

---

## Index

- 0-origin indexing, 25.
- $0^0$ , 582.
- 3:4:5 right triangles, 497–498.
- 3-coloring, 660.
- 3-dimensional documents, 709, 710, 714.
- 3-dimensional dragon curves, 603, 613.
- 3-dimensional knight, 489.
- 3-dimensional leaper graphs, 565, 569.
- 3-dimensional printer, 709, 714.
- 3-dimensional scanner, 681, 709.
- 3-letter words, 124–125.
- 4-letter words, 125–126, 250, 415–420.
- 5-letter words, 415, 418–420, 423–428.
  - of the Stanford GraphBase, 216, 404, 419, 422, 429–430, 433–436.
- $32 (2^5)$ , 42, 116, 257, 694, 696, 707.
- $64 (2^6)$ , 9, 14, 69–72, 150, 257, 691–692, 700.
- $90^\circ$  rotation, 177, 492–494, 617.
- 666 (beast), 140, 151.
- 12509 (star-chain number), 148.
- $65536 (2^{16})$ , 42, 109, 121–123, 146–148, 708.
- $\aleph_0$ , 148, 224.
- $\aleph_1$ , 148.
- $\gamma$  (Euler’s constant), 144, 147.
- $\lambda n$  ( $\lfloor \lg n \rfloor$ ), 111, 115.
- $\lambda^* n$ , 111, 115, 117.
- $\phi$  (golden ratio), 91–92, 100–101, 144, 197–198, 642–643, 680.
- $\varphi$  (totient function), 69, 152.
- $\pi$  (circle ratio), 2–3, 10, 17–18, 20, 72, 141–143, 197, 669, 708.
- A** *Baby is Promised*, 189–191.
- AAAS (American Association for the Advancement of Science), 672.
- Aarts, Emile Hubertus Leonardus, 687.
- abstention flag, 53.
- Academy of Recreational Mathematicians, 643.
- ace of hearts, 62.
- acrostic, ix, 705, *see also* telestich.
- actinon, 402.
- Adams, Don (= Donald James Yarmy), 154.
- Adams, Richard George, 131.
- Adams, William Wells, 101.
- addition, double-double precision, 47, 55–56.
- addition chains, 148.
- adjacency matrices, 524, 530.
- Adobe Photoshop<sup>®</sup>, 121, 123.
- Adobe Systems, 160, 708.
- Advent, 189–191.
- Adventure game, xii, 43, 176, 235–394.

- Aiken, Alexander Scott, 703.
- Aiken, Emily Lois, 669, 671, 676, 703.
- Aiken, Timothy Scott, 669, 678, 703.
- Akelijen, Roger Van, 701–702.
- algebraic numbers, 99, 102.
- algorithm DLX for exact covers, 446–471.
- algorithm X for exact covers, 440–446.
- algorithmic complexity, 117.
- algorithmic thinking, 396.
- Allouche, Jean-Paul, 101, 613.
- alternate dragon curve, 588–591.
- alternate dragon sequence, 601, 606.
- alternate ter-dragon curve, 600.
- alternate ter-dragon sequence, 606.
- aluminum sulphate, 402, 404.
- American Philological Association, 398.
- AMS (American Mathematical Society), xvii, 135, 136, 150.
- anagrams, 711, 715.
- analysis of algorithms, 671–672, 683.
- anamorphic art, 674.
- angels, 630–632, 634–635, 639.
- Ångström, Anders Jonas, unit, 708.
- ANSI C: The American National Standard Institute's standard version of the C language, 237.
- Applegate, David Lee, 570.
- Appleton, William Sumner, 30.
- April Fool, 38, 715.
- Archibald, Timothy, 703.
- Archimedes of Syracuse, 103, 105, 117, 118.
- argon, 402–403.
- Armenia, 711–712.
- Armistice Day, 22.
- Arnoux, Pierre Étienne Jean, 92.
- arrow notation, 117.
- art, v.
- anamorphic, 674.
  - computer, 657–658.
  - geek, 1–6, 657–703.
  - minus mathematics, 667.
  - plus mathematics, see mathematics and art.
  - textile, 665–671, 685–689.
  - thread, 684, 700–701.
- Art of Computer Programming*, x, 475, 483, 490, 626, 638, 643, 644, 648, 659, 678–680, 683–684, 695, 698–699, 708.
- artists, 657–658, 672, 691–692, 701–703.
- aspect-oriented programming, 711.
- associative operations, 87, 91, 92, 606.
- asymptotic growth, 535, 537.
- atomic elements, 401–403.
- Augustus, Gaius Julius Cæsar, 639.
- autobiography, x, xiv, 31–32, 182–184, 199–208, 395–400, 623–703.
- automatic sequences, 613.
- automobile tags, 121–160.
- Avogadro di Quaregna e Cerreto, Lorenzo Romano Amedeo Carlo, 21.
- Axelrod, Robert Marshall, 217–218.
- axial (reflective) symmetry, 503–505, 527, 536–537, 539, 690, 701.
- Aztec diamond patterns, 460–461, 470–471.
- B.M.**, 4, 21.
- Bach, Johann Sebastian, 129, 680–684.
- Bach, P. D. Q., 129, 684.
- Bachman, Randolph Charles, 44.

- backtrack programming, 438–472, 480–481, 486, 496.
- Bailey, David Harold, 142–143, 153, 154.
- balanced ternary number system, 597–599.
- Ball, Michael Owen, 567.
- Ball, Walter William Rouse, 504.
- balsa wood, 675.
- Banks, Bruce A., 582.
- banner, 676–677.
- Baring-Gould, Sabine, 37.
- Barris, Harry, 465.
- Barwell, Brian Robert, 457–458, 465, 471.
- basket ball, xii, 199–208, 672, *see also* Celtic knots.
- basketweave pattern, 559.
- Bates, Benjamin Franklin, 630.
- Bates, William Eugene, 630.
- batik, 674.
- Baumert, Leonard Daniel, 441–442, 466.
- Baxter, Andrew Michael, 67.
- Bayer, David Allen, 135–136, 153, 154.
- Bazargan, Kaveh, 715.
- BDDs (binary decision diagrams), 475.
- beads, 661.
- Beasley, John Derek, xvi, 233.
- Beatles, 150, 691.
- Bedquilt, 282.
- Beethoven, Ludwig van, 194.
- Beeton, Barbara Ann Neuhaus Friend Smith, 715.
- belcastro, sarah-marie, 669.
- Belgium, 701.
- Belzer, Jack, 58.
- Benjamin, Herbert Daniel, 465, 472, 659, 662, 686–688.
- Bentley, Jon Louis, 116, 117.
- Berge, Claude, 414.
- Bergholt, Ernest (= Binckes, Ernest George), 504, 512, 515, 527, 537, 565, 567.
- symmetry, 503–505, 528, 532–533, 537, 700–701.
- Berlekamp, Elwyn Ralph, xvi, 423, 450, 452, 465, 466.
- Berloquin, Pierre Louis, 484.
- Berrocal, Miguel Ortiz y, 690.
- Bertrand, Daniel, 102.
- Bethke, William, 400.
- Bhandari, Inderpal Singh, 208.
- Bibby, Duane Robert, 692, 696.
- Bible, 189, 423–428, 639.
- Bicknell-Johnson, Marjorie, 71.
- biconnected graphs, 565.
- billiard balls, 63–68, 604.
- billion, 104.
- binary branching, 630.
- binary logarithm function, 111.
- binary number system, 72, 88, 107, 111–112, 133, 139, 141, 147, 197, 574, 679, 695, 707–709.
- binary operators, 42.
- binary recurrences, 580–582, 590, 605.
- binary search, 108–109.
- binary to decimal conversion, 51–52.
- binary trees, 630, 679.
- binomial coefficients, 84.
- binomial tree, 679.
- bipartite digraph, 518, 526.
- bipartite graph, 548.
- Birken, Philipp (= Da Troll), 153.
- birth announcements, 31–32, 630.
- birthdays, 21–22, 103, 189, 411, 691–692, 694, 696, 702, 707.
- bitwise operations, 43, 57, 92, 449.
- Bixby, Robert Eugene, 570.
- Black, Max, 465.
- blank spaces, 53, 131, 708.
- Blase Böhning, Maria Dorothea, 630.
- Blatz, Josepha Weissen, 36.

- Blincoe, Robert, 154.  
 blintz, 2–3, 8, 10, 18, 20.  
 Bloch, Henry Wollman, 128.  
 Bloch, Richard Adolf, 128.  
 board, rectangular, 477–482,  
 503–509, 511–539, 541–570.  
 Boccara, Guy, 154.  
 Bohlin, Carol Jean née Fry,  
 137–138, 153.  
 Bohlin, Roy Michael, 137–138.  
 Böhm, Corrado, 44.  
 Böhmer, Paul Eugen, 101.  
 Böhning, Jobst Heinrich, 630.  
 Böhning, Martin John Henry, 630.  
 Bond, James, 007, 141, 151, 154.  
 Boole, George, 139.  
 Boolean programs, 487.  
 Boot, Johannes Cornelius  
 Gerardus, 216.  
 Borgmann, Dmitri Alfred, 119.  
 Borromeo rings, 693–694.  
 Borwein, Jonathan Michael, 154.  
 Borwein, Peter Benjamin, 154.  
 bouncing, 63–68, 604.  
 bound states, 518.  
 Bouwkamp, Christoffel Jacob, 687.  
 Boyce, James Edward, 116.  
 Brams, Steven John, 218.  
 Brand, Oscar, 37.  
 Brauer, Alfred Theodor, 157.  
 Brazier, Donn Paul, 400.  
 Brel, Jacques Romain Georges, 39.  
 Brent, Richard Peirce, 147, 154.  
 Brevard, Laurence Charles,  
 138–139, 153, 154.  
 Brooks, Mel (= Melvin Kaminsky),  
 154.  
 Brucker, Roger Warren, 282.  
 Buijn, Nicolaas Govert de, 450,  
 465–466.  
 Brunn, Karl Hermann, 694.  
 bullets, 177, 209–218.  
 silver, 711.  
 Bulls and Cows, 224, 228.  
 burr puzzle, 695.  
 Burroughs Corporation, 626.  
 Bussell, Frederick W., 37.  
 byllion, 104–105.  
 C language, 237.  
 C-INTERCAL compiler, 54, 57–58.  
 C.D., xiv, 21, 25, 58.  
 C.M., 4.  
 Caillouette, James Clyde, 32, 593.  
 Calcomp<sup>®</sup> plotter, 593, 613,  
 680–683.  
 calculus, 81–83.  
 calendar, 4, 10–11, 16, 18, 21–22,  
 25.  
 Caltech (California Institute of  
 Technology), 32, 124, 626.  
 Candelaria, John, 119.  
 Cardozo, Lida Helena Lopes, 619.  
 Carnegie, Andrew, 398.  
 carpets, 658, 662.  
 carries, 56, 88–89, 695.  
 Carroll, Lewis (= Dodgson, Charles  
 Lutwidge), xiii, 415–416, 421,  
 423, 428.  
 Carter, Benjamin Fluallen or  
 Franklin, 630.  
 Carter, James Llewellyn, 630.  
 Carter, James Wellington, 122, 624,  
 630, 659, 665.  
 Carter, Wilda Ernestine née Bates,  
 624, 630, 659, 665, 684.  
 Case Institute of Technology, xi,  
 8, 19, 27, 59, 185, 199–208,  
 401–402.  
 Casey (= KC), Henry Wayne, 37.  
 cave game, 235–394.  
 CCRMA (Center for Computer  
 Research in Music and  
 Acoustics), 193.  
 CDC (Control Data Corporation)  
 6600 computer, 480–481.  
 ceiling function, 72.  
 Celsius, Anders, temperature, 6,  
 15, 23.

