Index

The [*number*] indicates a citation in the References.

adapter 11, 105–117, 148–9, 152–3
Adjacency Matrix view 61–2, 65
algorithm animation
  display taxonomy 14–18
  movies 27–9
  systems 34–46
  videotapes 172
algorithm input events, *see* events
algorithm output events, *see* events
algorithm parameters 8, 61, 68, 93
  examples 57–8
  implementation 140, 146–7
algorithm races 40, 55–60, 63, 66, 168
algorithm trace 96–7
algorithmatician 12
algorithms 7, 93–8, 148–9, 150
  repertoire 95, 98
  presentation state 69
  structural state 67–8
  temporal state 68
Anderson, Jim [1] 40
animating an algorithm 97
animators 12
Animus 34, 43
annotations 148–9, 156
Apollo workstations 165
applications 4–5,
  see also Electronic Classroom
Asente, Paul [3] 162

Baecker, Ronald M. 34; [6,7] 35;
  [8] 13; [35] 31, *see also* PV;
  [9] 29, *see also Sorting Out Sorting*
Bajaj, Anil [4] 27
BALSA–II 2–4
  application 126, 135–144, 156–7
  preprocessor 126–134, 156–7
Balzer, Robert M. [5] 40
Baskerville, David B. [10] 32,
  see also GDBX
Bentley, Jon L. 34, 77; [11] 44–5,
  see also Movie/Stills
Bertin, Jacques [12,13] 19, 162,
  see also graphic design
Binpacking algorithms 14–18, 52–5
Bins view 15, 16, 17
Bobrow, Daniel G. [62] 41–2
Booth, Kellog S. [14] 29
Borning, Alan H. [72] 76
Bosworth, George [1] 40
broadcasting 73–4, 89–90, 166, 169
Brown, Gretchen P. [15,35,44] 31–2,
  see also PV

Brown, Marc H. [16] 3, 24, 172, 173; [17] 3, 172, 173; [18] 3, 24, 173
Bush, Vannevar 76
Buxton, William [19] 162

CAI 169
Carling, Richard T. [15,35,44] 31–2, *see also* PV
CD-ROM 90, 163, 170
Cedar, 5
chained modelers 115–7
Chang, Shi-Kuo [20,21] 13, 27
client-programmer, 3, 6, 12
  goals 91–2
  model 9–11
  specifications 145–155
Code view 16, 17
Compare-Exchange view 16–7, 48–9
coroutines 40, 141, 156
correlate messages 11, 99, 115, 107, 148–9; *see also* message dictionary
CorrelateMsg 148–9

de Boer, James M. [22] 35, 36–8
Dots view 15, 49–50, 52, 55–6, 116
Duisberg, Robert A. [24] 6, 43; [23] 43; [47] 6, 34, 42–3, 46

Electronic Classroom 2, 165–171, 172–4
EMACS [68] 72–3, 77
end-user 3–4, 6, 7–9, 66–70
Engelbart, Douglas C. 76
Entwisle, Doris R. [39] 28
event count 63–6
event dictionary 127–130, 145–6
event routing 143–4
events 9–10, 24, 39, 62–6, 68, 95, 97, 98
  as BALSA-II sees them 63, 142–3, 145–6, 149
  as client-programmers see them 62, 98
  as end-users see them 62, 98
  cost 62–6, 66–7, 68
  step 62–3, 65, 66–7, 68
  stop 62–3, 65, 66–7, 68
  see also interpreter implementation
Evett, Matt P. 172
EXDAMS 40

Feiner, Steven K. [25] 19; [26] 76
Foley, James D. [27] 27; [28] 82, 168, 172
Foxboro Auditorium 165, 170, 171
Fredman, Michael L. [29] 5, 21–2
Friedel, Mark [35] 31, *see also* PV

