3-view modeling, 208
Agent-based software development, 305
Agent-oriented programming, 306
Agile methodologies, 308
Alarm configuration, 217
Alarm
  alarm flooding, 134
  alarm handling, 200, 224
  alarming and reporting, 6
Analysis and management workstation, 245
Animation link, 125
API functions, 19
Application programming interface, 20, 24, 66, 121
Artificial neural network classifier, 227
Automatic blending, 179
Automatic duty balancing, 123
Automatic supervision software, 153
Automatic test system, 197–198
Back-end tasks, 297
Bottom-up model, 17
Cached updates mechanism, 161
Channel configuration, 229
Client/server, 288
Clipboard, 135
Coad/Yourdon approach
  attributes, 50
  objects, 49
  services, 50
  subjects, 49
Code interface node, 283
Command manager, 184
Commercial-off-the-shelf component, 79
Common gateway interface, 295
Communication protocol, 188
Compatibility, 15–16
Component-based software
  component-based software development, 32–33
  component-based software engineering, 33
Component technology, 31
Computer-based control, 95
Computer integrated manufacturing system, 99
Condition monitoring, 1, 5, 93, 240
Control delay, 180
Control packages, 185
Data-flow analysis, 246
Data-flow diagram, 208
Data acquisition, 5, 11, 152, 216
  data acquisition devices, 241
  data acquisition module, 210
  data acquisition workstation, 242
Data analysis, 218
Data collection, 5
Data communication, 167
Data configuration, 217
Data display, 219
Data I/O, 155
Data management component, 215
Data memory sharing, 184
Data processing, 118
Data storage, 14
Database components, 122
Database management, 217
Database management system, 62, 64, 110, 119, 256, 260
Database model
  hierarchical model, 60
  network model, 60
Database selection, 255
Database technology, 118
Decision-making, 6
Design process of user interface
  conceptual design, 55
  construction, 56
  evaluation, 56
  logical design, 55
  physical design, 55
  requirements analysis, 54
Device management, 190
Distributed control system, 94
Distributed intelligence, 14
Drag-and-drop, 27
Driver image table, 163
Driver loading process, 167
Driver testing, 172
Dynamic configuration, 160
Dynamic data exchange, 85, 136
Dynamic link library, 181
Embedded data processor, 12
Entity–relationship diagram, 249
Entity–relationship model, 208
Event–response model, 250
Event-driven approach, 227
Event-driven programming, 220
Event-driven tasks, 159
Event–response model, 187
Exception handler, 167
Expandability, 7, 12, 18
Factory automation, 31
Fault diagnosis, 5, 224
Feasibility study, 244
Flexibility, 7
Fuzzy logic, 227
G Web server, 293
Generalization, 31
Generic query system, 145
GPIB instruments, 16
Graphical measurement platform, 31
Graphical programming, 21, 257
Graphical user interfaces, 6
Handheld instrument, 2
Handshaking mechanism, 171
Hardware driver, 163
Hardware simulation terminal, 171
Homogenization boiler, 181
Human–machine interaction, 182
Human–machine interface, 198, 6
I/O interface, 16, 19, 25
IMP configuration, 217, 229
Industrial automation systems, 1, 309
Industrial measurement and control, 27, 94, 122
Information technologies, 309
Instrument components, 31
Instrument drivers, 24–25
Integrated development environment, 113
Inter-process communication, 136
Interoperability, 7, 12, 14, 16, 18
Interrupt mechanism, 185
Island of automation, 7
Isolated measurement pods, 201
LabVIEW, 21, 258
Large-scale database system, 142
Large-scale rotating machinery, 239
Linguistic-based information analysis, 209
Local area network, 5
Low-level tasks, 189
Machine monitoring and control, 31
Man–machine interface, 20, 112
Measurement and control, 2
Measurement device, 10
Measurement point, 6, 151
Measurement point management, 154
Measurement sensor system, 199
Memory, 162
Message dispatching, 185
Message passing mechanism, 118
Middleware, 303
Modular instrument, 10, 13
Modular structure, 14
Modularity, 12
Modularization, 16, 31
Module-oriented design, 306
Monitoring software, 24
Multi-thread-based communication, 179
Multimedia display, 10
Multimedia timer, 171
Multitasking coordination mechanism, 291
Multithreaded programming, 169, 184
Mutex mechanism, 162
Networked control, 10, 14
Networked data sharing, 5
Networked system, 7
