), 226
- Operational availability, 205
- Operational concepts, 174
- Operational effectiveness model, 155
- Operational problems, 513
- Operational readiness testing, 512
- Operational requirements, 145, 158, 170, 323
- Operational test and evaluation, 467
- Operational view, 224
- Operations, 505
 - analysis, 146
 - and support phase, 81
- Origins, 5

- Package diagram, 229
- Performance
 - vs. cost, 29
 - requirements, 145, 178, 189, 201
- Physical definition, 97
- Physical models, 271
- Physical requirements, 145
- Physical simulation, 276
- Physical view, 224
- Predecessor system, 82
- Preliminary design, 420
 - review (PDR), 71, 421
- Preplanned product improvement (P3I), 519
- Probability, 296
- Producibility, 430
- Production, 483, 493
 - phase, 81
- Profession, 12

- Program design language (PDL), 386
- Programming languages, 386
- Project management, 5, 112
- Proposal development, 112
- Program risks, 215, 317
- Prototypes, 333, 389

- Qualification testing, 434
- Quality function deployment (QFD), 306

- Rapid application development (RAD), 369
- Rapid prototyping, 127, 338
- Regression testing, 395
- Requirements, 86
 - analysis, 95, 144, 172, 322, 374, 414
 - diagram, 238
 - validation, 173
- Reliability, 424
- Risk(s), 7, 111, 317
 - assessment, 122
 - management, 120, 431
 - management plan, 128
 - mitigation, 126, 333, 416
 - reduction, 349
- Robustness analysis, 383
- Robustness diagram, 383

- Scenarios, 159, 176
- Schematic models, 264
- Scrum, 372
- Selection criteria, 286
- Sequence diagram, 230
- Simulation, 211, 262, 272, 332
- Specifications, 86, 247, 322
- Spiral life cycle model, 103, 204
- Spiral model, 370
- Software
 - embedded systems, 361
 - engineering management, 396
 - integration and test, 393
 - intensive systems, 362
 - life cycle model, 73
 - metrics, 400
 - prototyping, 389, 417
 - systems engineering, 355
- State machine diagram, 230
- State transition diagram (STD), 382
- Statement of work, 112
- Structured analysis and design, 380

System

- acceptance test, 496
- architecting, 222, 378
- definition, 3
- design team, 131
- development planning, 219
- domains, 34
- effectiveness model, 217
- effectiveness simulations, 274
- materialization, 83, 142, 167, 199, 319, 410, 447
- modeling language (SysML), 228
- performance model, 465
- requirements, 165, 204
- software, 360
- of systems, 60

Systems engineering

- approaches, 36
- definition, 3
- master plan (SEMP), 117, 220
- method, 87, 92
- perspectives, 32
- viewpoint, 27

Systems integration, 455**T model, 20****Technical professional, 15****Technology development, 188****Test/testing, 99, 103, 115**

- equipment, 453, 472
- plan, 100, 340

planning, 450, 470

- scenarios, 464
- special equipment, 344
- unit, 392

Test and evaluation, 106

- master plan (TEMP), 343, 450
- 3-tier architecture, 358

Timing diagram, 230**Trade-off(s), 8, 97**

- analysis, 97, 262, 282

Trade studies, 283**Training, 472****Transition from development to production, 489****Unified modeling language (UML), 228, 382****Unit testing, 392****Upgrades, 516****Use case(s), 230, 377**

- diagram, 230

User interfaces, 348, 415, 418**Utility functions, 289****Verification and validation, 281, 393****Virtual reality simulation, 279****Visualization, 153****Waterfall model, 367****Work breakdown structure (WBS), 113, 219**