
Index

Symbols and Numbers

{ } (braces), constraints and, 236
<> (angle brackets), XML tags and, 59
<A> (anchor tag). *See* Anchor tag (<A>)
<APPLET>. *See* <OBJECT>
<AREA>, 325
<BODY>
 attributes, 319
 client pages and, 350
 events, 42
 as HTML element, 318–319
<boundary>, 222–223
<build>, 239
<business logic>, 194, 210
<BUTTON>, 335–336
<client page>. *See* Client pages
<client script object>, 273
<control>, 222
<dynamic page>, 348
<entity>, 222
<extends>, 179
<FORM>
 attributes, 353–355
 <form> and, 238
 HTML forms, 19, 327–329, 351–355
<form>, 238

«forward», 239, 373
<FRAME>. *See* <FRAMESET>
<FRAMESET>, 265–270
 client pages and, 268
 conceptual model of, 267–268
 controversy over use of, 22
 difficulty of modeling, 265
 function of, 21, 267
 as HTML element, 343–345
 i-frames, 269–270
 mapping to «frameset», 356
 mapping to «target», 355–356
 parameters, 21
 stereotypes for modeling, 266–267
 structure of, 265–266
 targets and, 266–267, 269
<frameset>
 mapping to <FRAMESET>, 344
 UML classes, 356
<HEAD>, 350
<HTML> elements
 <A>, 17–18, 320–325
 <APPLET>. *See* <OBJECT>
 <AREA>, 325
 <BODY>, 318–319
 <BUTTON>, 335–336
 <FORM>, 18–21, 327–329

- <HTML> elements *continued*
- <FRAME>. *See* <FRAMESET>
 - <FRAMESET>, 343–345
 - <HTML>, 318–319
 - <IFRAME>, 346–347
 - <INPUT>, 329–333
 - <LINK>, 325–327
 - <OBJECT>, 336–338
 - <PARAM>, 338–339
 - <SCRIPT>, 339–343
 - <SELECT>, 333–334
 - <TEXTAREA>, 334–335
 - <TITLE>, 319
 - «HTML form»
 - logical view and, 238
 - mapping <BUTTON> to, 335–336
 - mapping <FORM> to, 327
 - mapping <INPUT> to, 330–333
 - mapping <SELECT> to, 333–334
 - mapping <TEXTAREA> to, 334–335
 - modeling, 240
 - as UML class, 351–355
 - «HTTP Resource». *See* HTTP resources
 - <IFRAME>, 269–270, 346–347, 360–361
 - «iframe», 269–270, 360–361
 - «include», 239, 361–363, 373
 - «includes», 177, 182
 - <INPUT>, 20, 200, 329–333
 - «Input form», 200, 210, 357
 - «JSP Tag Library», 375–376
 - «JSP tag», 282–284
 - «JSP»
 - glossary application and, 300, 304
 - modeling JSP files with, 365–369
 - UML JSP profile and, 369–370, 373–375
 - <LINK>
 - as HTML elements, 325–327
 - «link» associations and, 358
 - style sheets and, 349
 - «link»
 - associations, 239, 358–360
 - href parameter and, 240
 - mapping HTML to UML, 321
 - mapping to <LINK>, 325
 - screen compartments and, 243
 - «managed», 210
 - <MAP> element, 325
 - <META>, 360
 - <OBJECT>, 336–338, 360
 - «object parameters», 338–339
 - «object», 239, 337–338, 360
 - associations, 239, 360
 - mapping <OBJECT> to, 337–338
 - <PARAM>, 338–339
 - «physical root», 244–246, 317, 348
 - «redirect», 239, 360, 373
 - «screen compartment», 204, 243, 357
 - «screen»
 - navigational maps and, 193
 - notations used with, 210
 - as UML classes, 356–357
 - UX model and, 210
 - <SCRIPT>, 339–343, 356
 - «script library»
 - client-side scripting, 271, 343
 - as UML classes, 356
 - as UML component, 349
 - «script», 343
 - <SELECT>, 19, 333–334
 - «server page». *See* Server pages
 - «style sheet», 349, 357
 - «submit», 239, 360
 - «Target», 355–356
 - «Targeted Link» *n*-ary association, 355
 - <TEXTAREA>, 19–20, 334–335
 - <TITLE>, 319
 - «trace dependencies», 138
 - «URL parameters», 358
 - «use bean», 373
 - «virtual root», 317, 348

A

- <A> (anchor tag). *See* Anchor tag (<A>)
- Abstract Windowing Toolkit (AWT), 43
- Abstraction, 4–5
- Access control, 89–90
- Action parameter, <FORM> tag, 19
- Active Server Pages (ASP)
 - as example of Web architecture, 7

- as scripted approach, 28–29
WAE profile and, 363
- ActiveX
based on COM model, 45
client-side security and, 83–84
controls, 149
extending client-side functionality, 45
- ActiveX/COM, 45–46
- Activity diagrams
controllers, 422
mapping analysis classes to use case, 226, 229
storyboards, 207–208
value of, 179
- Actors
defined, 173
interactions with system, 173–174
relationships with use cases, 177
UML representation of, 176
- Address collection interface, HTTP, 50
- Administrator-level access, 75
- ADS (Architecture Description Standard), 134
- Analysis, 117–120, 215–232
associations and traceabilities, 121
behavioral elements, 225–229
classes, 120, 222
dependence on requirements set, 120
design and, 117, 215–216, 230
focus of, 216
illustration of, 119
iteration and, 216–217
mapping to UX model, 230–231
master template pattern, 427
models produced by, 216
organizing based on things rather than
 actions, 219
package hierarchy and, 217–218
qualities of packages in, 220
relationships, 120
software architecture document and, 120, 231
structural elements, 222–225
structure of, 217–221
techniques, 221–222
top-level model, 218–221
- Anchor tag (`<A>`), 17–18
 associations and, 358
- functioning as anchor or as link, 320
`href` parameter, 17–18
mapping to UML, 320–325
`target` parameter, 18
- Animation, menus and buttons, 42
- Anonymous users
attacks by, 74
prevalence of, 75
- `<APPLET>`. *See* `<OBJECT>`
- Applets. *See* Java applets
- Application servers, thin Web clients, 147
- Architecture, 133–160
candidates for, 141–142
DCOM, 56
design elements, 378–379
design viewpoint, 136
development process and, 6
evolution of Web architectures, 7
Number Store application, 380
overview of, 133–135
presentation tier, 144–145
prototypes, 142–143
realization viewpoint, 136–137
requirements viewpoint, 135–136
requirements and, 116
software architecture document, 120
test viewpoint, 137–138
thick Web client, 149–155
thin Web client, 145–149
use case and, 139–141
viewpoint mappings, 138
WAE/WAE2 and, 7–8
- Web application structural patterns, 143–144
Web Delivery, 155–159
- Architecture Description Standard (ADS), 134
- `<AREA>`, 325
- Artifacts, 108–111
analysis and, 117–120
architectural viewpoints and, 135
artifact set, 111–112
deployment set, 128–130
design set, 120–123
as development stepping stones, 108
domain set, 113–114
implementation set, 123–127

