



HackerRank Online Judge

Prepared by: Mohamed Ayman

Algorithm Engineer at Valeo

Deep Learning Researcher and Teaching Assistant
at The American University in Cairo (AUC)

spring 2020

Valeo



THE AMERICAN
UNIVERSITY IN CAIRO



sw.eng.MohamedAyman@gmail.com



facebook.com/cs.MohamedAyman



linkedin.com/in/cs-MohamedAyman



github.com/cs-MohamedAyman



codeforces.com/profile/Mohamed_Ayman



HackerRank Online Judge - Phase 2 Mathematics



Lecture Agenda

We will discuss in this lecture
the following topics

1- Fundamentals [20 problems]

2- Number Theory [30 problems]

3- Combinatorics [30 problems]

4- Algebra [30 problems]

5- Geometry [15 problems]

6- Probability [15 problems]



Let's
STARTUP

Lecture Agenda

Section 1: Fundamentals

Section 2: Number Theory

Section 3: Combinatorics

Section 4: Algebra

Section 5: Geometry

Section 6: Probability



HackerRank - Fundamentals



- [01] <https://www.hackerrank.com/challenges/find-point>
- [02] <https://www.hackerrank.com/challenges/maximum-draws/problem>
- [03] <https://www.hackerrank.com/challenges/handshake/problem>
- [04] <https://www.hackerrank.com/challenges/lowest-triangle/problem>
- [05] <https://www.hackerrank.com/challenges/game-with-cells/problem>
- [06] <https://www.hackerrank.com/challenges/leonardo-and-prime/problem>
- [07] <https://www.hackerrank.com/challenges/connecting-towns/problem>
- [08] <https://www.hackerrank.com/challenges/p1-paper-cutting/problem>
- [09] <https://www.hackerrank.com/challenges/sherlock-and-moving-tiles/problem>
- [10] <https://www.hackerrank.com/challenges/best-divisor/problem>
- [11] <https://www.hackerrank.com/challenges/restaurant/problem>
- [12] <https://www.hackerrank.com/challenges/reverse-game/problem>
- [13] <https://www.hackerrank.com/challenges/strange-grid/problem>
- [14] <https://www.hackerrank.com/challenges/sherlock-and-divisors/problem>
- [15] <https://www.hackerrank.com/challenges/halloween-party/problem>
- [16] <https://www.hackerrank.com/challenges/filling-jars/problem>

HackerRank - Fundamentals



- [17] <https://www.hackerrank.com/challenges/harry-potter-and-the-floating-rocks/problem>
- [18] <https://www.hackerrank.com/challenges/russian-peasant-exponentiation/problem>
- [19] <https://www.hackerrank.com/challenges/most-distant/problem>
- [20] <https://www.hackerrank.com/challenges/possible-path>





Lecture Agenda

✓ Section 1: Fundamentals

Section 2: Number Theory

Section 3: Combinatorics

Section 4: Algebra

Section 5: Geometry

Section 6: Probability



HackerRank - Number Theory



- [01] <https://www.hackerrank.com/challenges/constructing-a-number>
- [02] <https://www.hackerrank.com/challenges/sherlock-and-gcd>
- [03] <https://www.hackerrank.com/challenges/primitive-problem/problem>
- [04] <https://www.hackerrank.com/challenges/identify-smith-numbers>
- [05] <https://www.hackerrank.com/challenges/eulers-criterion>
- [06] <https://www.hackerrank.com/challenges/fibonacci-finding-easy>
- [07] <https://www.hackerrank.com/challenges/cheese-and-random-toppings/problem>
- [08] <https://www.hackerrank.com/challenges/john-and-gcd-list/problem>
- [09] <https://www.hackerrank.com/challenges/closest-number/problem>
- [10] <https://www.hackerrank.com/challenges/twins/problem>
- [11] <https://www.hackerrank.com/challenges/the-chosen-one/problem>
- [12] <https://www.hackerrank.com/challenges/power-of-large-numbers/problem>
- [13] <https://www.hackerrank.com/challenges/salary-blues/problem>
- [14] <https://www.hackerrank.com/challenges/number-of-subsets/problem>
- [15] <https://www.hackerrank.com/challenges/breaking-sticks/problem>
- [16] <https://www.hackerrank.com/challenges/easy-gcd-1/problem>

