**Level 0 - Fundamental Knowledge**

The things you need to know before you get started - the basics of coding.

* Loops
  + For loops
  + While loops
  + Do while loops
  + For each loops (super important)
* Ifs
  + In some cases, you can do switch statements as well
* Arrays
  + 1d arrays
  + 2d arrays
* Data types
  + Int
  + String
  + Float
  + Double
  + Char
* Big 0 Complexity (basics, nothing extreme)

[Big list of Data Structures](https://en.wikipedia.org/wiki/List_of_data_structures)

[Big list of Algorithms](https://en.wikipedia.org/wiki/List_of_algorithms)

[Really good free course](https://algo.is/competitive-programming-course/)

**Books:**

[Algorithms (4th Edition)](https://www.amazon.com/Algorithms-4th-Robert-Sedgewick/dp/032157351X/ref=sr_1_13?ie=UTF8&qid=1527174372&sr=8-13&keywords=data+structures+and+algorithms)

[Introduction To Algorithms (3rd Edition)](https://www.amazon.com/Introduction-Algorithms-3rd-MIT-Press/dp/0262033844/ref=sr_1_6?s=books&ie=UTF8&qid=1527174414&sr=1-6&keywords=data+structures&dpID=41-1VkO%252B1lL&preST=_SY291_BO1,204,203,200_QL40_&dpSrc=srch)

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| **Name** | **Learn It** | **Practice**  **(Hackerrank)** | [**Algo.is**](https://algo.is/competitive-programming-course/) **lecture** | **Completed** |
| Arrays (1D & 2D) | [**1**](https://computer.howstuffworks.com/c10.htm) [2](https://processing.org/tutorials/2darray/) | [1](https://www.hackerrank.com/domains/data-structures?filters%5Bsubdomains%5D%5B%5D=arrays) | 2, 3 |  |
| Sets & HashMaps / Dicts | [1](https://www.youtube.com/watch?v=sBvaPopWOmQ) [2](https://www.youtube.com/watch?v=WPcKwA5WF7s) [3](https://stackoverflow.com/questions/2773824/difference-between-hashset-and-hashmap) | [1](https://www.hackerrank.com/challenges/linkedin-practice-dictionaries-and-maps/tutorial) [2](https://www.hackerrank.com/challenges/linkedin-practice-dictionaries-and-maps/problem) | 2, 3 |  |
| Heaps | [1](https://www.tutorialspoint.com/data_structures_algorithms/heap_data_structure.htm) [2](https://www.youtube.com/watch?v=eFCn6udv3gQ) | [1](https://www.hackerrank.com/domains/data-structures?filters%5Bsubdomains%5D%5B%5D=heap) | 2, 3 |  |
| Linked Lists | [1](https://www.youtube.com/watch?v=195KUinjBpU) [2](https://beginnersbook.com/2013/12/linkedlist-in-java-with-example/) | [1](https://www.hackerrank.com/domains/data-structures?filters%5Bsubdomains%5D%5B%5D=linked-lists) | 2, 3 |  |
| Stacks & Queues | [1](https://stackoverflow.com/questions/10974922/what-is-the-basic-difference-between-stack-and-queue) [2](https://en.wikipedia.org/wiki/Stack_(abstract_data_type)) [3](https://en.wikipedia.org/wiki/Queue_(abstract_data_type)) | [1](https://www.hackerrank.com/domains/data-structures?filters%5Bsubdomains%5D%5B%5D=stacks&filters%5Bsubdomains%5D%5B%5D=queues) | 2, 3, 8, 9 |  |
| Adjacency List | [1](https://www.youtube.com/watch?v=WtfGRS1BsBI) [2](https://en.wikipedia.org/wiki/Adjacency_matrix) |  | 8, 9 |  |
| Binary Search Trees | [1](https://www.youtube.com/watch?v=pYT9F8_LFTM) [2](https://en.wikipedia.org/wiki/Binary_search_tree) | [1](https://www.hackerrank.com/domains/data-structures?filters%5Bsubdomains%5D%5B%5D=trees&filters%5Bsubdomains%5D%5B%5D=balanced-trees) |  |  |
| Minimum Spanning Trees | [1](https://www.youtube.com/watch?v=5xosHRdxqHA) [2](https://www.youtube.com/watch?v=YyLaRffCdk4) [3](https://en.wikipedia.org/wiki/Minimum_spanning_tree) | [1](https://www.hackerrank.com/domains/data-structures?filters%5Bsubdomains%5D%5B%5D=trees&filters%5Bsubdomains%5D%5B%5D=balanced-trees) |  |  |
| Sorting & Search Algorithms | Entire List: [1](https://en.wikipedia.org/wiki/Minimum_spanning_tree)  Way too much resources, just Google it | [1](https://www.hackerrank.com/domains/algorithms?filters%5Bsubdomains%5D%5B%5D=arrays-and-sorting&filters%5Bsubdomains%5D%5B%5D=search) | 4 |  |
| Breadth First Search | [1](https://www.youtube.com/watch?v=9xuMBR9_BNs) [2](https://en.wikipedia.org/wiki/Breadth-first_search) | [1](https://www.hackerrank.com/challenges/bfsshortreach/problem) [2](https://www.hackerrank.com/domains/algorithms?filters%5Bsubdomains%5D%5B%5D=graph-theory) | 8, 9 |  |
| Depth First Search | [1](https://www.youtube.com/watch?v=Y40bRyPQQr0) [2](https://en.wikipedia.org/wiki/Depth-first_search) [3](https://www.geeksforgeeks.org/depth-first-search-or-dfs-for-a-graph/) | [1](https://www.hackerrank.com/domains/algorithms?filters%5Bsubdomains%5D%5B%5D=graph-theory) | 8, 9 |  |