- Celtic knight's tours, 489–509, 700–701.
- Celtic knots, 490, 491, 640–642, 694, 700–701.
- centigrade (Celsius) temperature, 6, 15, 23.
- centillion, 105.
- ceramic tiles, 615–619.
- Chaitin, Gregory John, 37, 117.
- Chaucer, Geoffrey, 131.
- chemical formulas, 28–30, 401–403.
- chess variant, 231–234.
- chessboard, 60–61, 461, *see also* knight's tours, *N* queens problem.
- Chesterton, Gilbert Keith, 407, 409.
- Chinese remainder algorithm, 76, 94, 96.
- chocolate, 395, 400.
- Chow, William W., 632.
- Chowning, John MacLeod, 193.
- Christmas, 22, 127, 219, 415, 492, 659, 668–669.
- cards, 623–657, 690, 698.
- carols, 189–191, 645–648.
- star, 625, 640–644, 648–649, 651, 656.
- tree ornaments, 629, 637.
- trees, 644–645.
- twelve days of, 35–36, 38, 628–629, 643.
- Chrystal, George, 37.
- Chung Graham, Fan Rong King, 136, 155.
- Churchhouse, Robert Francis, 145, 155.
- Churchill, Winston Leonard Spencer, 406, 408, 421.
- Chvátal, Václav (= Vašek), 570.
- Clarke, Nicky, 151.
- Clarke, Robert James, 4, 17.
- Clift, Neill Michael, 148, 155.
- closed source vertex, 516.
- closed states, 518, 526.
- closed tours versus open tours, 504.
- cloud computing, 712.
- CNC (Computer Numerical Controlled) devices, 696–699, 709, 714.
- Coffin, Stewart Temple, 691.
- Colbert, Stephen Tyrone, 658.
- coloring, 456–457, 659–660.
- colors, 624, 637–639, 660, 662, 664, 665, 673, 685, 703.
- Colossal Cave, 252, 276, 282, 380, 394.
- map, 254.
- Columbus, Christopher (= Corombo, Christoffa = Colón, Cristóbal) Day, 22.
- Comét, Stig, 116, 117.
- comma-free codes, 106–119.
- commutative law, 33.
- complexity theory, 33–39.
- composite numbers, 93–98, 663–665.
- compression of bits, *see* selection of bits.
- computable functions, 117.
- computer art, 657–658.
- computer graphics, 632, 657–658, 680, 684.
- Computer History Museum, 149, 208.
- Computer Modern typefaces, 410, 637–639.
- computer science versus mathematics, 148–150, 160.
- Conant, Lawrence Melvin, 419.
- Concorde TSP solver, 570.
- congruence cover, 145.
- weak, 93–94.
- connected graphs, 541–545, 568, 697.
- Conrad, Jess (= James, Gerald Arthur), 151.
- conservation of momentum, 403.
- constants, fundamental, 8, 18, 100–102, 141–144, 197, 612.

- continued fractions, 96, 99, 100.  
 contour lines, 680–683.  
 Conway, John Horton, 72, 119, 140,  
   450, 452, 455, 465, 706.  
 Cook, William John, 570.  
 Cool, Anastasia, 402.  
 Cool, Cynthia, 401–402.  
 copernicium, 403.  
 Cornell, Brian Clinton, 178.  
 Cornuejols, Jean, 484.  
 counting, units of, xiii, 20, 22.  
 coverlet, 665–667.  
 Cowhey, Dennis R., 155.  
 Cowznowski, Myron, 4, 17, 21.  
 Coxeter, Harold Scott MacDonald,  
   603.  
 Crichton, John Michael, 613–614.  
 crocheting, 684.  
 Cronkite, Walter Leland, Jr.,  
   207–208.  
 crossings of a path, 457–459, 477,  
   490, 492–502, 605.  
   perpendicular, 502.  
 crossword puzzle, 27–30.  
 Crowley, Charles Patrick, 39.  
 Crowther, William R., xii, 235, 260,  
   276, 282, 380, 394.  
 cryptograms, many-to-one,  
   405–409.  
**CTANGLE**, 236.  
 cube roots of unity, 595, 598–599,  
   663.  
 cubes, 433–436, 675, 685–689.  
 Cunningham, Matt, 155.  
**CWEB**, 235–236.  
  
**Dahl**, Ole-Johan, 465.  
 Dalí i Domènech, Salvador  
   Domingo Felipe Jacinto, 657.  
 Dallos, Robert E., 129, 155.  
 dancing links, 436–472, 483, 496,  
   661–662, 687–688.  
 Darling, Stephen Foster, 17.  
 Darwin, George P., 605.  
 data structures, 306, 438, 442–446.  
 Davies, Jim, xvi, 437.  
 Davis, Chandler, xiv, 134, 571, 603,  
   613, 618.  
 Davis, John (= Jack) Burton, Jr.,  
   8, 10, 17, 27, 30.  
 Davis, Martin, 143.  
 Davis, Philip Jacob, 116, 117.  
 Davison, John Leslie, 101.  
 Dawson, Thomas Rayner, 465, 484,  
   486–487, 545, 567.  
 de Bruijn, Nicolaas Govert, 450,  
   465–466.  
 De Fuccio, Jerome Alphonse, 27.  
 de Jaenisch, Carl Friedrich  
   Andreevitch, 560, 567.  
 De Koninck, Jean-Marie, 139–140,  
   155.  
 decimal clocks, 21, 25.  
 decimal to binary conversion,  
   50–51, 56.  
 Dekking, Frederik Michel, 606–613.  
 Dektar, Joan, 155.  
 depth-first search, 225, 438, 441,  
   697.  
 design motifs, 482, 485–486, 488,  
   509, 521–523.  
 determinants, 524, 529.  
 Deusing, Murl, 400.  
 Dewey, Melville (= Melvil) Louis  
   Kossuth, decimal system, 161.  
 Diaconis, Persi Warren, 706.  
 diameter of a graph, 565, 568–569.  
 diamond signs, 161–178.  
 diamond tiles, 603–604, 614,  
   620–621, 649–650.  
 dice, 675.  
 Dickins, Anthony Stewart Mackay,  
   567, 659.  
 dictionaries, 17, 216, 396–399, 407,  
   409, 416, 421–422, 429, 430,  
   433–436, 464.  
**Dijkstra**, Edsger Wybe, 438, 465.  
 Dillin, Gay, 153.  
 dimensions, 709.

- directed graphs, 72, 509, 513, 525, 608.  
     acyclic, 483.  
 disappearances, 411–414, 633–636.  
 dissection problems, 659.  
 distributive law, 33.  
 ditto machine, 623.  
 Dixon, Barbara, 155.  
 Dixon, John, 155.  
 Djorup, Frans Martin, Jr., 584.  
 DMV (Department of Motor Vehicles), 125–128, 136, 140.  
 documentation, 712.  
 dodecahedron, 628–629.  
 Dodgson, Charles Lutwidge, *see* Carroll, Lewis.  
 dollar bill, 613, 676.  
 dominant tone, 184, 196.  
 domination of representation schemes, 114–115.  
 Donaldson, Charles R., 155.  
 Dong Yunmei (= Tung, Yun-Mei), 116.  
 Dongarra, Jack Joseph, 148–149.  
 Doria, Michael Louis, 205–206.  
 Dörner, Anton, 38.  
 dot product of vectors, 74.  
 double-double precision, 46–52, 54–56.  
 double-weaving, 670–672.  
 doublets, 415–421.  
 doubly infinite dragon curve, 584.  
 doubly infinite ter-dragon curve, 597.  
 doubly linked lists, 437–439, 442–446.  
 doubly stochastic matrix, 73.  
 doxology, 630–631, 639.  
 dragon constant, 612.  
 dragon curves, xiii, 571–621, 657, 658, 681, 698.  
     defined, 573, 575.  
     supergeneralized, 606.  
 dragon design, defined, 573–574.  
 dragon function, 581.  
 dragon labyrinth, 604, 620, 698–699.  
 dragon pipeline, 620–621.  
 dragon polyomino, 604.  
 dragon sequence, 601, 606, 612.  
 dual states, 525, 528.  
 Dubrovsky, Vladimir, 618.  
 Duddridge, James Philip, 155.  
 Dudeney, Henry Ernest, 407, 409, 450, 466.  
 Dupree, Wayne Powell, 206.  
 Duverney, Daniel, 102.  
 dwarves, 359–367.  
 Dyck, Ivan von, 401–402.  
  