HackerRank - Number Theory



- [17] <https://www.hackerrank.com/challenges/manasa-loves-maths/problem>
- [18] <https://www.hackerrank.com/challenges/easy-math/problem>
- [19] <https://www.hackerrank.com/challenges/equations/problem>
- [20] <https://www.hackerrank.com/challenges/binomial-coefficients/problem>
- [21] <https://www.hackerrank.com/challenges/lucy-and-flowers/problem>
- [22] <https://www.hackerrank.com/challenges/a-weird-function/problem>
- [23] <https://www.hackerrank.com/challenges/arthur-and-coprimes/problem>
- [24] <https://www.hackerrank.com/challenges/megaprime-numbers/problem>
- [25] <https://www.hackerrank.com/challenges/ants/problem>
- [26] <https://www.hackerrank.com/challenges/ichigo-and-cubes/problem>
- [27] <https://www.hackerrank.com/challenges/prime-sum/problem>
- [28] <https://www.hackerrank.com/challenges/hyperrectangle-gcd/problem>
- [29] <https://www.hackerrank.com/challenges/ichigo-and-rooms/problem>
- [30] <https://www.hackerrank.com/challenges/ajob-subsequence/problem>
- [31] <https://www.hackerrank.com/challenges/matrix-tree/problem>
- [32] <https://www.hackerrank.com/challenges/niceclique/problem>
- [33] <https://www.hackerrank.com/challenges/down-the-rabbit-hole/problem>



Lecture Agenda

✓ Section 1: Fundamentals

✓ Section 2: Number Theory

Section 3: Combinatorics

Section 4: Algebra

Section 5: Geometry

Section 6: Probability



HackerRank - Combinatorics



- [01] <https://www.hackerrank.com/challenges/a-chocolate-fiesta/problem>
- [02] <https://www.hackerrank.com/challenges/picking-cards/problem>
- [03] <https://www.hackerrank.com/challenges/ncr-table/problem>
- [04] <https://www.hackerrank.com/challenges/coinage/problem>
- [05] <https://www.hackerrank.com/challenges/building-a-list/problem>
- [06] <https://www.hackerrank.com/challenges/merge-list/problem>
- [07] <https://www.hackerrank.com/challenges/choose-and-calculate/problem>
- [08] <https://www.hackerrank.com/challenges/sherlock-and-pairs/problem>
- [09] <https://www.hackerrank.com/challenges/consecutive-subsequences/problem>
- [10] <https://www.hackerrank.com/challenges/antipalindromic-strings/problem>
- [11] <https://www.hackerrank.com/challenges/lexicographic-steps/problem>
- [12] <https://www.hackerrank.com/challenges/number-list/problem>
- [13] <https://www.hackerrank.com/challenges/ajourney/problem>
- [14] <https://www.hackerrank.com/challenges/super-humble-matrix/problem>
- [15] <https://www.hackerrank.com/challenges/volleyball-match/problem>
- [16] <https://www.hackerrank.com/challenges/cyclicquadruples/problem>

HackerRank - Combinatorics



- [17] <https://www.hackerrank.com/challenges/game-of-throne-ii/problem>
- [18] <https://www.hackerrank.com/challenges/digit-products/problem>
- [19] <https://www.hackerrank.com/challenges/tower-3-coloring/problem>
- [20] <https://www.hackerrank.com/challenges/count-fox-sequences/problem>
- [21] <https://www.hackerrank.com/challenges/manasa-and-combinatorics/problem>
- [22] <https://www.hackerrank.com/challenges/coloring-grid/problem>
- [23] <https://www.hackerrank.com/challenges/div-and-span/problem>
- [24] <https://www.hackerrank.com/challenges/ichigo-and-revenge/problem>
- [25] <https://www.hackerrank.com/challenges/bincofrevenge/problem>
- [26] <https://www.hackerrank.com/challenges/circles-math/problem>
- [27] <https://www.hackerrank.com/challenges/costly-graphs/problem>
- [28] <https://www.hackerrank.com/challenges/bridges-and-harbors/problem>



Lecture Agenda

- ✓ Section 1: Fundamentals
- ✓ Section 2: Number Theory
- ✓ Section 3: Combinatorics
- Section 4: Algebra**
- Section 5: Geometry
- Section 6: Probability



HackerRank - Algebra



- [01] <https://www.hackerrank.com/challenges/difference-and-product/problem>
- [02] <https://www.hackerrank.com/challenges/pythagorean-triple/problem>
- [03] <https://www.hackerrank.com/challenges/number-groups/problem>
- [04] <https://www.hackerrank.com/challenges/wet-shark-and-42/problem>
- [05] <https://www.hackerrank.com/challenges/simple-one/problem>
- [06] <https://www.hackerrank.com/challenges/stepping-stones-game/problem>
- [07] <https://www.hackerrank.com/challenges/shashank-and-list/problem>
- [08] <https://www.hackerrank.com/challenges/triangle-numbers/problem>
- [09] <https://www.hackerrank.com/challenges/little-gaurav-and-sequence/problem>
- [10] <https://www.hackerrank.com/challenges/tell-the-average/problem>
- [11] <https://www.hackerrank.com/challenges/game-of-rotation/problem>
- [12] <https://www.hackerrank.com/challenges/hackonacci-matrix-rotations/problem>
- [13] <https://www.hackerrank.com/challenges/the-triplets/problem>
- [14] <https://www.hackerrank.com/challenges/manasa-and-sub-sequences/problem>
- [15] <https://www.hackerrank.com/challenges/count-solutions/problem>
- [16] <https://www.hackerrank.com/challenges/manasa-and-calculations/problem>