- Artifacts* *continued*
- models as, 109–110
 - navigational paths, 192–193
 - overview of, 188–189
 - project management set, 111–113
 - reasons for creating, 109
 - requirements set, 114–117
 - screens, 189–192
 - storyboards, 192
 - test set, 127–128
 - vision document and requirements and, 161
- ASP. *See* Active Server Pages (ASP)
- Associations. *See also* Relationships
- navigation path modeling, 199
 - UML. *See* UML associations
 - user input class and, 200–201
 - WAE, 239
- Assumptions, use cases, 174
- Attackers
- administrator-level access and, 75
 - anonymous vs. in-house, 74
 - detecting, 74
 - exploitation of bugs and improper configuration, 77–78
 - monitoring network traffic, 87
 - use of network sniffers by, 76–77
- Attributes
- <FORM>, 353–355
 - HTML core, 319
 - requirements, 166
- Audience, architectural design and, 133
- Auditing, security, 89
- Authentication
- levels of, 74
 - passwords and, 75, 85–86
 - security models and, 89
- Authors, use cases and, 174
- AWT (Abstract Windowing Toolkit), 43
- Berners-Lee, Tim, 9
- Best practices, security policy, 88–89
- Binding information, UDDI Web services, 65
- Black box testing, 127
- Blue Screen of Death (BSOD), 83
- <BODY>
- attributes, 319
 - client pages and, 350
 - events, 42
 - as HTML element, 318–319
- Booch, Grady, 3, 97
- «boundary», 222–223
- Browsers, 14–17
- compatibility with JavaScript, 36–37
 - cookies and, 23
 - directory browsing, 78
 - HTML and, 14–17
 - HTTP and, 10
 - multiple, 261
 - thick Web clients and, 152
 - thin Web clients and, 146
 - Web application design and, 261–262
- BSOD (Blue Screen of Death), 83
- Bugs
- exploitation by attackers, 77–78
 - JavaScript, 80
 - security risk and, 74
- «build», 239
- Business information, UDDI Web services, 65
- Business logic
- role of clients in execution of, 31
 - system models and, 4
 - Web applications and, 22–23
- «business logic», 194, 210
- Business objects, 246–247
- Business requirements, 116
- <BUTTON>, 335–336
- Buttons, animating, 42

B

- Behaviors (operations)
- analysis and, 225–229
 - behavioral diagrams, 225
 - screens, 196, 198

C

- Carriage return/line-feed (CR/LF), 10
- CAs (Certificate Authorities), 86, 87
- Cascading style sheets (CSS), 57–58
- CASE tools, 5, 288

- CERN (European Laboratory for Particle Physics), 9
- Certificate Authorities (CAs), 86, 87
- Certificates, 86
- cgi-bin, 26
- CGI (Common Gateway Interface), 26–27
- Change management, 112–113, 217
- Class diagrams
- client pages, 255
 - glossary application, 300
 - master template pattern, 425
 - search functionality and, 278
 - UML models and, 5
 - Web page control mechanism, 290
 - Web page design and, 252–253
- Class identifiers (CLSIDs), 55–56
- Class-Responsibility-Collaboration (CRC) cards, 221
- Class stereotypes, 210–212
- Classes, UML. *See* UML classes
- Client nodes, 149
- «client page». *See* Client pages
- Client pages
- «client page» UML class, 350–351
 - dynamic, 253
 - HTML framesets and, 268
 - logical view and, 237–238
 - mapping to HTML elements, 318–319
 - modeling, 240–242
- «client script object», 273
- Client/server architecture, 141
- Client-side programming, 42
- Client-side risks, 79–85
- ActiveX, 83–84
 - cookies and, 79–80
 - Java applets, 81–83
 - JavaScript, 80
 - plug-ins and MIME types, 84–85
- Client-side scripting
- design and, 253–257
 - extending thin clients, 149
 - script libraries, 271–272
 - script objects, 273
- Client-side validation, 31–32
- Client state management, 23–26
- cookies, 23–25
 - need for, 23
 - sessions, 25–26
- Client tier, 392, 431
- Clients. *See also* Dynamic clients
- browsers, 146
 - dynamic. *See* Dynamic clients
 - environments, 164–167
 - security risk and, 72
 - thick Web. *See* Thick Web clients
 - thin Web. *See* Thin Web clients
- CLSIDs (class identifiers), 55–56
- CMS. *See* Content management systems (CMS)
- Cockburn, Alistair, 173
- Code. *See also* Implementation
- dangers of coding prior to creating artifacts, 108
 - mapping design into, 287
- Collaboration diagrams, 204–206, 225–227
- cols parameter, HTML frameset, 21
- COM. *See* Component Object Model (COM)
- Common Gateway Interface (CGI), 26–27
- Communication
- artifacts and, 109
 - realization viewpoint and, 137
 - role of models in, 5
 - thick Web clients and, 152
- Companies, tailoring development to, 98–99
- Compiled-module approach, 27–28
- Complexity, managing, 50, 219, 377
- Component diagrams, 279, 405–406
- Component Object Model (COM)
- ActiveX based on, 45, 83
 - DCOM as extension of, 55
 - interoperability of components, 63
 - JavaBeans and, 63
- Component packages. *See* UML component packages
- Component view, 242–246
- dynamic page extensions, 244
 - glossary application, 441–443
 - Number Store application, 401–406
 - physical root extensions, 244–246
 - static page extensions, 242–244

