



HackerEarth Online Judge

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HackerEarth Online Judge - Phase 2

Non-Linear Data Structures



Lecture Agenda

We will discuss in this lecture
the following topics

- | | |
|----------------------------|---------------|
| 1- Binary Tree | [10 problems] |
| 2- Binary Search Tree | [10 problems] |
| 3- Heaps / Priority Queues | [20 problems] |
| 4- Hash Tables | [50 problems] |
-



Let's
STARTUP

Lecture Agenda

Section 1: Binary Tree

Section 2: Binary Search Tree

Section 3: Heaps / Priority Queues

Section 4: Hash Tables



HackerEarth - Binary Tree



- [01] <https://www.hackerearth.com/practice/data-structures/trees/binary-and-nary-trees/practice-problems/algorithm/mirror-image-2/>
- [02] <https://www.hackerearth.com/practice/data-structures/trees/binary-and-nary-trees/practice-problems/algorithm/magical-tree-1-e7f8cabd/>
- [03] <https://www.hackerearth.com/practice/data-structures/trees/binary-and-nary-trees/practice-problems/algorithm/mancunian-and-colored-tree/>
- [04] <https://www.hackerearth.com/practice/data-structures/trees/binary-and-nary-trees/practice-problems/algorithm/directory-deletion-71e793b8/>
- [05] <https://www.hackerearth.com/practice/data-structures/trees/binary-and-nary-trees/practice-problems/approximate/largest-cycle-in-a-tree-9113b3ab/>
- [06] <https://www.hackerearth.com/practice/data-structures/trees/binary-and-nary-trees/practice-problems/algorithm/tree-counting-3/>
- [07] <https://www.hackerearth.com/practice/data-structures/trees/binary-and-nary-trees/practice-problems/algorithm/population-outburst-7db5d39a/>
- [08] <https://www.hackerearth.com/practice/data-structures/trees/binary-and-nary-trees/practice-problems/algorithm/gandhi-tree-march/>
- [09] <https://www.hackerearth.com/practice/data-structures/trees/binary-and-nary-trees/practice-problems/algorithm/count-the-tree/>



Lecture Agenda

✓ Section 1: Binary Tree

Section 2: Binary Search Tree

Section 3: Heaps / Priority Queues

Section 4: Hash Tables



HackerEarth - Binary Search Tree



- [01] <https://www.hackerearth.com/practice/data-structures/trees/binary-search-tree/practice-problems/algorithm/monk-watching-fight/>
- [02] <https://www.hackerearth.com/practice/data-structures/trees/binary-search-tree/practice-problems/algorithm/monk-and-his-friends/>
- [03] <https://www.hackerearth.com/practice/data-structures/trees/binary-search-tree/practice-problems/algorithm/distinct-count/>
- [04] <https://www.hackerearth.com/practice/data-structures/trees/binary-search-tree/practice-problems/algorithm/b-sequence-f919fc86/>
- [05] <https://www.hackerearth.com/practice/data-structures/trees/binary-search-tree/practice-problems/algorithm/monk-and-cursed-tree/>
- [06] <https://www.hackerearth.com/practice/data-structures/trees/binary-search-tree/practice-problems/algorithm/monk-and-bst/>
- [07] <https://www.hackerearth.com/practice/data-structures/trees/binary-search-tree/practice-problems/algorithm/dummy3-4/>
- [08] <https://www.hackerearth.com/practice/data-structures/trees/binary-search-tree/practice-problems/algorithm/suarez/>
- [09] <https://www.hackerearth.com/practice/data-structures/trees/binary-search-tree/practice-problems/algorithm/little-monk-and-swaps/>
- [10] <https://www.hackerearth.com/practice/data-structures/trees/binary-search-tree/practice-problems/algorithm/mst-revisited-3f9d614c/>