HackerRank - Algebra



- [17] <https://www.hackerrank.com/challenges/the-simplest-sum/problem>
- [18] <https://www.hackerrank.com/challenges/manasa-and-pizza/problem>
- [19] <https://www.hackerrank.com/challenges/permutation-equations/problem>
- [20] <https://www.hackerrank.com/challenges/introduction-to-algebra/problem>
- [21] <https://www.hackerrank.com/challenges/cross-matrix/problem>
- [22] <https://www.hackerrank.com/challenges/linear-algebra-foundations-1/problem>
- [23] <https://www.hackerrank.com/challenges/linear-algebra-foundations-1-matrix-subtraction/problem>
- [24] <https://www.hackerrank.com/challenges/linear-algebra-foundations-3-matrix-multiplication/problem>
- [25] <https://www.hackerrank.com/challenges/linear-algebra-foundations-4-matrix-multiplication/problem>
- [26] <https://www.hackerrank.com/challenges/linear-algebra-foundations-5-the-100th-power-of-a-matrix/problem>
- [27] <https://www.hackerrank.com/challenges/linear-algebra-foundations-6-the-n-supthsup-power-of-a-matrix/problem>
- [28] <https://www.hackerrank.com/challenges/linear-algebra-fundamentals-10-eigenvectors/problem>
- [29] <https://www.hackerrank.com/challenges/determinant-of-the-matrix-1/problem>
- [30] <https://www.hackerrank.com/challenges/determinant-of-the-matrix-3/problem>



Lecture Agenda

✓ Section 1: Fundamentals

✓ Section 2: Number Theory

✓ Section 3: Combinatorics

✓ Section 4: Algebra

Section 5: Geometry

Section 6: Probability



HackerRank - Geometry



- [01] <https://www.hackerrank.com/challenges/points-on-a-line/problem>
- [02] <https://www.hackerrank.com/challenges/rectangular-game/problem>
- [03] <https://www.hackerrank.com/challenges/sherlock-and-counting/problem>
- [04] <https://www.hackerrank.com/challenges/sherlock-and-planes/problem>
- [05] <https://www.hackerrank.com/challenges/xrange-and-pizza/problem>
- [06] <https://www.hackerrank.com/challenges/points-on-rectangle/problem>
- [07] <https://www.hackerrank.com/challenges/circle-city/problem>
- [08] <https://www.hackerrank.com/challenges/spheres/problem>
- [09] <https://www.hackerrank.com/challenges/baby-step-giant-step/problem>
- [10] <https://www.hackerrank.com/challenges/a-circle-and-a-square/problem>
- [11] <https://www.hackerrank.com/challenges/hyperspace-travel/problem>
- [12] <https://www.hackerrank.com/challenges/solve-equations/problem>
- [13] <https://www.hackerrank.com/challenges/stars/problem>
- [14] <https://www.hackerrank.com/challenges/polar-angles/problem>
- [15] <https://www.hackerrank.com/challenges/jim-and-the-challenge/problem>



Lecture Agenda

- ✓ Section 1: Fundamentals
- ✓ Section 2: Number Theory
- ✓ Section 3: Combinatorics
- ✓ Section 4: Algebra
- ✓ Section 5: Geometry

Section 6: Probability



HackerRank - Probability



- [01] <https://www.hackerrank.com/challenges/random-number-generator/problem>
- [02] <https://www.hackerrank.com/challenges/bday-gift/problem>
- [03] <https://www.hackerrank.com/challenges/normal-distribution-1/problem>
- [04] <https://www.hackerrank.com/challenges/normal-distribution-2/problem>
- [05] <https://www.hackerrank.com/challenges/vertical-sticks/problem>
- [06] <https://www.hackerrank.com/challenges/extremely-dangerous-virus/problem>
- [07] <https://www.hackerrank.com/challenges/matchstick-experiment/problem>
- [08] <https://www.hackerrank.com/challenges/palindromes/problem>
- [09] <https://www.hackerrank.com/challenges/lazy-sorting/problem>
- [10] <https://www.hackerrank.com/challenges/binomial-distribution-1/problem>
- [11] <https://www.hackerrank.com/challenges/binomial-distribution-1/problem>
- [12] <https://www.hackerrank.com/challenges/the-white-lotus-and-caterpillar-game/problem>
- [13] <https://www.hackerrank.com/challenges/dice-stats/problem>
- [14] <https://www.hackerrank.com/challenges/james-tree/problem>
- [15] <https://www.hackerrank.com/challenges/colorful-polygon/problem>



Lecture Agenda

- ✓ Section 1: Fundamentals
- ✓ Section 2: Number Theory
- ✓ Section 3: Combinatorics
- ✓ Section 4: Algebra
- ✓ Section 5: Geometry
- ✓ Section 6: Probability





DO
MORE.