 $e$  (base of natural logarithms), 143–144, 197–198.  
 $e^\gamma$ , 147.  
 eagles, 676–678.  
 Eames, Charles Ormond, Jr., 155.  
 Eames, Ray-Bernice Alexandra née Kaiser, 155.  
 Earle, Clifford John, Jr., 135.  
 earthshaking, 175, 707, 714.  
 Easter, 511.  
 Eckler, Albert Ross, Jr., xvi, 119.  
 Eckler, Faith Lorraine née Woodward, 130, 155.  
 Ehlert, Ernst Fred, 630.  
 Ehlert Bohning, Pauline Anna Marie, 630.  
 Eichenberger, Peter Armin, 177.  
 Eilers, Daniel Ralph, xiv, 483.  
 einsteinium, 401–403.  
 Eisemann, Kurt, 39.  
 Eisenbud, David, 135, 153.  
 Eisenstein, Ferdinand Gotthold Max, integers, 588, 598–599. primes, 663–667.  
 Elder, Will “Chicken Fat” (= Eisenberg, Wolf William), 8, 10, 17, 27, 30.  
 electronic coach, 199–208.  
 elevator problem, 79–86.  
 Elias, Peter, 116, 118.

- Elkies, Noam David, 526, 537–539.  
 Elliott, Gordon L., 464, 466.  
 Elliott, Robert Brackett, 30.  
 ellipses, 694.  
**embroidery**, 665–667, 696–698, 714.  
 Emeneau, Murray Barnson, 124.  
 Emerson, Ralph Waldo, 260.  
 Emmaus Lutheran School, 400.  
 empty set, 131.  
 encryption, 236, 405–409.  
 Englert, Gail, 134.  
 Enstad, Robert, 156.  
 enumeration, 475–476, 483,  
     511–539, 625; *see also* dancing  
     links.  
 environmental plates, 127.  
**eofill**, 491, 553, 554, 557, 559,  
     569–570, 657, 694.  
 Epstein, Richard Arnold (= Stein,  
     E. P.), 216, 218.  
 equilateral triangles, 63–68, 209,  
     636–637.  
 equivalence classes, 525.  
 Erdős, Pál (= Paul), 145, 156.  
 Escher, Maurits Cornelis, 630, 632,  
     648, 657, 706.  
 Escheresque tiles, 630–632,  
     676–678.  
 esoteric programming languages,  
     57–58.  
 etaoin shrldu, 429–430.  
 Etchemendy, Max, xiv.  
 Euclid of Alexandria, algorithm, 96.  
 Euler, Leonhard, 137, 492, 511–513,  
     515, 516, 520, 533, 538, 558,  
     566, 567, 668.  
     constant ( $\gamma$ ), 144, 147.  
 Eulerian symmetry, 527, *see*  
     rotational symmetry.  
 Eulerian trails, 609, 697.  
 Even, Shimon, 116, 118.  
 exact cover problems, xiii, 439–471.  
     generalized, 458, 461.  
**Factorials**, 69–72.  
 Fahrenheit, Daniel Gabriel,  
     temperature, 15, 617.  
 fallacious reasoning, 66–67, 80–81,  
     218, 419, 711.  
 Faló della vanita, 128.  
 Faraday, Michael, 24.  
 Farrell, Jeremiah Paul, xvi.  
 farshimmelt potrzebieś, 2, 9, 20,  
     708.  
 Feldon, Barbara née Hall, 154.  
 Feldstein, Albert Bernard (= Ed,  
     Howsyourmom), 1, 7, 30.  
 Feller, Willibald (= Vilim = Willy  
     = William), 613.  
 Felsenstein, Lee, 149.  
 Fermat, Pierre de, 137.  
     primes, 122, 147.  
 Feynman, Richard Phillips, 628.  
 Fibonacci, Leonardo, of Pisa  
     (= Leonardo filio Bonacii  
     Pisano),  
     leapers, 569.  
     multiplication, 87–92.  
     numbers, xi, 87–95, 99–100, 648.  
     string  $S_\infty$ , 101.  
 Fido, 602.  
 file and rank, 541.  
 Filman, Robert Elliot, 687.  
 Finch, Steven Richard, 102.  
 finite fields, 121–122.  
 Finland, 152, 670.  
 Fischer, Marlene née Bohning, 705.  
 Fisher, Ginda Susan née Kaplan,  
     695.  
 five-letter words, 415, 418–420,  
     423–428.  
     of the Stanford GraphBase,  
     216, 404, 419, 422, 429–430,  
     433–436.  
 fixed-point arithmetic, 44, 57.  
 Fleming, Ian Lancaster, 141, 156.  
 Fletcher, John George, 450, 466.  
 flexagons, 625–628.  
 Flexner, Stuart Berg, 398–399.  
 Flood, Merrill Meeks, 225, 227.



- floor function, 62, 69–72.  
 Floyd, Robert W, 438, 466.  
 Flye Sainte-Marie, Camille, 560, 567.  
 folded representation, 575–576.  
 folding monoid, 606–612.  
 folding paper, 571–574, 589, 606–613.  
 folding powers, 606–612.  
 fonts, 132, 136, 152, 682, 684, 722.  
     *celtica* and *celticb*, 640–642.  
     Computer Modern, 410, 637–639.  
     *ctour*, 492.  
     *holly*, 642.  
     *jen*, 642, 729.  
     *ktour*, 490.  
     *nnncmbx*, 410.  
     *stitchery*, 724.  
 foo, 349.  
 Forth language, 149.  
 FORTRAN language, 149, 235–236, 613.  
 four-letter words, 125–126, 250, 415–420.  
 four-part harmony, 189–191, 196–198, 646–647.  
 Fourier, Jean Baptiste Joseph, 137.  
     transform, finite, 74.  
 Fourth of July, 678.  
 fractal patterns, xiii, 575, 591, 596, 600, 605, 607, 609, 610, 695.  
 Fraenkel, Aviezri S, 91.  
 Francis, John, 228.  
 free states, 518.  
 Freuder, Eugene Charles, 464.  
 Frolov (= Frolov), Mikhail, 567.  
 frontispieces, 678–680, 683–684.  
 Frost, Andrew Hollingworth, 554.  
 Fuchs, David Raymond, 116.  
 fullerenes, 403.  
 fun, xi, 1–741.  
 fundamental constants, 8, 18, 100–102, 141–144, 197, 612.  
 Funk, Isaac Kauffman, 396, 398–399.  
 fur, fake, 675–676.  
 furshlugginer potrzebies, 3, 6, 8, 9, 15, 20.  
**G**-Zahlen, 120.  
 Gács, Péter, 117, 118.  
 Gaines, William Maxwell, 1.  
 Gale, David, 706.  
 Gallivan, Britney Crystal, 573.  
 Galois, Évariste, 137.  
     fields, 121–122.  
 games, xii, 199–394.  
 Gamow, George Anton, 79, 81, 86.  
 Gander, Walter, 177.  
 Garb, Gordon, 140, 156.  
 garbage collection, 437.  
 García-Molina, Héctor, 703.  
 Gardner, Herbert George (= Herb), 185.  
 Gardner, Martin, v, ix, xi, xiii–xiv, xvi, 66, 68, 69, 71, 103, 120, 156, 212, 215–217, 231, 407, 409, 411, 423, 428, 440, 466, 603, 605, 606, 611, 613, 628, 636, 656, 686, 690–691, 705–706.  
 Garey, Michael Randolph, 466.  
 Garrigues, George Louis, 156.  
 gathering bits, *see* selection of bits.  
 Gathering for Gardner, 423, 649, 687, 689.  
 Gauß (= Gauss), Johann Friderich Carl (= Carl Friedrich), 137, 150, 491.  
 Gaussian integers, 577–579, 662–665.  
     primes, 663–665.  
 geek art, 1–6, 621, 657–703; *see also* design motifs.  
 Geisel, Theodor Seuss, 741.  
 Geisler, Wilhelm (= Willy), 184.  
 generalized diagonals, 73–77.  
 generalized dragon curves, 590–594, 601, 612.

- generalized exact cover problem, 458, 461.
- generalized ter-dragon curves, 600, 601.
- generating functions, 509, 524–535.
- geometric series, 75, 574.
- geometrically distinct knight's tours, 479, 492, 516, 536, 537.
- Geschke, Charles Matthew, 160.
- Get Off the Earth, 414.
- Ghiorso, Albert, 402.
- Gilbert, John Russell, 300.
- Gill, G. W., 224, 229.
- glitches, 198, 619, 683–684, 714.
- global data structures, 438.
- Gnebbishland, 185–188.
- Goemans, Michel Xavier, 144, 153, 156.
- golden ratio ( $\phi$ ), 91–92, 100–101, 144, 197–198, 642–643, 680.
- golden triangles, 642–644, 689–690.
- Golomb, Solomon Wolf, 141, 156, 440–442, 450, 455, 464, 466, 686.
- Golub, Gene Howard, 148, 694.
- Google, 216, 701.  
     Calculator, 26.  
     Maps, 178.  
     Trends, 658.
- googol, 148, 151.
- Gordon, Mack (= Gittler, Morris), 188.
- Gosper, Ralph William, Jr., 142–143.
- goto** statements, 54, 236.
- Gottschalk, Walter Helbig, 603.
- Goulding, Raymond Walter, 29–30.
- GPS coordinates, 161–175, 709.
- Graber Bates, Lydia, 630.
- Grabner, Peter Johannes, 92.
- graffiti, 176, 178.
- Graham, Dave, 156.
- Graham, Ronald Lewis, 93–94, 98, 136–137, 153, 155, 156.
- Graham, Peter, 433.
- Grant, Gordon, 156.
- Grant, Jeffrey Lloyd Jagton, 436.
- graph paper, 59–62, 681.
- graphs, directed, 72, 509, 513, 525, 608.  
     acyclic, 483.
- graphs, undirected, 145–146, 541–570, 697.
- Gray, Frank, binary code, 605.
- Gray code for spanning trees, 644.
- greatest integer function, 71.
- Green, John Willie, 77.
- grids, 193, 459–460, 473–476, 541, 607–608, 625, 638–639, 658, 663–664, 680–683, *see also* pentagrid.  
     hexagonal, 612, 663–667.
- Griffin, Gerald G., 156.
- Grigsby, David Collins, 203, 208.
- Grochow, Jerrold Marvin, 224.
- Gross, Leonard, 185.
- Grünbaum, Branko, 692–694.
- guessing game, 107–109, 111–112.
- Guibas, Leonidas John, 691–692.
- Gutenmacher, Victor L'vovich, 618.
- Guy, Michael John Thirian, 72, 452.
- Guy, Richard Kenneth, 119, 450, 452, 455, 464–466.
- Haber**, David, 156.
- Hacker Holiday, 25.
- hackers, xi, 41, 149, 258, 296.
- hacks, 44–58, 92, 306, 368.
- Hagerti, Percival, 401–402.
- halavah, 2–3, 5, 8, 10, 14, 17–18, 20, 23.
- Hall, Marshall, Jr., 145–147.
- Hamilton, William Rowan, cycles, 496, 511–529, 538–539, 541, 545–570.
- Hamiltonian paths, 511–539, 545, 560, 563–564.
- Hance, James, 658.
- Hansen, Walter, 148, 157.