- Components. *See* UML components
- Computer-aided software engineering (CASE) tools, 5, 288
- Configuration, security risk and, 74, 77–78
- Connectionless protocols, fault tolerance and, 13
- Constantine, Larry, 173
- Constraints, UML extensions and, 261–262
- Contained classes, user input, 200–201
- Content management systems (CMS)
- business logic and, 191–192
 - classes, 194, 210
 - design and, 260–261
 - dynamic content, 190–191, 194
 - screens, 190–192, 194–196
- Content, static vs. dynamic, 189–190. *See also* Dynamic content
- «control», 222
- Controllers. *See also* Model View Controller (MVC) pattern
- activity diagrams, 422
 - adding, 413
 - analysis diagrams, 417
 - analysis model classes, 415–417
 - analysis model collaborations, 418
 - implementation and, 290
 - Number Store application, 395–398
 - removing, 414
 - use case view, 411–414
- ControlTemplate.jsp source, 295, 395
- Cookies, 23–25
- function of, 23
 - limitations of, 25
 - managing session state, 25–26, 140
 - parameters, 23–24
 - security and, 79–80
 - Set-Cookie header, 24
- Coordinators, controllers, 415–416
- CORBA IIOP, 52
- Countermeasures, security, 89, 91
- Country-specific domains, 12
- CR/LF (carriage return/line-feed), 10
- Crackers. *See* Attackers
- CRC (Class-Responsibility-Collaboration) cards, 221
- Cryptology. *See* Encryption
- CSSs (cascading style sheets), 57–58
- The Cuckoo's Egg* (Stoll), 74
- ## D
- Data structures, UDDI, 65–66
- Data tier, 401, 438–441
- Database servers, 147
- DCE (distributed computing environment), 56
- DCOM. *See* Distributed COM (DCOM)
- Decentralized processing, Web services, 63
- Delivery. *See* Web delivery
- Deployment, 128–130
- associations and traceabilities, 129
 - illustration of, 130
 - plan, 128–129
 - requirements, 166
- Design, 120–123, 233–263
- analysis and, 117, 215–216, 230
 - associations and traceabilities, 124
 - characteristics of designers, 122–123
 - client-side scripting and, 253–257
 - component view, 242–246
 - glossary application, 431–434
 - guidelines, 261–262
 - identification of Web pages, 247–253
 - illustration of, 122
 - integrating with CMS, 260–261
 - logical view, 237–242
 - mapping to code, 287
 - mapping to UX model, 257–260
 - overview of, 136, 233–236
 - process view, 120
 - subsystem details, 120
 - thick Web clients, 152–154, 246–247
 - thin Web clients, 146–149
 - UML extensions and, 236–237
 - Web applications, 246
 - Web delivery applications, 155–157, 247
- Design, advanced, 265–286
- client-side scripting, 271–273
 - HTML frames, 265–270
 - HTTP resources, 273–279
 - JSP custom tags, 281–285

- Design, Number Store, 385, 392–401
 architecture, 380
 client tier, 392
 controllers, 395–398
 data tier, 401
 entity tier, 398–401
 page requests, 394–395
 presentation tier, 392–394
 top-level model, 385
 UX mapping, 398
Design team, 120, 122–123
Designers, characteristics of, 122–123
Develop Software use case, 101–105. *See also*
 Software development process
 activity diagram for, 102
 artifact version management, 101
 business analysis, 101
 domain model, 103
 problem analysis, 103
 project plan, 103
 risk assessment and, 104
 vision document, 103
Developers, infrastructure independence and, 54
Development environment, 137, 248
Development process. *See* Software development process
DHTML (Dynamic HTML), 36
Diagrams
 activity, 179, 207–208, 226, 229
 behavioral, 225
 class, 252–253
 collaboration, 204–206, 225–226
 interaction, 177
 navigation, 192–193
 package, 184
 participant, 208–209
 sequence, 179, 181, 225–226, 252–253
 use case, 177–179
Digitally signed files, 82
Directory browsing, 78
Distributed COM (DCOM), 55–57
 architecture of, 56
 class identifiers (CLSIDs) and, 55–56
 disadvantages of, 57
 object deployment with, 56–57
 overview of, 55
 Web delivery and, 156
Distributed computing environment (DCE), 56
Distributed objects. *See also* Distributed COM (DCOM); Remote Method Invocation (RMI)
 advantages of, 50–51
 examples of, 51–52
 Web architecture and, 49–50
DNS (domain name server), 11
!DOCTYPE keyword, 60
Document elements, WSDL, 66–67
Document identification, URLs, 10–11
Document Object Model (DOM), 33–36
 goals of, 34–35
 illustration of, 34
 JavaScript and, 37–38
 relationship of components in, 33–34
 vendor and platform neutrality, 35
Document objects, JavaScript, 37
Document type definitions (DTDs), 60–61, 62
doGet(), 290
DOM. *See* Document Object Model
Domain name server (DNS), 11
Domains, 113–114
 as artifact of domain set, 113
 domain model and, 113
 glossary and, 113–114
 names, 11–12
 in Number Store application, 380–381
 requirements viewpoint and, 135
 UML and, 103
doPost(), 290
Dot notation, JavaScript, 37
DTDs. *See* Document type definitions
Dynamic clients, 31–47
 ActiveX/COM, 45–46
 DOM and, 33–36
 Java applets and, 43–44
 JavaScript events, 40–42
 JavaScript objects, 37–40
 overview of, 31–33
 scripting technologies and, 36–37
Dynamic content
 content management and, 190–191
 contrasted with static content, 189–190

Dynamic content *continued*

- input forms and, 202
- UX model and, 193–194
- Dynamic HTML (DHTML), 36**
- «dynamic page» class, 348
- Dynamic pages**
 - component view, 244
 - «dynamic page» class, 348
 - requests, 150
 - thin Web client components, 147