GARDEN 13, 30
Garrett, L. Nancy 172, 173
GDBX 32–3, 34
GELO 30
Goldberg, Adele [30,31] 5, 40–1
Grafton, Robert B. [32] 13, 27
Graph Traversal algorithms 61–65
Graph view 61–2, 65–6
graphic design 12, 13, 162
graphical debuggers 30–4, 45
graphical display of data 30, 45
graphical displays, *see* views
graphical programming, *see* visual programming
graphics package (in BALSA-II) 121–5, 139–140

Halbert, Daniel C. [33] 76–7
hardware for algorithm animation 2, 162–3, 170
Hashing movie 29
HBars view 57–8
HBars-History view 56, 59
Heapsort algorithm 55
Herot, Christopher F. [34] 35; [15,35,44] 31–2, *see also* PV
Hickman, Kelly [4] 27
Hong, Zhu [36] 5
Hopgood, F. Robert A. [37] 27–8, 29
Huggins, William H. [38,39] 28

Ichikawa, Tadao [32,21] 13, 27

Incense 30–1, 33, 34
Incerpi, Janet M. [41] 5
input generator parameters, 8, 68, 101–2
  examples 60–1
  implementation 140, 146–7
input generator trace 104
input generators, 7, 58–9, 98–104, 148–9, 151
  repertoire 101
  structural state 68
InputEvent 148–9
Insertion sort algorithm 49, 58–9, 60, 95–6
interactive environment
  for end-users 47–66
  for script authors 77–8
  for script viewers 78–80
  model 66–70
Interlisp 5
Intermedia 76
interpreter
  implementation 63, 141–4
  end-user controls 48, 65
Inversion-Table view 58–9, 114–7

journaling 83, 137

Kahn, Kenneth M. [62] 41–2
Kernighan, Brian W. 34, 77; [11] 44–5, *see also* Movie/Stills
Knowlton, Kenneth C. [42] 28
Knuth, Donald E. [43] 5
Koçak, Hüseyin 173
Kramlich, David A. [15,35,44] 31–2; *see also* PV
Kruskal MST algorithm 66

L6 movie 28
Lambert, Steve [45] 90
Ligomenides, Panos A. [21] 13, 27
Lipton, Richard J. [46] 30
London, Ralph L. [47] 6, 34, 42–3, 46
LOOPS 41–2

Macintosh 71, 76
  toolkit 36, 83, 137, 139, 156
  user interface 36, 47, 54
Mackinlay, Jock [48] 91
MacPascal 65
McMath, Charles F. [27] 27
Mergesort algorithms 55–6
Merzbacher, Matthew A. 173
messages,
see update messages, correlate messages
message dictionary 127–130, 145–6
message routing 143–4
Meyrowitz, Norman K. 173; [73] 76, 174
Model, Mitchell L. [49] 25, 39
modeler 105–117, 148–9, 154–5
  repertoire 106
modeling package 125, 140, 156
Moher, Thomas G. [50] 33, *see also* PROVIDE
Movie/Stills 34, 44–5, 77
multiple algorithms, *see* algorithm races, interpreter
multiple processes 8, 163–4
MVC 40–1, 42–3
Myers, Brad A. [53] 13, 30; [51,52] 13, 30, *see also* Incense

Nagy, Sandor [26] 76
name-that-algorithm 168
Nelson, Theodore L. 75
nested PASCAL modules 134
New Bins view 16
Nievergelt, Jurg [54] 27
Noparstak, Barbara [1] 40
North, Steven C. [46] 30

object-oriented
  languages 40–3, 117–121
  protocols, *see* repertoires
OutputEvent 148–9

Packing w/probes view 17

Packing view 17, 52–5
Partition-Tree view 21, 22, 50–2
PECAN 5–6
Plattner, Bernhard [54] 27
portability issues, 127, 156
PQ Tree movie 29
presentation properties 67, 69–70, 77, 80, 136, 139
Probes view 16, 17
process monitoring 27
program monitoring 27
program visualization 13–14, 19–20
PROVIDE 33–4, 159
PV 31–2, 33, 34