- Hansson, Frans, 686–688.  
haptics, 709, 714.  
Haralick, Robert Martin, 464, 466.  
Harbath, Peter Eloby, 206.  
Hardy, Godfrey Harold, 146, 157.  
Hariguchi, Yoichi, 177, 715.  
harmony, four-part, 195–198.  
Harris, Robert Scott, 656.  
Harter, William George, 585, 593, 603, 613.  
Hartmann, Johann Heinrich Conrad, 630.  
Hartmann Knuth, Anna Augusta Caroline Elisabeth, 630.  
Harvard University, 30, 669.  
Haselgrove, Colin Brian, 466.  
Haselgrove, Jenifer née Wheildon-Brown (= Leech, Jenifer), 451, 455, 466.  
hashing, 238–239, 680.  
Haubrich, Jacques, 457, 468.  
Hayes, Barry, 178.  
Hazlett, Charles Cole, 206.  
header nodes, 442, 458, 463.  
Heath, Edith, Ceramics, 616.  
Hecke, Erich, 101.  
hectograph machine, 623.  
Hedlund, Gustav Arnold, 576, 603, 606.  
Heesch, Heinrich, 632.  
Heighway, John Eugene, 573, 593, 603, 613.  
Heim, Philip Kurtz “Nip”, 199, 204–208.  
Hein, Piet, 619, 706.  
Heller, Leon, 155.  
Henry, Buck (= Henry Zuckerman), 154.  
Herbert, Alan Patrick, 218.  
Herford, Julius Goldstein, 184.  
Herz, Jean-Claude, 155.  
hexadecimal representation, 143, 160, 711.  
hexagonal primes, *see* Eisenstein primes  
hexagons, 612, 625, 663–667.  
hexiamonds, 452–455, 465, 469.  
hexominoes, 659–662.  
hidden line elimination, 683.  
Hilbert, David, 91, 137.  
Hitotumatu, Hiroshi, 438, 461, 467.  
Hoare, Charles Antony Richard, xvi, 437, 465.  
Hobby, John Douglas, xiv.  
Hoggatt, Verner Emil, Jr., 71.  
Holbrook, Nate Edward, 177.  
holidays, *see* April Fool, Armistice Day, birthdays, Christmas, Columbus Day, Easter, Fourth of July, Hacker Holiday, New Cowznofski’s Day, New Year’s Day, Pi Day, Saint Patrick’s Day, Valentine’s Day, Washington’s Birthday.  
holly font, 642.  
Holmes, Thomas Sherlock Scott, 406, 408.  
Holtan, Marvin Eugene, 38.  
Holzman, Albert George, 58.  
homomorphic image, 525.  
horizontal symmetry, 452–456, 469.  
hot-water bottles, 675–676, 688.  
Howlett, Jack, 58.  
Hsü Yo (= Xu Yue), 116.  
Huber-Stockar, Émile, 558, 567.  
hyperbolic geometry, 648–649, 714.  
hypergeometric functions, 138.  
hypertext, 709.  
IAS (Institute for Advanced Study) “MANIAC” computer, 440, 449, 464.  
IBM 650 computer, 60–61, 199–208.  
IBM 704 computer, 149.  
IBM 1620 computer, 465.  
IBM 7094 computer, 450.  
IBM (International Business Machines Corporation) Watson Research Center, 208.  
ick compiler, 54, 57–58.

- ICS (Information Computer Systems) Multum computer, 451.
- identity, rather amazing, 115.
- illiterate programming, 41–57, 712.
- inch, 8, 19.
- index, xiv, 717–741.
- India, 91.
- inert gas trap, 401–403.
- infinite directed graph, 608–609.
- infinite Fibonacci word, 101.
- infinity, 108, 119, 148, 150.
- input, 42, 45, 57, 709–710, 714.
- instruments, 179–183.
- Intel® Core™ 2 Duo computer, 468.
- intellectual property, iv, xv–xvi, 39, 613–614, 659, 712, 714.
- interactive fiction, 235–394.
- INTERCAL language, 41–58.
- interlacing, 489–509, 693–694, 700–701.
- International Puzzle Party (IPP), 431–432, 473, 476, 690, 695.
- international relations, 211, 217.
- Internet, iv, 176–178, 208, 229, 235, 398, 410, 428, 658, 660, 665, 669, 697, 703, 707–715.
- Internet Archive, 467, 715.
- inversions of a triad, 195–198.
- IPP (International Puzzle Party), 431–432, 473, 476, 690, 695.
- irredundant representation schemes, 112–115.
- Irving, Robert Wylie, 225.
- Isaacs, Stanley Salant, 690.
- Ⓜ, 710–715.
- J**ablán, Slavik Vlado, 649.
- Jack, Underwood Kyle, 35, 38.
- Jacobi, Carl Gustav Jacob, 102.
- Jaenisch, Carl Friedrich  
Andreevitch de, 560, 567.
- James VI and I, 423, 424.
- James Rees, Ida Emzella, 630.
- Janko, Zvonimir, 145, 147.
- Japan, 20, 152, 407, 409, 619, 643, 669, 679, 689–691.
- Jelliss, George Peter, 464–465, 467, 485, 492–501, 508, 512, 521, 522, 537, 538, 541, 545, 546, 560, 567, 569–570.
- jen font, 642.
- Jerz, Dennis George, 394.
- Jesus of Nazareth, son of Joseph, 22, 189, 636–637, 639.
- Jobs, Steven Paul, 707.
- Johnson, David Stiffler, 466.
- Johnson, Stephen Curtis, 160.
- jokes, 34, 47, 140, 184, 213, 403, 734.  
Norwegian, 154.
- Joseph of Nazareth, son of Jacob or Heli, 636–637, 639.
- Jul, 645–648.
- Julian dates, 25.
- Jünger, Michael, 566, 567, 570.
- K**adner, Franz, 659.
- Kahle, Brewster, 715.
- Kahle, Louise, 630.
- Kahn, Matthew (= Matt), 160, 672–684.
- Kaminsky, Melvin (= Mel Brooks), 154.
- Kanada, Yasumasa, 142–143.
- Kaplan, Craig Steven, 632.
- Karagueuzian, Dikran  
(= Գարսկէօզեան, Տիգրան),  
xiv.
- Karlinger, Richard Joseph, 204.
- KC and the Sunshine Band, 37.
- Kells, Book of, 490, 504.
- Kelvin (= Thomson, William), 18.
- Kendrick, Donald Francis, 419.
- Kennedy, John Fitzgerald, 705.
- Kennedy, Peter, 34–36, 38.
- Kent, Allen, 58.
- Kielland, Gabriel Kirsebom, 648.

- Kielland, Susanne Sophie Caroline  
Gustava née Blom, 646, 648.
- Kilgour, Donald Marc, 218.
- Kindersley, David Guy Barnabas,  
619.
- King, Frank Haydon, 224.
- King James Bible, 423–425, 428.
- kite shape, 499, 643.
- Klarner, David Anthony, xv, xvi,  
103, 411.
- Klees, Robert E., 127.
- Kloper, Kenneth, 216–217.
- knight graphs, 511, 541.
- knight's tour mosaics, 491, 553,  
554, 557, 559, 570, 657.
- knight's tours, xiii, 477–570.  
3 ×  $n$ , 478–479, 481, 485–486,  
508–539.  
Celtic, 489–509, 700–701.  
geometrically distinct, 479, 492,  
516, 536, 537.
- knitting, 668–669.
- Knuth, Carter John, 189.
- Knuth, Donald Ervin, iii, iv,  
xiv–xvi, 1, 7, 16–17, 38–39, 44,  
57–58, 86, 96–98, 118, 157, 177,  
203–208, 380, 399, 405, 467,  
480, 538, 603, 618, 630, 697.
- Knuth, Ervin Henry, 16, 199,  
395–397, 623, 625, 630,  
634–635, 659.
- Knuth, Jennifer Sierra, xi, 37, 168,  
171, 628, 630, 638, 642, 643,  
658, 672, 680.*
- Knuth, Johann (= Hans), 630.
- Knuth, Johann Wilhelm (= John  
William), 630.
- Knuth, John Martin, xi, 31, 37,  
131, 231–232, 630, 638, 658,  
672, 680.
- Knuth, Kevin Don, 177, 189.
- Knuth, Louise Marie née Bohning,  
199, 395–397, 623, 630,  
634–635, 659, 665.
- Knuth, Nancy Jill née Carter,  
xi–xiv, 32, 161–162, 165,  
167, 170, 173, 175, 177,  
184, 189–191, 490, 615, 618,  
623–703.
- Knuth Darwent, Paula Beth, 623.
- Kobayashi, Shigetaro, 480, 482.
- Kondo, Shigeru, 143, 160.
- Kovacs, Ernest Edward, 4, 17, 21,  
30.
- Koyama, Kenji, 225–226.
- Kraehenbuehl, David, xii, 194–198.
- Kraft, Leon Gordon, Jr., 118.  
inequality, 112.
- Kraitchik, Maurice Borisovitch,  
567.
- Krigstein, Bernard, 8.
- Krogdahl, Stein, 668.
- Kronecker, Leopold, 103, 118.
- KTG (Kludgy Telestich Gaming)  
society, xiv.
- Kufic designs, 649.
- Kurtzman (= Kurtz~~z~~), Harvey, 8,  
10, 17.
- Laaser, Jennifer Elaine, 694–695.
- labyrinths, 604–605, 611, 620,  
698–699.
- laddergrams, 416–427.
- Lafarge, Guy Pierre Marie, 188.
- Lai, Tony Wen Hsun, 225–226.
- Lansdown, Robert John, 657–658.
- Laplace (= de la Place), Pierre  
Simon, 137.
- Larrabee, Tracy Lynn, 157.
- Larsen, David, 157.
- Larsen, Harold Daniel, 216.
- lascutter, 698–700, 714.
- Latin language, 105, 119.
- latin squares, 272, 431–432.
- latinbyllionyllion, 105.
- Lauder, Afferbeck, 717–741.
- law of reflection, 63–68.
- Lawrence, Robyn Griggs, 619.
- Le Chiffre, Énigme, 156.