Dynamic relationships, 177

E

EJB (Enterprise JavaBeans), 145, 401

- Elements**
 - HTML.** *See* <HTML> elements
 - XML, 58–59**
- Enabling technologies, 26–29**
 - CGI, 26–27**
 - client-side, 33
 - compiled-module approach, 27–28
 - ISAPI and NSAPI, 27
 - scripted approach, 28–29
- Encryption, 86–88**
 - disadvantages of, 88
 - key pairs and, 87
 - protecting network traffic, 76–77, 86–87
 - technologies, 87
 - VPNs and, 77
- Engineering team, 258–259**
- Enterprise JavaBeans (EJB), 145, 401**
- «entity» class, 222
- EntryList tag, JavaServer Pages (JSP), 303–310, 435, 437–438**
- EntryLoop tag, JavaServer Pages (JSP), 303, 311, 313–314, 435, 437–438**
- Entry tag, JavaServer Pages (JSP), 310–313, 435, 437–438**

Environments

- client, 164–167
- development, 137, 248
- distributed, 56
- runtime, 381

European Laboratory for Particle Physics (CERN), 9

- Event handlers, JavaScript, 41**
- Events, JavaScript, 40–42**
- «extends», 179
- Extensible Markup Language. *See* XML**
- Extensible Stylesheet Language (XSL), 57–58**
- eXtreme Programming (XP), 97**

F

Façade architectural pattern, 144

- Fault tolerance, 13–14**
- Field validation, dynamic clients, 31**

File systems, thin Web clients, 147

Firewalls, 85, 146

- <FORM>**
 - attributes, 353–355
 - «form» and, 238
 - HTML forms, 19, 327–329, 351–355
- Form elements, HTML, 18–21**
 - <FORM>, 19
 - <INPUT>, 20
 - overview of, 18–19
 - <SELECT>, 19
 - <TEXTAREA>, 19–20

Form validation, 31

- «form», 238
- «forward», 239, 373

<FRAME>. *See* <FRAMESET>

- <FRAMESET>, 265–270**
 - client pages and, 268
 - conceptual model of, 267–268
 - controversy over use of, 22
 - difficulty of modeling, 265
 - function of, 21, 267
 - as HTML element, 343–345
 - i-frames, 269–270
 - mapping «frameset» to, 356
 - mapping «target» to, 355–356
 - parameters, 21
 - stereotypes for modeling, 266–267
 - structure of, 265–266
 - targets and, 266–267, 269

«frameset», 344, 356
mapping to <FRAMESET>, 344
UML classes, 356
function statement, JavaScript, 340
Functional decomposition, avoiding, 179–183
Functional requirements
defined, 165
as focus of analysis process, 216
requirements viewpoint and, 135
software development and, 116
Funding, vision document and, 164

G

GET values, HTML forms, 19
Glossary, project
component view, 441–443
data tier, 438–441
design model, 431–434
development process and, 113–114
entity tier, 438
function of, 167–168
implementation and, 300–301
presentation tier, 435–438
requirements and use case model, 429–431
screens, 444–448
user experience model, 431
Goal statements, 174

H

Hackers. *See* Attackers
Hardware requirements, 166
<HEAD>, 350
HI (human interaction) skills, 188
Home.jsp source, 299–300
Host names, 11
href parameter, 17–18, 240
<HTML> elements
<A>, 17–18, 320–325
<APPLET>. *See* <OBJECT>
<AREA>, 325
<BODY>, 318–319
<BUTTON>, 335–336
<FORM>, 18–21, 327–329

<FRAME>. *See* <FRAMESET>
<FRAMESET>, 343–345
<HTML>, 318–319
<IFRAME>, 346–347
<INPUT>, 329–333
<LINK>, 325–327
<OBJECT>, 336–338
<PARAM>, 338–339
<SCRIPT>, 339–343
<SELECT>, 333–334
<TEXTAREA>, 334–335
<TITLE>, 319
«HTML form»
logical view and, 238
mapping <BUTTON> to, 335–336
mapping <FORM> to, 327
mapping <INPUT> to, 330–333
mapping <SELECT> to, 333–334
mapping <TEXTAREA> to, 334–335
modeling, 240
as UML class, 351–355
HTML (Hypertext Markup Language), 14–22
core attributes, 319
elements. *See* <HTML> elements
form elements, 18–21
formatting commands, 15–16
frames, using for screen compartments, 203
framesets. *See* <FRAMESET>
function of, 14
input controls, 200
limitations of, 14
mapping to UML, 315–316
multimedia tags and, 17
as output of CGI modules, 27
overview of, 14–17
separating content from presentation, 16–17
storyboards and, 192
style sheets and, 16
tags, 14–15
URL resolution, 316–318
Web architecture and, 49
XML compared with, 57–58
HTTP (Hypertext Transfer Protocol)
disadvantages of, 49–50
document identification and, 10–11

HTTP (Hypertext Transfer Protocol) *continued*
 domain names and, 11–12
 fault tolerance and, 13–14
 limitations of, 155
 resource identifiers and, 13
 state management, 23. *See also* cookies
 thin Web client connections, 147
 Web architecture and, 49
 «HTTP Resource». *See* HTTP resources
 HTTP resources, 273–279
 class stereotype, 277
 glossary application and, 442
 mapping to URLs, 273
 physical, 275, 317, 348
 as UML component, 349
 UX model and, 281
 virtual, 275–276, 348
 HTTPS (Secure HTTP), 14
 Human interaction (HI) skills, 188
 Hypertext Markup Language. *See* HTML
 Hypertext Transfer Protocol. *See* HTTP

I

IA (Information architect), 100, 188
 ICANN (Internet Corporation for Assigned Names and Numbers), 12
 ICONIX Unified Process, 97
 IE (Internet Explorer), 84
 <IFRAME>, 269–270, 346–347, 360–361
 <iframe>, 269–270, 360–361
 IIOP (Internet Inter-Orb Protocol), 52
 Implementation, 123–127, 287–314
 associations and traceabilities, 126
 control mechanism, 290
 ControlTemplate, 295
 EntryListTag, 303–310
 EntryTag, 310–313
 glossary page, 300–301
 home page, 299–300
 illustration of, 125
 index page, 301–303
 overview of, 287–289
 page requests, 291
 PresentationTemplate, 296–299

programming languages and technologies, 123, 125
 RequestProcessor, 292–295
 ScreenDefinitions, 295–296
 unit testing and, 123
 «include», 239, 361–363, 373
 «includes», 177, 182
 Index.jsp source, 301–303
 Information architect (IA), 100, 188
 <INPUT>, 20, 200, 329–333
 «Input form», 200, 210, 357
 Input forms
 multiple, 202
 types of, 200
 Interaction diagrams, 177
 Internet Corporation for Assigned Names and Numbers (ICANN), 12
 Internet Explorer (IE), 84
 Internet Inter-Orb Protocol (IIOP), 52
 Internet Protocol (IP), 11
 Internet Server API (ISAPI), 27
 Intrusion detection, 89
 Iteration
 activity diagram for, 106
 analysis and, 216–217
 plans, 103, 111–112
 Software Iteration use case, 105–108
 workflow and, 104–105