Lecture Agenda

✓ Section 1: Binary Tree

✓ Section 2: Binary Search Tree

Section 3: Heaps / Priority Queues

Section 4: Hash Tables



HackerEarth - Heaps / Priority Queues



- [01] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/little-monk-and-abd/>
- [02] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/seating-arrangement-6b8562ad/>
- [03] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/monk-and-multiplication/>
- [04] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/monk-and-champions-league/>
- [05] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/roy-and-trending-topics-1/>
- [06] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/hostel-visit/>
- [07] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/haunted/>
- [08] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/pk-and-special-array-operation-1-7bd52ad1/>
- [09] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/approximate/little-monk-and-root/>
- [10] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/little-monk-and-williamson/>
- [11] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/little-monk-and-virat/>
- [12] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/little-monk-and-steve-smith/>
- [13] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/guptas-escape-b71099d5/>
- [14] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/monk-and-some-queries/>
- [15] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/monk-and-iq/>
- [16] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/power-up-2/>
- [17] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/2nd/>
- [18] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/monk-and-the-magical-candy-bags/>

HackerEarth - Heaps / Priority Queues



- [19] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/maximiser-le-score-64285dcd/>
- [20] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/break-the-door/>
- [21] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/booble-the-search-engine/>
- [22] <https://www.hackerearth.com/practice/data-structures/trees/heapspriority-queues/practice-problems/algorithm/theatre-830bdbff/>





Lecture Agenda

- ✓ Section 1: Binary Tree
- ✓ Section 2: Binary Search Tree
- ✓ Section 3: Heaps / Priority Queues
- Section 4: Hash Tables**



HackerEarth - Hash Tables



- [01] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/perfect-pair-df920e90/>
- [02] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/kth-character-2/>
- [03] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/bob-and-string-easy/>
- [04] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/will-rick-survive-or-not-2/>
- [05] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/maximum-occurrence-9/>
- [06] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/lets-plot-this-47a575ed/>
- [07] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/thanos-and-the-infinity-stones/>
- [08] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/statistics-2/>
- [09] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/star-studded-lockdown/>
- [10] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/alien-language/>
- [11] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/xsquare-and-palindromes-insertion/>
- [12] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/riyaz-dhruv-the-friendship/>
- [13] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/xsquare-and-double-strings-1/>
- [14] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/n-co-ordinates-map-practice/>
- [15] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/all-vowels-2/>
- [16] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/pair-sums/>
- [17] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/cricket-balls/>
- [18] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/frequency-of-students/>

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- [19] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/n-co-ordinates-pair-practice/>
- [20] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/bob-an-idiot-11/>
- [21] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/mind-palaces-3/>
- [22] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/the-monk-and-kundan/>
- [23] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/exists/>
- [24] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/maximum-subarray-sum-of-subarrays-7f33aefa/>
- [25] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/easy-one-8/>
- [26] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/notebook-pages-dbad75a5/>
- [27] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/aman-and-lab-file-work-8cd1d24c/>
- [28] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/difficult-characters/>
- [29] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/crushing-violence/>
- [30] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/factorial-game-1/>
- [31] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/suzakus-festivals-14dacd7c/>
- [32] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/little-jhool-and-the-magical-jewels/>
- [33] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/icpc-team-management/>
- [34] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/e-16/>
- [35] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/little-monk-and-the-matchmaker/>
- [36] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/the-monk-and-prateek/>

HackerEarth - Hash Tables



- [37] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/the-electric-type/>
- [38] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/highest-rating-f8ead57a/>
- [39] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/chetan-vs-fauji/>
- [40] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/a-needle-in-the-haystack-1/>
- [41] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/ishans-dilemma/>
- [42] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/yet-another-valentines-proposal/>
- [43] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/mathison-and-the-divisible-trio-a0a169b0/>
- [44] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/shantam-and-richness-1/>
- [45] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/longlong/>
- [46] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/mandee-and-his-girlfriend-9a96aabd/>
- [47] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/shubham-and-subarrays-325b1e73/>
- [48] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/scrambled-letters-00e18912-6cb9f33c/>
- [49] <https://www.hackerearth.com/practice/data-structures/hash-tables/basics-of-hash-tables/practice-problems/algorithm/chandu-and-chandni/>



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DO
MORE.