- Le Lionnais, François, 139–140, 144–145, 157.  
 leading tone, 196.  
 leaper graphs, 485, 541–570, 657.  
    $k$ -dimensional, 569.  
 least significant 1-bit, 133.  
 Lee, Hollylynnée née Stohl, 138.  
 Lee, Jonathan Todd, 138.  
 Leech, Jenifer née Wheildon-Brown (= Haselgrove, Jenifer), 451, 455, 466.  
 Lehmer, Derrick Henry, 665.  
 Leibniz, Gottfried Wilhelm, Freiherr von, 139.  
 Lekkerkerker, Cornelis Gerrit, 91.  
 Lemaire, Bernard François Camille, 484.  
 Lentzner, Mark, 658.  
 Leone, Sergio, 218.  
 Levenshtein, Vladimir Iosifovich, 116, 118.  
 Levin, Carl and Sonia, 126.  
 Levin, Leonid Anatolievich, 117.  
 Levy, Steven Jay, 258, 296.  
 lexicographic order, 106.  
 Li, Tien-Yien, 140, 157.  
 Liberty Bell, 676–678.  
 license plates, 121–160.  
 ligatures, 642, 709.  
 limericks, 405–409.  
 Lincoln, Abraham, 22, 406, 408.  
 Lindberg, Greg, 158.  
 linked lists, 437–439, 442–446, 697.  
 linked rings, 692–694.  
 Linotype machine, 429.  
 Linux<sup>®</sup> operating system, 151, 160.  
 Liouville, Joseph, 99, 101.  
   numbers, 99–100.  
 LISP language, 149.  
 Listing, Johann Benedict, 668.  
 liter, 17–19.  
 literate programming, xii, 235–394, 465, 684, 712.  
 little-endian convention, 53.  
 Litwin, David Ari, 658.  
 Lloyd, Norman, 38.  
 Logar, Richard Michael, 205–206.  
 logarithms, 70–72, 111, 160.  
 Lonce, Stefan Joseph, 130, 158.  
 looping, 52, 54, 56.  
 loops (self-avoiding cycles), 473–476.  
 lowercase letters, 236, 238  
 Loyd, Samuel, 414.  
 Lucas, François Édouard Anatole, 567.  
   numbers, 91.  
 Luke, the evangelist, 639.  
 Luther, Megan, 158.  
 Lyon, James Michael “Jimbo”, 41, 57, 58.  
 Maas, Robert Elton, 637.  
 Mabry, Richard Duval, 694.  
 MacDonald, Old, 34, 35, 722.  
 MacDowell, Edward Alexander, 188.  
 macroinstructions, 710.  
 MAD, a unit of counting, xiii, 6, 14, 18, 20.  
 MAD, the magazine, xi, 1–11, 16–17, 20, 27, 184, 430, 658, 675.  
 Madachy, Joseph Steven, xv.  
 Maeda, John, 658.  
 magi, 640–641.  
 magic, 412–413, 636.  
 magic squares, 73–77.  
 magic words, 260, 264, 276, 330, 380.  
 Magid, Andy Roy, 137, 158.  
 Magnanti, Thomas Lee, 567.  
 Magritte, René François Ghislain, 657.  
 Makhholm, Henning, 326.  
 Mandelbrot, Benoît Baruch, xiii.  
 MANIAC computer, 440, 449, 464.  
 map of Colossal Cave, 254.

- Markov (= Markoff), Andrei  
Andreevich the elder,  
processes, 208.
- Marks, Milton, Jr., 127.
- Marquette University, 208.
- Martin, Donald (= Don), 4, 17, 21.
- Mary, mother of Jesus, 636–637,  
639.
- Master Mind, 219–229.
- masyu, 473, 475–476.
- mated cells, 513–520, 538.
- Mathematical Sciences Research  
Institute, 135, 538.
- mathematics and art, xiii, 160, 193,  
470, 485, 488–509, 521–523,  
553, 559, 568, 615–621, 624,  
657, 664, 679, 695.
- Mathieu, Émile Léonard, 137.
- Mathis, René, 156.
- MathML (Mathematical Markup  
Language), 713.
- Matiyasevich (= Matijasevič), Yuri  
Vladimirovich, 91–92.
- matrices, 73, 148, 524–525, 530,  
713.
- Matrix, Irving Joshua, 71, 156.
- Matsuda, Michio, 480, 482.
- maximum cut, 144.
- maximum independent set,  
429–430, 662.
- maze, interactive, 235–394.
- McCarthy, Colman Joseph, 126,  
158.
- McCarthy, John, 235–236.
- McClure, Mark Christian, 643.
- McKay, Brendan Damien, 494.
- McLoughlin, Margaret Anne née  
Hendrickson, 464.
- McMoon, Cosmo, 11, 23.
- McMurray, Scott Charles, 208.
- meandering patterns, 610.
- mechanical puzzles, xiii, 690–691,  
695.
- median element, 672.
- Meeus, Jean, 467.
- Mehra, Ashutosh, xiv.
- Meirowitz (= Meyerowitz),  
Mordecai, 224.
- Memmingen, 152.
- mendelevium, 402–403.
- Mendenhall, Thomas Corwin, 8.
- Mendès France, Michel, 612–613.
- Mendez, Raul Hernan, 153.
- Mersenne, Marin, primes, 455.
- Merson, Robert (= Robin) Henry,  
484–485.
- METAFONT, iv, 194, 410, 638, 642,  
692, 711.
- METAPOST, xii, xiv.
- Metropolis, Nicholas Constantine,  
58, 467.
- Meves, Theodore August, 400.
- Meyerowitz (= Meirowitz),  
Mordecai, 224.
- Miller, Victor Saul, 135, 153.
- Milnor, John Willard, 706.
- Milwaukee Lutheran High School,  
1, 9, 182.
- Milwaukee Public Museum, 395,  
400.
- mimeograph machine, 202.
- mingling, 42.
- Mingo, Norman Theodore, 4, 17,  
21.
- mirrors, 289, 292, 604, 674, 683.
- Mix, Thomas Hezekiah Edwin, 140.
- Miya, Eugene Nobuo, 150, 153,  
158, 160.
- MMIX, 140, 152.
- MKS: Meter–kilogram–second  
units, 19.
- mnemonic, 8, 124.
- Möbius, August Ferdinand, 668.  
band, 668–669.
- molecules, 401–403.
- momentum, conservation of, 403.
- money, ix, 226–227, 481, 711–713.
- Monma, Clyde Lawrence, 567.
- Monte Carlo estimates, 145, 441,  
468, 480–481, 661, 662.

- monus operation ( $\max(x - y, 0)$ ),  
 219.  
 MOO, 224, 228.  
 Moore, Gordon Earle, law, 484,  
 708.  
 Moretus, Jan (= Moerentorf,  
 Johann), 701.  
 Morse, Harold Calvin Marston,  
 576, 606.  
 Moser, Leo, 216.  
 Moshman, Jack, 38.  
 mountain folds, 571, 625–626, 628,  
 637.  
 Move It Or Lose It, 231–234.  
 movies, 30, 141, 218.  
 multiplication, double-double  
 precision, 48–49, 56.  
 multiplicative sequences, 580,  
 601–602.  
 Multum computer, 451.  
 Munsell, Albert Henry, color  
 system, 31, 673.  
 Murray, Harold James Ruthven,  
 504, 537.  
 Museum Explorer's Club, 395–396,  
 400.  
 music, xii, 170, 179–198, 645–648,  
 680, 683, 709–710.  
 mutilated chessboard, 456.  
 myllion, 104–105.  
 myriad, 104–105.  
  
*n*-ominoes, 440, see polyominoes.  
*N* queens problem, 438, 461–463.  
 Nabokov, Vladimir Vladimirovich,  
 416.  
 Nash, John Forbes, Jr., 706.  
 Nash-Williams, Crispin Saint John  
 Alvah, 568.  
 National Institute of Wealth, 37.  
 National Research Council of  
 Canada, 603.  
 National Science Foundation, xiv,  
 32, 77, 91, 98.  
  