J

J2EE
 API, 7
 Number Store example, 379
 Web page management, 248–249
 Jacobson, Ivar, 3, 97, 173
 JAR (Java Archive) files, 44, 82
 Java applets
 <OBJECT> tag and, 43–44
 class libraries, 43
 client-side security and, 81–83
 downloading and caching on client, 44
 extending thin clients with, 149
 passing parameters to, 44
 RMI and, 55

Java Archive (JAR) files, 44, 82
Java Development Kit (JDK), 52, 81–82
Java Foundation Classes (JFC), 43
Java Pet Store, 7
Java programming language, 36, 43
Java Remote Method Protocol (JRMP), 52
Java servlets, 27
Java technology, 43
Java Virtual Machine (JVM), 83
JavaBeans
 COM objects and, 63
 compared with scripting, 32
JavaScript
 <SCRIPT> element and, 339
 animating menus and buttons, 42
 browser compatibility and, 36–37
 client-side security and, 80
 custom objects, 39–40
 document objects, 37
 DOM and, 37–38
 events, 40–42
 function statement and var keyword, 340
 Java programming language and, 36
 script libraries, 271–272
 script objects, 273
 variables, 342
JavaServer Pages (JSP)
 custom tags, 281–285
 as example of Web architecture, 7
 JSP components in glossary application, 443
 JSP files, 365–369
 mapping to UML, 363–369
 scripted approach of, 28–29
 stereotypes, 282–283
 Web applications and, 363–365
 web.xml file, 363
JavaServer Pages Model 2 Architecture, 249–250
JDK (Java Development Kit), 52, 81–82
JFC (Java Foundation Classes), 43
JRMP (Java Remote Method Protocol), 52
.js file, 271–272, 349
JSP. *See* JavaServer Pages (JSP)
JSP files, 365–369
«JSP Tag Library», 375–376
«JSP tag», 282–284

«JSP»
glossary application and, 300, 304
modeling JSP files with, 365–369
UML JSP profile and, 369–370, 373–375
JVM (Java Virtual Machine), 83

K

Kruchten, Philippe, 133

L

Languages, UML, 3
<LINK>
 as HTML elements, 325–327
 «link» associations and, 358
 style sheets and, 349
«link»
 associations, 239, 358–360
 href parameter and, 240
 mapping HTML to UML, 321
 mapping to <LINK>, 325
 screen compartments and, 243
Lockwood, Lucy, 173
Logical view, 237–242
 client page extension, 237–238
 design viewpoint and, 136
 HTML forms extension, 238
 master template pattern, 425–426
 modeling client pages, 240–242
 modeling HTML forms, 240
 modeling server pages, 240–241
 relationships between stereotypes, 239
 server page extension, 237
 Web components and, 280

M

«managed», 210
<MAP> element, 325
Master template pattern, 423–427
 analysis model, 427
 logical view, 425–426
 use case view, 423–424
MDE (Microsoft Development Environment), 248

- Menus
 animating, 42
 glossary application and, 434
- <META>, 360
- method parameter, <FORM> tag, 19
- Microsoft DCOM. *See* Distributed COM (DCOM)
- Microsoft Development Environment (MDE), 248
- Microsoft Transaction Server (MTS), 145
- MIME (Multipurpose Internet Mail Extensions)
 types, 84–85
- Model View Controller (MVC) pattern, 411. *See also* Controllers
- Modeling
 benefits of, 5
 by-products vs. purposes of, 5–6
 development process and, 109–110
 levels of abstraction in, 4–5
 model-driven development, 3
 secure systems, 89–91
 updates and, 287
- Mouse-over events, 42
- MTS (Microsoft Transaction Server), 145
- Multipurpose Internet Mail Extensions (MIME)
 types, 84–85
- MVC (Model View Controller) pattern, 411. *See also* Controllers
- ## N
- Namespaces, XML, 61–62
- National Center for Supercomputing Applications (NCSA), 16
- navigate to(), 196
- Navigational map
 associations and, 199
 diagrams, 192–193
 glossary application and, 432
 notations used with, 210
 Number Store application and, 387–388
 pathways between screens, 192–193
 principal paths, 196, 200
 top-level mapping of Web applications, 210
 user input, 201
- NCSA (National Center for Supercomputing Applications), 16
- .NET
 Web page management, 248–249
 Web services and, 63
- Netscape Server API (NSAPI), 27
- Network security, 72
- Nonfunctional requirements
 categories of, 165–166
 requirements viewpoint and, 135–136
 software development and, 116
- Notation, navigational, 210
- NSAPI (Netscape Server API), 27
- Number Store application. *See* Software architecture document, Number Store
- ## O
- <OBJECT>
 as HTML elements, 336–338
 «object» and, 360
- Object-oriented principles, 3
- «object parameters», 338–339
- «object»
 associations, 239, 360
 mapping <OBJECT> to, 337–338
- Objects, JavaScript, 37–40
- Open Systems Interconnection (OSI), 13
- Operating system security, 79
- Operations (behaviors). *See* Behaviors (operations)
- Organizations, tailoring development to, 98–99
- OSI (Open Systems Interconnection), 13
- Outstanding issues, use cases and, 174
- ## P
- Package diagrams, 184
- Packages
 hierarchy in analysis model, 217–218
 «JSP Tag Library» package, 375–376
 Number Store application, 378
 ownership of, 219–220
 qualities in analysis model, 220
 UML components, 348
- Page composition, 144, 417
- Page requests
 controlled controllers and, 412

