<https://discuss.codechef.com/questions/18752/what-are-the-must-known-algorithms-for-online-programming-contests>

I've been practicing at Codechef for a while and now I'm gradually moving toward medium/hard problems. However many algorithms at these levels are very difficult to predict, and I was always stuck because I'm not aware of them. So I open this topic, my hope is to have a wish-list of most used algorithm for online programming contest that I can look up for reference. Here is my short-list up to now:

1. Segment tree (with lazy propagation)
2. Interval Tree
3. Binary Indexed Tree
4. [Fast Modulo Multiplication (Exponential Squaring)](http://discuss.codechef.com/questions/20451/a-tutorial-on-fast-modulo-multiplication-exponential-squaring)
5. Heuristic Algorithms
6. KMP string searching
7. Manacher's Algorithm
8. Union Find/Disjoint Set
9. Trie
10. Prime Miller Rabin
11. [Matrix Recurrence + Fast Modulo Multiplication for counting](http://discuss.codechef.com/questions/2335/building-up-the-recurrence-matrix-to-compute-recurrences-in-ologn-time?page=1#20529)
12. Stable Marriage Problem
13. [Extended Euclid's algorithm](http://discuss.codechef.com/questions/20842/a-tutorial-on-the-extended-euclids-algorithm)
14. Ternary Search
15. Fast Fourier Transform for fast polynomial multiplication
16. Djikstra's algorithm, Bellman-ford algorithm, Floyd-Warshall Algorithm
17. Prim's Algorithm, Kruskal's Algorithm
18. RMQ, LCA
19. Flow related algorithms, assignment problem, Hungarian algorithm
20. Bipartite matching algorithms
21. Heavy-light decomposition
22. Sweep line algorithm
23. Z algorithm
24. Convex Hull
25. [Suffix Arrays](http://discuss.codechef.com/questions/21385/a-tutorial-on-suffix-arrays)
26. LCP
27. Suffix Tree
28. Gaussian Elimination
29. Numerical Integration/Differentiation
30. Line Clipping
31. Advanced Maths Ad-Hoc problems
32. Aho–Corasick string matching algorithm;
33. [Calculate nCr % M Lucas's Theorem](http://discuss.codechef.com/questions/3869/best-known-algos-for-calculating-ncr-m)
34. Heavy Light decomposition in trees
35. Inverse Modulo operations
36. Pollard Rho Integer Factorization
37. Catalan Numbers
38. Euclid's GCD Algorithm
39. Extended Euclid's algorithm
40. Binary Search, Ternary Search
41. Sieve of Eratosthenes for finding primes
42. Fast Fourier Transformation for fast polynomial multiplication
43. Graph algorithms - BFS, DFS, finding connected components
44. Djikstra's algorithm, Bellman-ford algorithm, Floyd-Warshall Algorithm
45. Prim's Algorithm, Kruskal's Algorithm
46. RMQ, LCA
47. Flow related algorithms, assignment problem, Hungarian algorithm
48. Bipartite matching algorithms
49. Heavy-light decomposition
50. Sweep line algorithm
51. Z algorithm
52. Suffix Arrays;
53. LCP;
54. Heuristic Algorithms;
55. Gaussian Elimination;
56. Numerical Integration/Differentiation;
57. Line Clipping;
58. Advanced Maths Ad-Hoc problems;
59. Aho–Corasick string matching algorithm;
60. Knuth–Morris–Pratt algorithm;
61. Heavy Light decomposition in trees
62. [Inverse Modulo operations](http://comeoncodeon.wordpress.com/2011/10/09/modular-multiplicative-inverse/)
63. [Lucas theorem method for nCr](http://discuss.codechef.com/questions/3869/best-known-algos-for-calculating-ncr-m)
64. [Pollard Rho Integer Factorization](http://comeoncodeon.wordpress.com/2010/09/18/pollard-rho-brent-integer-factorization/)
65. [Catalan Numbers](http://en.wikipedia.org/wiki/Catalan_number)