 NCTM (National Council of  
 Teachers of Mathematics),  
 134, 137–138, 153.  
 near-symmetry, 452–456, 469.  
 Nebbishes, 185.  
 Needham, Noel Joseph Terence  
 Montgomery, 118.  
 needle and thread, 628.  
 needlework, 659–660, 665–667, 684,  
 688, 696–698.  
 Nemhauser, George Lann, 567.  
 Nesterenko, Yuri Valentinovich,  
 102.  
 nesting, 43, 302.  
 Nestor, Thomas Patrick, Jr.,  
 226–229.  
 Neuman, Alfred Ervin, 20, 27–28,  
 30.  
 Neuwirth, Erich, 225.  
 New Cowznofski's Day, 22.  
 New Year's Day, 634–635.  
 Newman, James Roy, 117.  
 nexting, 54.  
 Ngai, Sze-Man, 613.  
 ngogn, 2–3, 10, 17, 18, 20, 160.  
 Nguyen, Nhu To, 613.  
 Nicol, John William, 98.  
 Nielsen, Pace Peterson, 158.  
 Nii, Hisako Penny, 128.  
 Nikoli puzzles, 473–476.  
 Ninomiya, Yoshiyuki, 691.  
 Nishioka, Keiji, 102.  
 Nishioka, Kumiko, 102.  
 Nixon, Richard Milhous, 30.  
 noncrossing paths, 473–488.  
 nondeterministic algorithms, 37,  
 438, 440–441, 443.  
 Norges Almenvitenskapelige  
 Forskningsråd, xiv, 215.  
 Norway, 152, 154, 419, 637,  
 645–648, 658–661, 668, 679.  
 Noshita, Kohei, 438, 461, 467.  
 NP-complete problems: Problems  
 that are complete for



- nondeterministic polynomial  
 time complexity, 149, 439.  
 NPR (National Public Radio), 705.  
 number of the beast, 140, 151.  
 numbers, *x*.  
   algebraic, 99, 102.  
   auspicious, 121–122, 138–148,  
   153.  
   composite, 93–98, 663–665.  
   Fibonacci, *xi*, 87–95, 99–100, 648.  
   large, 103–120.  
   Liouville, 99–100.  
   Lucas, 91.  
   names for, 103–105, 118–119.  
   Pell, 565.  
   Pisot, 92.  
   prime, 93–94, 120, 122, 147,  
   662–665.  
   properties of, 144–148.  
   random, 358.  
   real, 141–144, 583, 598–599, *see*  
   *also* fundamental constants.  
   remarkable, 145.  
   representation of, *see*  
   representation of integers.  
   Roth, 99–101.  
   round, 146.  
   supernatural, 103, 120.  
   surreal, 120, 141, 679.  
   transcendental, 99–102, 612.  
 numerals, Roman, 29, 45, 57, 140.
- o*** notation, 137.  
***O*** notation, 33–39, 137.  
*O Yule With Thy Joy*, 646–647.  
 O’Beirne, Thomas Hay, 452, 454,  
 455, 466, 467, 469.  
 o’Dell, Conrad Cornelius o’Donald,  
 741.  
 object-oriented programming, 243,  
 306, 711.  
 OEIS (On-Line Encyclopedia of  
 Integer Sequences), 145–147,  
 159, 538.  
 œnophile, 149.
- Office of Naval Research, *xiv*, 91,  
 98, 215.  
 Olkin, Ingram, 137.  
 Olkin, Julia Ann, 137.  
 Ondrejka, Rudolf, 119, 618.  
 one-sided pentominoes, 455–456,  
 468.  
 one-sided surfaces, 668–669.  
 one-sided tetrasticks, 460–461,  
 469–470.  
 open source vertex, 516.  
 open states, 518.  
 open tours, 504–509.  
 orchestra song, 179–184.  
 order-preserving binary code, 106.  
 organ, pipe, 680.  
 organ-pipe ordering, 462–463.  
 Organa Solo, Leia Amidala née  
 Skywalker, 658.  
 Osarczuk, Petra I., 618.  
 Östergård, Patric Ralf Johan, 468.  
 Ottaway, Richard Geoffrey James,  
 158.  
 Otto, Susan, 400.  
 Oulipo (Ouvroir de Littérature  
 Potentielle), 414.  
 output, 42, 45, 57, 709–710, 714.  
 over-under-over-*⋯*, 489–509, 629,  
 693–694, 700–701.  
 overflow, 46, 54.  
 Oxford English Dictionary, 17, 216,  
 398, 429, 436.  
 Oxford Universal Dictionary, 407,  
 409.
- P*** versus *NP*, 149.  
 pacifism, 212, 217.  
 Padberg, Manfred William, 566.  
 paradoxes, *x–xiii*, 79, 213, 414, 702.  
 parentheses, doing without, 43.  
 parity arguments, 456–457, 491,  
 531, 548, 659.  
 partial differential equations, 713.  
 partridge in a pear tree, 35–36, 38,  
 628–630.

- party favors, 126, 473–476.  
 path counting, 523–539.  
 pattern matching in strings, 672.  
 Paulhus, Marc McBeth, 455, 467.  
 Pauly, Wolfgang, 484, 487.  
 Peano, Giuseppe, 31–32, 611.  
 Pease, Emma Ruth, xiv.  
 Peile, Robert Edward, 156.  
 Pell, John, numbers, 565.  
 Penrose, Roger, tiles, 643, 674.  
 pentagons, 628–629, 643, 648–649,  
 689–690, 699.  
 pentagrid, 648–649, 699.  
 Pentium<sup>®</sup> I computer, 449.  
 Pentium<sup>®</sup> III computer, 449–450.  
 pentominoes, 440–451, 685–689.  
 one-sided, 455–456, 468.  
 Perelman, Grigori (= Grisha)  
 Yakovlevich, 137, 158.  
 perfect folding sequences, 608–612.  
 perfect shuffle, 42.  
 perfectionism, 619.  
 periodic table, 401–403.  
 Peter-Orth, Christoph, 467.  
 Peters, Johann (= Jean) Theodor,  
 70.  
 Pethő, Attila, 92.  
 Phillips, Hubert, 216.  
 Phillips, Jacob Jean, 204.  
 Photoshop<sup>®</sup>, Adobe, 121, 123.  
 photostats, 684.  
 phyllotaxis, 680.  
 pi ( $\pi$ ), 2–3, 10, 17–18, 20, 72,  
 141–143, 197, 669, 708.  
 Pi Day, 669.  
 Picker, Nita, 38.  
 pipe organ, 680.  
 Pisot, Charles, numbers, 92.  
 pixels, 176, 638–639, 658, 709.  
 Planck, Karl Ernst Ludwig Marx  
 (= Max), 25.  
 plane-filling sequences, 607–612, *see*  
*also* space-filling curves.  
 plane-filling with tiles, *see* tiling  
 the plane.  
 Plantin, Christophe (= Plantijn,  
 Christoffel), 701.  
 Plass, Michael Frederick, 405, 715.  
 Plato (= Aristocles, son of  
 Ariston), 193.  
 Platoni, Kara Anne, 703.  
 plotter, 613, 680–683.  
 plotting points, 59–62.  
 Plouffe, Simon, 154.  
 plugh, 242, 260, 276, 330, 354,  
 358, 368.  
 Plymouth Fury, 427.  
 poems, 8, 91, 405–409, 411–414,  
 634–636.  
 Poincaré, Jules Henri, 137.  
 point contribution in basketball,  
 201, 208.  
 Pol, Balthasar van der, 664–665.  
 Pólya, György (= George), 150,  
 158.  
 polyiamonds, 452–455, 465, 469.  
 polyominoes, 440–451, 659–662,  
 685–689.  
 one-sided, 455–456, 468.  
 polysticks, 457–461, 465, 471–472.  
 Ponting, Lee, 613.  
 Ponzi, Carlo Pietro Giovanni  
 Guglielmo Tebaldo  
 (= Charles), scheme, 712.  
 Poorten, Alfred Jacobus van der,  
 612–613.  
 Porta, Horacio Alberto, 91.  
 PostScript<sup>®</sup>, 553.  
 potrzebie, 8, 30, 160, 178.  
 constant, 102.  
 Potrzebie System of Weights and  
 Measures, xi, 1–26, 58, 160,  
 708.  
 official table of conversion  
 factors, 15–16.  
 PowerPoint, scaled, 708.  
 powers of two, 37, 70, 104, 109,  
 116, 122, 146–147, 163, 257,  
 618, 625, 694, 702, 708;

- see also 32 ( $2^5$ ), 64 ( $2^6$ ),  
 65536 ( $2^{16}$ ).  
 POX typesetting system, 637.  
 practice versus theory, 712.  
 Prancing Pony, 338.  
 Pratt, Vaughan Ronald, 148.  
 prefix code, 106.  
 preorder of tree nodes, 441.  
 Price, Roger “Droodles”, 10, 17, 30.  
 primary columns, 458, 461, 463.  
 prime factors, 76, 663.  
 prime numbers, 93–94, 120, 122,  
 147, 662–665.  
 profile gauge, 681.  
*Project Marianne*, 711.  
 proofs of programs, 712.  
 properties of numbers, 144–148.  
 prosody, 91.  
 publishing, 712–713.  
 punched cards, 60, 200, 206, 208.  
 puns, bad, 301, 729.  
 puzzles, x.  
     for the reader, xiv, 27–30,  
     44–53, 59, 61, 105, 109, 221,  
     370, 405–407, 415–419, 421,  
     423–425, 431, 460, 473–474,  
     482, 485, 486, 629, 640, 643,  
     651, 662, 689.  
     mechanical, xiii, 690–691, 695.  
 Puzzling Pentagon, 690.  
 Pythagoras of Samos, son of  
     Mnesarchos, 193, 686.
- Q**uasi-random graphs, 136.  
 queens, 185, 232–234, 438, 461–463.  
 quicksort, 670–672.  
 quilts, 665–667, 688.  
 quincunxes, 538–539.  
 Quirinius, Publius Sulpicius, 639.  
 quote marks, 43.
- R**abbit constant, 102.  
 radial distortion, 486–488.  
 radon, 5, 14, 402.
- Ragsdale, William Frederick, 139,  
 153.  
 Ramanujan Iyengar, Srinivasa, 157.  
*Random House Dictionary*,  
 398–399.  
 random numbers, 358.  
 random sampling, 128, see also  
     Monte Carlo estimates.  
 randomness, 193–198, 282, 617,  
 673.  
 rank and file, 541.  
 Ranucci, Ernest Raymond, 632.  
 Rathmell, Edward Cary, 134.  
 Raymond, Eric Steven, 57, 58.  
 Reagan, Ronald Wilson, 44,  
 126–127.  
 real numbers, 141–144, 583,  
 598–599, see also fundamental  
     constants.  
 Reasons, George, 125, 159.  
 Rebozo, Charles Gregory “Bebe”,  
 126.  
 recreational mathematics, ix–xi,  
 643.  
 rectangular boards, 477–482,  
 503–509, 511–539, 541–570.  
 recurrence relations, 83–84, 87, 93,  
 524, 565.  
     binary, 580–582, 590, 605.  
     ternary, 595.  
 recursion versus iteration, 109, 119.  
 recursive methods, 108–119, 443,  
 579, 695, 697.  
 reduction of states, 525, 529.  
 reentrant paths, 512.  
 Rees, Alfred Wellington, 630.  
 Rees Carter, Lena Bernice, 630.  
 Reeve, John E., 452, 467.  
 referee, 70, 72, 86.  
 reflection symmetry, 503–505, 527,  
 536–537, 539, 690, 701.  
 reflections, 289, 292, 604, 674, 683.  
 Reid, Miles, 669.  
 Reidelbach, Maria Rita, 1.  
 Reinelt, Gerhard, 566, 567.