QuickDraw 122, 140, 156
Quicksort algorithm 20–1, 22, 36, 49–52, 55, 57–9, 63–5

Raeder, Georg [55] 13, 27
reentrant PASCAL modules 130–3
Reingold, Edward M. [56] 30
Reiss, Steven P. [57,58,59] 5–6, 13, 30
renderer 105–117, 148, 154–5
  graphics package 121–5
  parameters 140, 146–7
  repertoire 106
repertoires 40, 121, 146
reverse execution, 34, 40
Ripa, Alberto A. Della [1] 40
Robson, David [31] 5
Roeth, Janine A. 172, 173
Ropiequet, Suzanne [45] 90
routing events and messages 143–4
runtime properties 67, 136
runtime-specifics 9, 104
  programmer examples 103–4
  user examples 61, 67, 68, 140

Sandberg, J. S. [46] 30
script authors 12, 71–2, 77–8
script viewers 12, 71–2, 78–80
scripts 1–2, 4, 71–2
  applications 73–5, 167, 170
  effects on programmers 84, 86–7, 146–7
  implementation 80–90, 136, 138–9
  research directions 78, 162–3
  transcript file 71–2, 87–9
SDMS 35
Sedgewick, Robert 169; [60] 167; [61,36] 5;[29] 5, 21–2; [16] 3, 172, 173;[17] 3, 172, 173;[18] 3, 24, 173
selected algorithm 56, 65, 69
selected view 53, 56, 69
Selection sort algorithm 36–8, 48–9
setup-run loop 7–8, 66–7, 77, 80, 139
Shannon, Alfred [71] 30
Shellsort algorithm 55, 59
Sherman, David [9] 29,
  see also Sorting Out Sorting
Shipp, William S. 174
Sleator, Daniel D. [29] 5, 21–2
SmallStar 76–7
Smalltalk MVC 40–1, 42–3
Smith, Karen E. 172, 173
Sorting Out Sorting movie 29, 39, 40
Souza, Paul [15] 31, 32, *see also* PV
stable state 67, 135, 141–2
Standish, Thomas A. [4] 27
Stefik, Mark J. [62] 41–2
Sticks view 48–9, 50, 58, 60, 109–114
Strickman, Michael D. 173
structural properties 67–8, 77, 80, 135, 139
submodelers 114–7
systems guru 12–13

Tarjan, Robert E. [29] 5, 21–2
Teitelman, Warren [64,65] 5
Tempo 71
temporal properties 67, 68, 77, 80, 135, 139
Teng, Michael [1] 40
Tesler, Larry [66] 39
Tilford, John S. [56] 30
Tufte, Edward R. [67] 19, 162

Unix pipes 40, 117–121
unstable state 67, 135, 141–2
update messages 11, 99, 107, 115, 148–9; *see also* message dictionary
UpdateMsg 148–9

van Dam, Andries 169; [73] 76, 174; [69] 166, 174; [28] 82, 168, 172; [26] 76
view parameters 8–9
  user examples 52–3, 70
  programmer examples, *see* renderer parameters
views 7, 11, 104–117
  implementing 114
  classification 160
  composition 160
  presentation state 69–70
  using existing 109–113
virtual time 63–6
virtual videotape 72, 89
visual programming 13, 27
Vitter, Jeffrey S. [70,61] 5
Voronoi diagram 5, 6

Waste view 15–16, 17
Waymire, Elisabeth A. 172, 173
Weights view 16, 17, 52–3
Wetherell, Charles [71] 30
Weyer, Stephen A. [72] 76
window dressing 53–4, 63, 69–70
window management 51–6
World Database 66–70, 135

xxx 95, 110, 151, 152, 154

Yankelovich, Nicole 173; [73] 76, 174
Yarwood, Edward [74] 35–6
yyy 95, 101, 110, 152, 154

zzz 101