handling, 394–395
implementation scenarios, 291
mechanisms, 289
Number Store application and, 396–398
`<PARAM>`, 338–339
Participants diagram, 208–209
Passwords
 basic authentication, 75
 creating policy for, 85–86
 guidelines for choosing, 76
 programs for cracking, 75–76
Performance
 requirements, 165
 testing, 127
Perl (practical extraction and reporting language), 26
PHP, 28–29
«physical root», 244–246, 317, 348
Physical view. *See* Component view
Plug-ins, client-side security and, 84–85
POST values, HTML forms, 19
Postconditions, use cases, 174
Practical extraction and reporting language (Perl), 26
Presentation logic, vs. business logic, 31
Presentation tier
 glossary application, 435–438
 Number Store application, 392–394
 patterns, 143–145
PresentationTemplate.jsp source, 296–299
Prioritization of requirements, 171–173
Privacy, cookies and, 25, 80
Private/public keys, 87–88
Procedural risk, contrasted with technical risk, 73
Process. *See* Software development process
Process view, 120, 136
Project management, 111–113
Project plans, 103, 111–112
Project scope, 162–163
Prototypes
 architectural, 142–143
 JavaScript, 40
 as output of UX team, 188
Public/private keys, 87–88

Q

Quality assurance (QA), 99, 127

R

Rational Rose, as modeling tool, 4
Rational Unified Process (RUP), 97, 105
Realization viewpoint
 overview of, 136–137
 thick Web client, 154
 thin Web client, 149
 Web Delivery, 157
«redirect», 239, 360, 373
Regression testing, 127
Relationships. *See also* Associations
 analysis and, 120
 dynamic, 177
 between requirements, 166–167
 between stereotypes, 239
 use case model, 177
Reliability requirements, 165
Remote Method Invocation (RMI), 52–55
 IIOP as transport protocol, 52
 interaction of applets and remote objects, 55
 layered architecture of, 53
 setting up remote object server, 54
 stub and skeleton objects and, 52–53
 Web delivery and, 156
Remote object server, 54, 156
Remote objects, 156
Remote procedure calls (RPCs), 56, 63
Remove object transfer protocol, 156
RequestProcessor
 controllers and, 415
 implementation and, 292–295
 Number Store application, 395
Requirements, 164–167
 associations and traceabilities, 118
 attributes, 166
 dependence of analysis on, 120
 example document, 168–170
 functional and nonfunctional, 116, 165–166
 gathering, 168–169
 glossary application and, 429–431

- Requirements *continued*
- hierarchy of, 166
 - illustration of, 115
 - Number Store application and, 378–381
 - overview of, 135–136
 - prioritizing, 171–173
 - relationships between, 166–167
 - requirements team, 114, 168
 - reviewing and amending, 170
 - screens as artifacts of, 192
 - as system constraints, 164–165
 - testing, 165
 - thick Web clients, 151–152
 - thin Web clients, 145–146
 - use cases, 116–117, 175
 - user experience document and, 117
 - vision document and, 116, 163
 - Web Delivery, 155
 - writing requirements statements, 171
- Requirements team, 114, 168
- Resource identifiers, 13
- Reverse-engineering
- modeling and, 5–6
 - updating models and, 288
- Risk
- addressing early, 217
 - client-side, 79–85
 - development process and, 104
 - server side, 77–79
 - technical, 73–77
 - types of, 72–73
- RMI. *See* Remote Method Invocation (RMI)
- Role playing, analysis process and, 221
- Round-trip engineering, 4, 5
- Rows parameter, HTML frameset, 21
- RPCs (remote procedure calls), 56, 63
- Rumbaugh, Jim, 3, 97
- Runtime environment, 381
- RUP (Rational Unified Process), 97, 105
- S**
- SARs (significant architectural requirements), 135, 380
- Scalability strategies, 137
- Schedules
- development process and, 104
 - iteration and, 107–108
- Schemas, XML, 62–63
- SCM (service control manger), 56
- Scope, vision document, 162–163
- «screen compartment», 204, 243, 357
- Screen flow, 196, 200. *See also* Navigational map
- «screen»
- navigational maps and, 193
 - notations used with, 210
 - as UML classes, 356–357
 - UX model and, 210
- ScreenDefinitions.jsp source, 295–296, 395
- Screens, 189–200
- behaviors (operations), 196, 198
 - compartments, 203–204
 - content management and, 190–192, 194–196
 - contrasted with Web pages, 189
 - flow, 196, 200
 - glossary application, 444–448
 - navigational map of, 192–193
 - Number Store application, 406–410
 - properties, 190
 - as requirement artifact, 192
 - «screen» class and, 193
 - storyboards and, 192
 - as user interface, 189
- <SCRIPT>, 339–343, 356
- «script library»
- client-side scripting, 271, 343
 - as UML classes, 356
 - as UML component, 349
- «script», 343
- Scripts. *See also* JavaScript
- applying client-side business logic, 31–32
 - enabling technologies and, 28–29
 - extending thin clients, 149
 - libraries, 271–272
 - objects, 273
 - security of, 80
 - WAE profile and, 363
- Search engines, 22–23
- Secure Electronic Transaction (SET), 87
- Secure HTTP (HTTPS), 14