- remarkable numbers, 145.  
 Remley, Paul, 436.  
 Rényi, Alfréd, 75, 77.  
 representation of integers, 69–72,  
   87–88, 92, 106–119, 574–579,  
   *see also* balanced ternary  
   number system, binary number  
   system.  
 revolving representations, 577–579,  
   598–599.  
 rhombuses, 452–453.  
 Ricci-Curbastro, Gregorio, flow,  
   137.  
 Riley, Tom, 204–205.  
 Rinaldi, Giovanni, 566, 567.  
 rings, 692–694.  
 Rivest, Ronald Linn, 706.  
 Rivin, Igor, 467.  
 Robbins, David Peter, 137.  
 Roberts, Paul Morris Adrian, 157.  
 Robinson, Charles Dudley, 149.  
 Rodeh, Michael, 116, 118.  
 Rodgers, Thomas Malin, Jr., xvi,  
   423, 466.  
 Roebuck, Alvah Curtis, 713.  
 Rokicki, Tomas Gerhard, 464.  
 Roman numerals, 45, 57, 140.  
 Roosevelt, Theodore, 398.  
 root of a triad, 195–198.  
 roots of unity, 74–76, 577, 595,  
   598, 663.  
 Roscoe, Andrew William, xvi, 437.  
 Rosser, John Barkley, 74, 77.  
 Rota, Gian-Carlo, 58.  
 rotational symmetry,  
   by  $90^\circ$ , 492–494.  
   by  $180^\circ$ , 484, 492, 494, 503–505,  
   527, 533, 537, 554, 566, 632.  
 Roth, Klaus Friedrich, 99, 101.  
   numbers, 99–101.  
 Roubaud, Jacques, 414.  
 round numbers, 146.  
 Rubik, Ernő, cubes, 658.  
 Ruemmler, Ronald Elsworth, 480,  
   482.  
   rugs, 658, 662.  
   rulers, 9, 19.  
   Ruskey, Frank, 692–694.  
   Russell, Bertrand Arthur William,  
     32, 151.  
   Russell, John Francis Stanley  
     (= Frank), 151.  
   Russell, Stanley Emerson, 207.  
   ryas, 658–661, 700.  
   Ryon, Art, 159.  
**S** heuristic, 442, 447–450.  
 Sagan, Bruce Eli, 569.  
 Sagan, Hans, 611.  
 Saint Patrick's Day, 489.  
 Salamin, Eugene, 142–143.  
 Salesin, David Henry, 632.  
 Sallmen, Joseph P., 159.  
 Salzer, Herbert Ellis, 159.  
 Sarhangi, Reza, 649.  
 satisfiability, 144.  
 saxophone, 180–182, 194.  
 Sazdanovic, Radmila, 649.  
 scaled decimal arithmetic, 44, 57.  
 Schattschneider, Doris Jean, 632.  
 Scheme language, 711.  
 Schickele, Johann Peter, 684.  
 Scholl, Bill, 203–204.  
 Scholtz, Robert Arno, 156.  
 Scholz, Arnold, 157.  
 Schonblom, James Eric, 216–217.  
 Schumacher Hartmann, Justine  
   Wilhelmine Georgine, 630.  
 science fiction, 707–714.  
 Scott, Dana Stewart, 439–442, 447,  
   449, 450, 453, 467–468.  
 Scrabble®, 419, 433–434, 436.  
 Sears, Richard Warren, 713.  
 second system syndrome, 707–714.  
 secondary columns, 458, 461, 463,  
   483.  
 security, 236, 708, 711.  
 Sedgewick, Linda Ann née  
   Migneault, 669–670, 672.


- Sedgewick, Robert, 669–672, 691–692.
- Seeley, Cathy Lynn, 134, 153.
- Segers, Lea, 702.
- selection of bits, 42.
- self-avoiding cycles, 473–481, 484–485, 607.
- self-dual states, 525, 528.
- self-intersecting paths, 457–459, 477, 490–502, 605.
- semidefinite programming, 144.
- Serre, Jean-Pierre, 120.
- Severin, John Powers, 10, 17.
- sewing machine, 676–677, 688, 696–698.
- (SEX), 44.
- sexist language, 172, 209.
- SGB (Stanford GraphBase), 422, 697.
- five-letter words, 216, 404, 419, 422, 429–430, 433–436.
- Shahn, Benjamin, 38.
- Shallit, Jeffrey Outlaw, 101, 613, 706.
- Shannon, Claude Elwood, Jr., 706.
- Sharp, Cecil James, 37–38.
- Sharp, Richard, 224.
- Shatz, Stephen Sidney, 120.
- Shaw, Christopher Joseph, 38.
- sheep, 400, 419, 436, 633.
- shepherds, 639.
- Sheppard, Henry Fleetwood, 37.
- Sherinyan, William Kerrigan, 124.
- shields, 676–677.
- shifting right, 43, 57, 92, 605.
- shifty poems, 411–414, 635.
- Shiokawa, Iekata, 102.
- shirt, 677–678.
- SHRDLU program, 430.
- Shu Shu Chi I* (= *Shushu Jiyi*), 116.
- Shubik, Martin, 216.
- Sierpiński, Waclaw Franciszek, 694–695.
- gasket, 695.
- Silverman, David L., 216.
- similar representations, 579, 587.
- simple cycles and paths, 483.
- simple graphs, 145–146.
- Simplified Spelling Board, 398.
- sink vertex, 516.
- skimperlink puzzles, 474–476.
- slitherlink puzzles, 474–475.
- Sloane, Neil James Alexander, 145–146, 159, 538.
- Smale, Stephen, 134.
- Smart, Maxwell (= Agent 86), 141.
- Smith, Dave, 158.
- smoke, black, 361.
- green, 384.
- orange, 370, 375.
- Smurdley, Natures, 6, 11, 15, 17, 23.
- Snook Walters, Alwilda, 630.
- Snow, Charles Percy, 657.
- Snyder, Don, 159.
- software engineering, 711–712.
- Soma cube, 467.
- songs, 33–39, 183, 186–191, 645–648.
- sorting machine, 200.
- space complexity versus time complexity, 33, 39.
- space-filling curves, 583, 595, 611.
- spanning trees, 644.
- SPARCstation 2 computer, 449.
- spelling, simplified, 398.
- Speziali, Pierre, 664–665.
- Spicer, Charles James Dag, 149.
- spirit duplicator, 623.
- splines, 682.
- sporadic groups, 145.
- square root, 69–72.
- double-double precision, 49–50, 56.
- Stäckel, Paul Gustav Samuel, 668.
- stacks, 54–55.
- Stalin, Joseph Vissarionovich, 406, 408.

- standard representation schemes, 114.
- standing up, 706.
- Stanford Artificial Intelligence Laboratory, 173, 236, 338, 681, 683.
- Stanford GraphBase, 697.  
     five-letter words, 216, 404, 419, 422, 429–430, 433–436.
- Stanford Music Affiliates, 193.
- Stanford Research Institute, 125.
- Stanford University, xiv, 148, 165, 173, 193, 672–674, 687, 691–692.  
     Archives, 217, 706.
- Stanley, Richard Peter, 471, 537.
- star of Christmas, 625, 640–644, 648–649, 651, 656.
- Star Trek*, 658.
- statistics, 200–201.
- Stead, Walter, 659–662, 686.
- Steele, Guy Lewis, Jr., 39.
- Steiner, Jacob, tree, 421–422.
- Steinitz, Ernst, 120.
- Stentiford, Timothy J., 159.
- stereographic projection, 486–488.
- Stern, Marvin, 79, 81, 86.
- Stettner, Armando Paul, 149.
- Stillman, Michael Eugene, 154.
- Stirling, James, approximation, 70.
- Stolarsky, Kenneth Barry, 91.
- Stone, Arthur Harold, 628.
- Strindberg, Johan August, 194.
- Stubbs Carter, Mary Elizabeth, 630.
- stupid questions, 108, 111–112.
- subroutines, 53–54, 697.  
     prototypes for, 237.
- subtraction, double-double  
     precision, 47, 55–56.
- Sudeck, William Charles, 199, 204, 208.
- sudoku, 473, 651–656.
- supernatural numbers, 103, 120.
- surreal numbers, 120, 141, 679.
- Surrick, John Earle, 419.
- SVD (singular value decomposition), 148.
- Sweden, 152, 648.
- symmetry, 160, 452–455, 469,  
     *see also* Bergholt symmetry,  
     reflection symmetry, rotational  
     symmetry.  
     of closed knight's tours, 503–505,  
     700–701.  
     of open knight's tours, 532.
- Szabaga, Peter P., 159.
- Szegő, Gábor, 150, 158.
- Tablecloths**, 664–665.
- Talese, Gay Joseph, 159.
- Tanaka, Tetsuro, 228.
- TANGLE**, 684.
- Tarantino, Quentin Jerome, 218.
- Tarback, Jimmy, 151.
- Tatsuya, Jinmei, 715.
- tattoos, 658.
- Tchaikovsky, Peter Ilyich, 680.
- Teeters, Joseph Lee Kriegh, 632.
- teleprinter code, 45, 53–54.
- telestich, xiv, 705.
- temperature, units of, 5, 6, 11, 15,  
     17, 23.
- ter-dragon curves, 595–600.
- ter-dragon labyrinth, 605.
- ter-dragon sequences, 601, 606.
- ternary recurrences, 595.
- tetrahedrons, 636–637.
- tetrasticks, 457–461, 465, 471–472.
- TeX**, iv, 26, 133, 142, 150, 464, 637,  
     642, 692, 696, 702, 707–712.
- textile art, 665–671, 685–689.
- textures, 177, 675.
- The Art of Computer  
     Programming*, x, 475, 483,  
     490, 626, 638, 643, 644, 648,  
     659, 678–680, 683–684, 695,  
     698–699, 708.
- Theta Chi fraternity, 185.
- Thienel, Stefan, 566.