Non-real-time retrospection, 134
Object-&-class layer, 203
Object-oriented design
  database management component, 51
  human interaction component, 50
  problem domain component, 50
task management component, 50
Object-oriented method
data abstraction, 115
dynamic binding, 116
encapsulation, 115
inheritance, 116
polymorphism, 116
Object-oriented programming, 115
Object-oriented software engineering, 189
Object linking and embedding, 85, 137
Object orientation
encapsulation, 36
inheritance, 36
polymorphism, 36
Open architecture, 309
Open database connectivity
application, 67
data source, 68
driver, 67
driver manager, 67
Open structure, 12
Phrase frequency analysis, 208
Post-fault analysis, 200
Post-fault diagnosis, 227
Problem domain component, 214
Process-oriented design, 306
Process, 161
Process control, 31
Programmable logic controller, 163, 180
Real-time communication, 10, 228
Real-time constraints, 6
Real-time database, 28, 129, 157
Reconfigurable software, 111
Reconfigurable supervision, 152
Reconfigurable systems, 95
Reconfiguration, 94, 107
Relational database system
concurrency control, 60
data integrity constraints, 60
user interface, 60
Reliability, 309
Remote browsers, 243
Remote communication, 142
Requirement capture and elicitation, 46, 108, 246
Requirements capture, 207, 244
Resource management, 5
Resource manager, 17
Responsiveness, 7
Reusability, 12
Rotating machine, 197
Safety-critical system, 162
Scalability, 7, 11
Sensor configuration, 217
Serial communication, 24, 167
Serial port driver, 168
Signal processing, 6
Single-board controller, 282
Single-chip micro-controller, 180
Socket, 287
Software-intensive systems, 43
Software agent, 306
Software development model
incremental model, 45
spiral model, 45
waterfall model, 45
Software engineering
software coding, 44
software design, 44
software maintenance, 44
software planning, 44
software requirements analysis
software testing, 44
Software maintenance
adaptive maintenance, 85
corrective maintenance, 84
perfective maintenance, 85
preventive maintenance, 85
Software performance testing
availability, 80
flexibility, 81
maintainability, 83
reliability, 81
security, 82
stress testing, 82
survivability, 81
usability, 82
Software structure
dynamic logic, 48
dynamic physics, 48
static logic, 48
static physics, 48
Software testing approach
black-box testing, 72
white-box testing, 72
Software testing phase
integration testing, 76
system testing, 78
unit testing, 75
validation, 79
verification testing, 78
Software testing strategy
big-bang testing, 71
incremental testing, 71
SQL server, 255
Standardization, 16, 31, 123
State transition diagram, 208
Static logic model
aggregation, 48
association, 48
generalization, 48
instantiation, 48
Statistics and analysis module, 109
Status overview, 28
Structured query language
  data control language, 65
  data definition language, 65
  data manipulation language, 65
  data query language, 65
System analysis, 207
System configuration, 6, 155
System driver, 155, 159, 163
System modularization, 123
System openness, 19
System servers, 243
Task configuration, 126
Task management, 165
Task management component, 215
Task trigger mechanism, 159
Test and measurement, 31
Textual programming, 21, 257
Third-party software, 200
Thread, 161
Time-driven tasks, 159
Turbine machinery, 197
Unified modeling language, 304
Unprogrammed shutdown, 197
Usability of user interface
  fault tolerance, 57
  learnability, 56
  operation efficiency, 56
User configuration, 222

User interaction component, 215
User interface design
  consistency, 53
  minimal surprise, 54
  recoverability, 54
  user diversity, 54
  user familiarity, 53
  user guidance, 54
User management, 190
Verification, 79
Versatility, 19
Vibration variable, 284
Virtual instrument
  virtual instrument driver, 19
  virtual instrument software architecture, 17
Virtual instrumentation, 9–10
Virtual X Device driver, 181
VISA specification, 15
Visual component library, 27, 107, 114, 189, 220
Visual database query, 28, 140
Visual programming, 27
VPP specification, 19
VXI instrument, 13
VXI Plug&Plug, 10
Wave display, 28
Whole–part relationship, 210
Wide area network, 5
Win95 message mechanism, 144
WinSock programming, 288