- Secure Sockets Layer (SSL), 87
Security, 71–92
 ActiveX and, 83–84
 best practices, 88–89
 client-side risks, 79–85
 cookies and, 79–80
 encryption, 86–88
 Java applets, 81–83
 JavaScript, 80
 modeling secure systems, 89–91
 plug-ins and MIME types, 84–85
 requirements, 166
 risk types, 72–73
 server-side risks, 77–79
 strategies, 85–86
 technical risks, 73–77
 vision document and, 164
 zones in Internet Explorer (IE), 84
<SELECT>, 19, 333–334
Sequence diagrams
 Browse Catalog and, 181, 227
 client pages, 257
 vs. collaboration diagrams, 225–226
 value of, 179
 Web page design and, 252–253
«server page». *See* Server pages
Server pages
 logical view stereotypes, 237
 modeling, 240–241
 «server page» class, 349
 UML JSP profile, 370–373
 user interface construction, 262
Server security, 72
Server-side includes (SSI), 16–17, 78
Server-side risks, 77–79
Service control manager (SCM), 56
Session state, 25–26, 140
Set-Cookie header, 24
SET (Secure Electronic Transaction), 87
SGML (Standard Generalized Markup Language),
 14, 58
Significant architectural requirements (SARs),
 135, 380
Simple Object Access Protocol. *See* SOAP
Skeleton objects, RMI, 52–53
Sniffers, 76–77
SOAP (Simple Object Access Protocol), 64–65
 combining with WSDL and UDDI, 67–68
 message parts, 64
Software architecture document, 120, 231
Software architecture document, Number Store,
 379–406
 component view, 401–406
 design view. *See* Design, Number Store
 requirements view, 379–381
 use case view, 382
 user experience view, 382–385
Software bugs, 74
Software development process
 analysis set, 117–120
 artifacts, 108–111
 deployment set, 128–130
 design set, 120–123
 Develop Software use case, 101–105
 domain set, 113–114
 implementation set, 123–127
 managing complexity in, 377
 overview of, 96–100
 project management set, 111–113
 requirements set, 114–117
 roles in, 96
 Software Iteration use case, 105–108
 test set, 127–128
 UML model as basis of, 100–101
 vision document as basis of, 161
 Web architectures and, 6
Software Iteration use case, 105–108
 activity diagram for, 106–107
 review and refinement process and,
 107–108
 slipping schedules and, 107
Source code, 137
Specification information, UDDI Web
 services, 65–66
SSI (server-side includes), 16–17, 78
SSL (Secure Sockets Layer), 87
Stakeholders, 101, 161–162
Standard Generalized Markup Language
 (SGML), 14, 58
State diagrams, 401

- State management, 23
 Static content, screens, 189–190
 Static pages
 extensions, 242–244
 requests, 148
 «static page» class, 348
 thin Web client components, 147
 Stereotypes
 component view, 242–246
 HTML framesets, 266–267
 JSP tags, 282–283
 logical view stereotypes, 237–242
 UML extensions and, 261–262
 Stoll, Clifford, 74
 Storyboards, 204–209
 checkout storyboard, 197–198
 collaboration diagrams and, 204–206
 glossary application and, 433
 navigational flow, 207–208
 Number Store application and, 389–391
 participants diagram, 208–209
 screens and, 192
 Structural elements, analysis, 222–225
 Structural patterns, Web applications, 143–144
 Stub objects, 52–53, 156–157
 «style sheet», 349, 357
 Style sheets, HTML, 16
 Subdomains, 11
 «submit», 239, 360
 Swing components, Java applets, 43
 Symbolic links, 78
 System
 constraints. *See* Requirements
 development process and, 109–110
 interaction with actors in, 173–174
 nodes, 137
- T**
- Tag library stereotype, 282
 Tag stereotype, 283
 Tagged values, UML extensions, 261–262
 Tags
 HTML for document text, 14–16
 JSP custom, 281–285
 special HTML tags for multimedia, 17
 XML, 59
 target parameter, anchor tag (<A>), 18
 «Target», 355–356
 «Targeted Link» *n*-ary association, 355
 Targets, 266–267, 269
 TCP (Transmission Control Protocol), 13
 Teams
 architectural, 139, 141–142
 design, 120, 122–123
 preferences and work habits of, 99
 relationship between engineering and UX, 258–259
 requirements, 168
 skill level of, 99
 test, 127
 UX, 100, 122–123
 Technical risk, 73–77
 authentication and, 74–76
 configuration and bugs and, 74
 contrasted with procedural risk, 73
 encryption and, 76–77
 Tei stereotype, 283
 Template pattern. *See* Master template pattern
 Templated pages, 144
 Test team, 127, 138
 Tests
 compared with quality assurance, 127
 illustration of, 128
 overview of, 137–138
 plan, 138
 requirements, 165
 thick Web client, 154–155
 thin Web client, 149
 types of, 127
 Web Delivery, 157
 Web pages, 261
 <TEXTAREA>, 19–20, 334–335
 Thick Web clients, 149–155
 defined, 144–145
 deploying, 154
 design viewpoint, 152–154
 designing, 246–247
 illustration of participants, 152
 overview of, 149–151

- realization viewpoint, 154
- requirements viewpoint, 151–152
- test viewpoint, 154–155
- Thin Web clients, 145–149
 - defined, 144
 - deploying, 151
 - design viewpoint, 146–149
 - illustration of participants, 148
 - partitioning objects for, 246
 - realization viewpoint, 149
 - requirements viewpoint, 145–146
 - test viewpoint, 149
- Third-level domains, 12
- <TITLE>, 319
- Top-level domains (TLDs), 11–12
- Top-level model
 - analysis and, 218–221
 - glossary application, 432
 - Number Store application, 378, 385, 392
- «trace dependencies», 138
- Traceability
 - analysis, 121
 - deployment, 129
 - design, 124
 - development process and, 109, 111
 - implementation, 126
 - project management and, 112
 - requirements, 118
- Transmission Control Protocol (TCP), 13
- U**
 - UDDI. *See* Universal Description, Discovery, and Integration
- UML associations
 - «iframe», 360–361
 - «include», 361–363
 - «link», 358, 358–360
 - «object», 360
 - «redirect», 360
 - «submit», 360
- UML classes
 - «boundary», 222–223
 - «client page», 350–351
 - «control», 222
 - «entity», 222
 - «frameset», 356
 - «HTML form», 351–355
 - «input form», 200, 357
 - «screen compartment», 204, 357
 - «screen», 193, 356–357
 - «script library», 356
 - «server page», 349
 - «style sheet», 357
 - «target», 355–356
 - «targeted link» *n*-ary association, 355
- UML component packages
 - «physical root», 348
 - «virtual root», 348
- UML components
 - «dynamic page», 348
 - «HTTP resource», 349
 - «script library», 349
 - «static page», 348
 - «style sheet», 349
- UML JSP profile, 369
 - «forward», 373
 - «include», 373
 - «JSP tag», 373–375
 - «JSP», 369–370
 - «JSP tag library», 375–376
 - «redirect», 373
 - «server page», 370–373
 - «use bean», 373
- UML (Unified Modeling Language). *See also* Web Application Extension for UML (WAE)
 - creation of, 3
 - design extensions, 236–237
 - mapping to/from HTML, 315–316, 347
 - mapping to JSP, 363–369
 - modeling XML with, 63
 - scripting and, 340
 - software development process and, 100–101
 - use case model and, 176
 - user experience. *See* User experience (UX)
- Uniform resource identifiers (URIs), 13, 316
- Uniform resource locators (URLs)
 - document identification and, 10–11
 - HTTP parameters, 322–323
 - mapping to HTTP resources, 273–279, 316–318