- Thomson, John Walter, Jr., 17.  
 Thomson, William, *see* Kelvin.  
 thoron, 402.  
 thread art, 684, 700–701.  
 threads, 489, 507, 628–629, 700–701.  
 three-coloring, 660.  
 three-letter words, 124–125, 464.  
 Thue, Axel, 606.  
 Thureau, Gustav, 38.  
 Thurber, James Grover, 429.  
 Tichy, Robert Franz, 92.  
 Tierney, John Aloysius, 69, 71.  
 tiles, 603–605, 611, 615–621, 649–650.  
   Penrose, 643, 674.  
 tiling the plane, 485–486, 630–632, 676–678.  
 time, units of, 4, 10, 18, 21, 25, 145.  
 time complexity versus space complexity, 33, 39.  
 Tiskin, Alexander Vladimirovich, 160.  
 Tolkien, John Ronald Reuel, 298.  
 top-down versus bottom-up, 54–55, 318.  
 Torbijn, Pieter Johannes, 452, 468.  
 toruses, 442, 485–486, 488, 675–676.  
 Torvalds, Linus Benedict, 160.  
 totient function  $\varphi$ , 69, 152.  
 Tower of Hanoi, 694.  
 TPK algorithm, 41–58.  
 Trabb Pardo, Luis Isidoro, 41, 44, 58.  
 transcendental numbers, 99–102, 612.  
 traveling salesrep problem, 566, 570.  
 tree structure, 447, 630, 679.  
 triadic chords, 195–198.  
 triangles, 452, 589–590.  
   3:4:5 right, 497–498.  
   equilateral, 63–68, 209, 636–637.  
   golden, 642–644, 689–690.  
   type  $k$ , 498–503.  
 Trickier Trivet, 695.  
 tricks, 56–57.  
 triel, 209–218.  
 trihexaflexagons, 625–628.  
 triplets of connected words, 421–422.  
 Troll, Da (= Birken, Philipp), 153.  
 troll bridge, 296–298, 310, 338, 356.  
 Trotter, Hale Freeman, 440, 449, 450.  
 truel, 216.  
 TSP (Traveling Salesrep Problem), 566, 570.  
`tsplib`, 570.  
 Tucker, Kadin Morris, 189.  
 Tucker, Rees Levi, 189.  
 Tuckerman, Bryant, 628.  
 TUG:  $\TeX$  Users Group, 707, 714.  
 Tukey, John Wilder, 628.  
 Tung, Yun-Mei (= Dong Yunmei), 116.  
 Turing, Alan Mathison, 45, 53, 149.  
 Turnbull, Andrew Stuart, 153.  
 Tutte, William Thomas, 150, 159.  
 twelve days of Christmas, 35–36, 38, 628–629, 643.  
 Twenty Questions, 107.  
 twisty little passages, 254, 258, 268–269, 272.  
 two-part invention, 683.  
 typographic errors, 8, 415.  
 typography, xii, 136, 152, 193–194, 637–642, 672, 696, 701.  
 Tyrrell, John A., 452, 467.  
 UCSD (University of California, San Diego), 137.  
 Ultrasuede<sup>®</sup>, 669.  
 Umble, Ronald Nelson, 67.  
 unary operators, 43.

- uncrossed knight's tours, 477–488.  
 under-over-under-... , 489–509, 629,  
     693–694, 700–701.  
 undoing, 438–439, 444.  
 Unicode, 709, 711, 714.  
 unicursal routes, 697.  
 unique factorization domains, 663.  
 units of a domain, 663–664,  
     666–667.  
 units of measure, 1–26, 418–420,  
     708, 713.  
 unity, roots of, 74–76, 577, 595,  
     598, 663.  
 universe, size of, 103.  
 University of California, Berkeley,  
     124–125.  
 University of Wisconsin, 121.  
 UNIX<sup>®</sup>, 25, 57, 149, 160, 236.  
 updates, in algorithm DLX, 447.  
 uppercase letters, 236, 238.  
 USA (United States of America),  
     676–678, 699.  
  
**V**alentine's day, 689.  
 valley folds, 571, 625–626.  
 Van Akelijen, Roger, 701–702.  
 van de Walle, C., 694.  
 van der Pol, Balthasar, 664–665.  
 van der Poorten, Alfred Jacobus,  
     612–613.  
 Vandermonde, Alexandre  
     Théophile, 489–490, 565, 568.  
 vanishing puzzles, 411–414,  
     633–636.  
 vanity plates, 121–160.  
 vaporware, 714.  
 Vardi, Ilan, 467.  
 Vasilyev, Nikolay Borisovich, 618.  
 Venn, John, 692–694.  
 Verbinski, Gregor, 218.  
 Verdonk, Brigitte Maria, 701.  
 vertical symmetry, 453–456, 469.  
 vest, 669.  
 Vida, Herbert J., 159.  
 vigintillion, 105.  
 vigintyllion, 104.  
 Vigneras, Marcel J., 38.  
 Vitter, Jeffrey Scott, 691–692.  
 von Dyck, Ivan, 401–402.  
 Vsemirnov, Maxim Aleksandrovich,  
     98.  
  
**W**abi-sabi, 193–194, 619, 683–684.  
 Wagnalls, Adam Willis, 396,  
     398–399.  
 Wałęsa, Lech, 8.  
 Walker, Robert John, 74, 77.  
 walks, 524.  
 Walle, C. van de, 694.  
 Walters, Salem, 630.  
 Walters, Tessie, 630.  
 Waltz, David Leigh, 468.  
     filtering, 464.  
 Ward, Mark Daniel, xiv.  
 Warnock, John Edward, 160.  
 warped images, 486–488.  
 Washington, George, Birthday, 22.  
 Wassermann, Alfred, 468, 470.  
 Watson, Richard Allan, 282.  
**WEAVE**, 684.  
 weaving, 489, 664–665, 669–672.  
**WEB**, 684.  
 Weber, Heinrich, 118.  
 Webster, Noah, dictionary,  
     421–422.  
 Wechsler, Allan, 119.  
 Wegner, Henry August, 184.  
 weights and measures, 1–26,  
     418–420, 708, 713.  
 Weiner, Peter Gallegos, 86.  
 welded tetrasticks, 460.  
 Wells, David Graham, 139–140,  
     159, 224.  
 Wermuth, Udo Wilhelm Emil, xiv.  
 Westminster Choir College, 194.  
 Weston, Mark Richard Nicholas,  
     694.  
 Whitehead, Alfred North, 32.  
 Widom, Jennifer, 703.



- Wiederhold, Giovanni Corrado Melchiorre (= Gio), 148.  
 Wiener, Michael James, 227.  
 Wiezorke, Bernhard, 457, 468.  
 Wikimedia Commons, 153.  
 Wiktionary, 398.  
 Wilf, Herbert Saul, 98.  
 Wilkins, David, 159.  
 Willcocks, Theophilus Harding, 554, 564–567, 570.  
 Williamson, David Paul, 144, 156.  
 Winkler, Phyllis Astrid née Benson, 670.  
 Winograd, Terry Allen, 430.  
 Winston, Patrick Henry, 468.  
 Wischmeyer Ehlert, Clara Louise, 630.  
 Wisconsin Academy of Sciences, Arts and Letters, Junior division, 1, 9, 17.  
 Witt, Perry Odd, 281.  
 Woeginger, Gerhard Johannes, 92.  
 Wolfram|Alpha™, 26.  
 Woltman, George Frederick, 160.  
 Wolverton, Basil Barnbrain, 4, 10.  
 Wood, Wallace Allan, 1–8, 10, 17, 19, 21.  
 Woodbridge, George Charles, 30.  
 Woodcock, Jim C. P., xvi, 437.  
 Woods, Donald Roy, xii, 41, 43, 57, 58, 235–236, 240, 289, 292, 296, 380.  
 word cubes, 433–436.  
 word golf, 416.  
 word ladders, 415–427.  
 word links, 416.  
 word play, ix, xii–xiv, 395–436.  
 word puzzles, 27–30, 415–419, 421, 423–425, 431.  
 word squares, 425, 428, 435–436, 464.  
 Worlton, William Jack, 467.  
 WTMJ-TV, 395–396, 399–400.  
 WYFIWYG (What You Feel Is What You Get), 709.
- X3C problem, 439.  
 Xeon® computer, 570.  
 Xerox PARC (Palo Alto Research Center), 638, 657, 680.  
 XGP (Xerox Graphics Printer), 680, 683.  
 XML markup language, 709.  
 Xu Yue (= Hsü Yo), 116.  
 xyzyzy, 242, 260, 264, 330, 354, 376.
- Y-formation, 421–422.  
 Y2, 276.  
 Yao, Andrew Chi-Chih, 116, 117.  
 Yarbrough, Lynn Douglas, 477, 480.  
 Yarmy, Donald James (= Don Adams), 154.  
 yarn, 658–660, 668.  
 Yee, Alexander Jih-Hing, 143, 160.  
 Yorke, James Alan, 140, 157.  
 Yoshigahara, Nobuyuki, 431, 473, 643, 689–691.  
 Yoshigahara, Takako, 691.  
 YouTube, 208.
- Zapf, Hermann, 702.  
 ZDDs (zero-suppressed decision diagrams), 475–476, 481–484, 486–487.  
 Zeckendorf, Edouard, 87, 88, 91–92.  
 zero, 663, 666–667.  
 Ziegler, George, 395.  
 Ziegler Company, 395, 396, 400.  
 Ziegler's Giant Bar, 395–400.  
 Zimmer, Carl William, 658.  
 Zimmermann, Paul Vincent Marie, 467.  
 zipper function, 42.  
 Zuckerman, Henry (= Buck Henry), 154.
- , 741.