- Uniform resource locators (URLs) *continued*
- referencing remote objects, 53
 - resolution for HTML, 316–318
 - URL redirection for session management, 26
 - URL uniqueness, 323–325
 - «virtual root» and, 348
 - Uniform resource names (URNs), 13, 317
 - Unique ID, 174
 - Unique keys, 26
 - Unit testing, 123, 287
 - Universal Description, Discovery, and Integration (UDDI), 65–66
 - application of, 66
 - combining with WSDL and SOAP, 67–68
 - data structure types, 65–66
 - publishing Web services, 65
 - Updating models, 287
 - URIs (uniform resource identifiers), 13, 316
 - «URL parameters», 358
 - URLs. *See* Uniform resource locators (URLs)
 - URNs (uniform resource names), 13, 317
 - Usability requirements, 165
 - «use bean», 373
 - Use cases, 173–185
 - analysis, 120, 216
 - controllers, 411–414
 - Develop Software, 101–105
 - diagrams, 177–179
 - examining and prioritizing, 139–141
 - functional decomposition and, 179–183
 - glossary application, 430
 - interaction between actors and systems, 173–174
 - key information captured with, 174
 - Master Template Pattern, 423–424
 - multiple scenarios and, 175–176
 - Number Store application, 382
 - relationships, 177
 - requirements, 116–117
 - risk assessment, 104
 - Software Iteration, 105–108
 - structure of, 175, 183–185
 - UML representation of, 176
 - User account security, 88
 - User experience (UX), 187–213
 - class stereotypes, 210–212
 - document, 117, 185
 - glossary application, 431
 - HTTP resources and, 281
 - mapping analysis to UX model, 230–231
 - mapping design to UX model, 257–260
 - navigational map, 192–193, 210
 - Number Store application, 382–385, 394, 398
 - overview of, 188–189
 - screen compartments, 203–204
 - screen flow, 196–200
 - screens, 189–196
 - storyboards, 192, 204–209
 - user input, 200–203
 - User experience (UX) team
 - artifacts responsible for, 188–189
 - artistic and creative aspect of projects and, 100
 - characteristics of, 122–123
 - engineering team and, 258–259
 - information architect (IA) as member of, 188
 - responsible for look-and-feel, 187
 - user experience document and, 117
 - User IDs, 75. *See also* Passwords
 - User input, 200–203
 - association and contained classes and, 200–201
 - dynamic content and, 202
 - input forms, 200
 - multiple input forms, 202
 - navigational flow and, 201
 - User interface
 - construction of, 262
 - screens as, 189
 - Users, 173
 - UX. *See* User experience (UX)
 - UXG (UX guidelines) document, 185
- ## V
- Validation
- client-side, 31–32
 - thick Web clients and, 151–152
- var keyword, JavaScript, 340
- Version control, 110
- Viewpoints, architectural
- design viewpoint, 136
 - mapping, 138

- overview of, 134
 - realization viewpoint, 136–137
 - requirements viewpoint, 135–136
 - test viewpoint, 137–138
 - Virtual private networks (VPNs), 77
 - «virtual root», 317, 348
 - Vision document, 161–164
 - artifact process and, 108
 - as basis of development process, 103, 161
 - elements of, 162
 - features and requirements, 163
 - funding and, 164
 - Number Store application and, 377
 - project scope and, 162–163
 - requirements set and, 116
 - security and client environments, 164
 - VPNs (virtual private networks), 77
- W**
- W3C (World Wide Web Consortium)
 - HTML standard, 14
 - XML namespaces, 61
 - XML schemas, 62–63
 - XML standard, 57
 - Web Application Extension for UML (WAE). *See also* UML
 - applicability to Web architectures, 7
 - association stereotypes, 239
 - class stereotypes, 316
 - defined, 379
 - expressing in terms of stereotypes, tagged values, and constraints, 236
 - extending UML for Web modeling, 4
 - version 2, 8
 - Web applications
 - client state management, 23–26
 - design guidelines, 261–262
 - designing, 246
 - enabling technologies, 26–29
 - JavaServer Pages (JSP) and, 363–365
 - Web sites vs. Web applications, 22–23
 - Web architecture
 - distributed objects and, 49–50
 - HTML and, 49
 - HTTP and, 49
 - limitations of, 7
 - Web delivery, 155–159
 - defined, 145
 - deploying, 159
 - design viewpoint, 155–157
 - designing applications for, 247
 - overview of, 155
 - realization viewpoint, 157
 - remote object execution scenario, 158
 - requirements viewpoint, 155
 - test viewpoint, 157
 - Web pages
 - class diagrams, 252
 - control mechanisms, 289
 - design, 247–253
 - J2EE and .NET and, 248–250
 - Number Store shopping functionality and, 399
 - page request mechanisms, 289
 - screens contrasted with, 189
 - search engine example, 250–251
 - sequence diagrams, 252–253
 - UX design elements, 248
 - Web servers, 146
 - Web services, 63–64
 - compared with RPCs, 63
 - decentralized processing and, 63
 - publishing with UDDI, 65
 - SOAP, 64–65
 - UDDI, 65–66
 - WSDL, 66–68
 - Web Services Description Language. *See* WSDL
 - Web sites, vs. Web applications, 22–23
 - web.xml file, 289, 363
 - Word form analysis, 222
 - Workers, 96
 - Workflows
 - development process and, 96–97
 - as dynamic relationship, 177
 - iterative nature of, 97–98
 - RUP and, 105
 - World Wide Web Consortium. *See* W3C (World Wide Web Consortium)

WSDL (Web Services Description Language),
66–68
combining with UDDI and SOAP, 67–68
document elements, 66–67
Web services and, 66

X

XML (Extensible Markup Language), 57–63
advantages of, 58

compared with HTML, 57–58
document elements, 58–59
DTDs, 60–61
namespaces, 61–62
roots in SGML, 58
schemas, 62–63
successful use of, 59
tags, 59
XP (eXtreme Programming), 97
XSL (Extensible Stylesheet Language), 57–58