

Girls in Code 2025 Fall Competition

Empowering the Next Generation of Female Coders



Official Competition Booklet

Organized by Girls in Code SEA

Date: 29th November 2025 — **Venue:** Online 10AM to 4PM

Instructions and Rules

1. **ANY USE OF AI IS STRICTLY PROHIBITED AND WILL RESULT IN IMMEDIATE DISQUALIFICATION.**
2. You are permitted to use calculators and Google **only** for information gathering to support your solutions.
3. You must **write down your full code** for each question.
4. You are **not allowed to discuss** the competition questions with anyone for the duration of the competition.
5. There are **30 questions** in total. You are **not required to answer all questions**.
6. **Scoring:**
 - Beginner Level – 1 points per correct answer
 - Intermediate Level – 5 points per correct answer
 - Advanced Level – 10 points per correct answer

No marks will be deducted for incorrect answers.

7. The winner in each category will be the participant or team with the highest total score.
8. For any questions or concerns, please email us at: girlsincodesea@gmail.com (available even during the competition).

Beginner Level Questions

Level 1

Question 1: String Reversal

A robot has sent you a secret command string.

Task: Write a program that prints this string in reverse. The reversed string should have all characters in the opposite order. Preserve all letters, numbers, dashes, and symbols exactly as in the original string. Print the following string in reverse:

```
QXZ93ALPHA-ROBOT-INVASION-DELTA-4930-ZETA-MK77-OMEGA-PROTOCOL-  
START-SEQUENCE-9981-PLASMA-MODULE-GAMMA-DRIVE-CORE-STABILIZER  
-ULTRA-NODE-5567-NEUTRON-FIELD-COMPRESSOR-VOLTAGE-RAY-TRANSMITTER  
-ALLOY-CIRCUITRY-OMEGA-REBOOT-CYCLE-PRIME-DELTA-SECTOR-4411
```

Question 2: Finding an Index

You are given an array of 100 module names. Find the index of the target value. If not found, print -1 . Indexing starts at 0.

```
modules = "alpha-core", "servo-77", "ion-boost", "gamma-node", "omega-  
drive", "proto-9", "xenon-chip", "ultra-link", "quantum-port", "drone-  
42", "zeta-coil", "mecha-118", "fusion-rail", "delta-hub", "arc-17",  
"astro-unit", "hyper-cell", "nano-gear", "plasma-lock", "core-omega",  
"vortex-lens", "robot-axle", "spectra-99", "matrix-7", "cyber-pulse",  
"unit-404", "titan-core", "synth-wave", "ionizer-5", "gearshift-88",  
"mech-loop", "nano-shield", "ultra-piston", "laser-grid", "alpha-jet",  
"servo-12", "byte-claw", "omega-circuit", "drone-77", "zeta-frame",  
"rho-spark", "core-fusion", "hyper-rotor", "nano-sphere", "arc-29",  
"xenon-flare", "plasma-rod", "ion-rider", "core-sigma", "proto-88",  
"flux-torque", "robot-armature", "stellar-bolt", "quantum-relay", "zeta-  
blade", "fusion-reactor", "delta-spark", "omega-thruster", "drone-19",  
"mega-crank", "core-dynamo", "hyper-drive", "ion-pulse", "servo-900",
```

```
"alpha-shield", "neutron-link", "gear-lock", "vector-71", "ultra-guard", "plasma-wave", "robot-fang", "matrix-88", "core-helix", "arc-504", "synth-core", "omega-burst", "quantum-spike", "gamma-torque", "proto-11", "laser-core", "robot-spire", "fusion-cell", "ion-drift", "delta-node", "mega-unit", "core-surge", "xeno-lens", "ultra-pulse", "servo-55", "arc-omega", "robot-kernel", "nano-core", "hyper-blade", "plasma-ring", "quantum-array", "spectra-core", "drone-501", "omega-vault", "core-prime", "zeta-engine"]
```

Input: delta-spark

Question 3: Median of Sensor Readings

A robot collects 100 sensor readings. Compute the median. If even count: median = average of the two middle values.

```
Readings = [42, 17, 93, 58, 21, 76, 39, 88, 65, 14, 27, 91, 33, 50, 84, 7, 99, 12, 36, 62, 18, 47, 55, 68, 73, 29, 81, 24, 37, 90, 16, 45, 59, 74, 28, 61, 80, 10, 86, 35, 53, 97, 19, 41, 64, 32, 49, 71, 23, 56, 38, 66, 79, 11, 83, 20, 48, 67, 15, 52, 85, 31, 63, 9, 78, 25, 43, 70, 30, 57, 22, 60, 77, 13, 82, 26, 46, 69, 34, 54, 87, 40, 51, 75, 8, 89, 44, 72, 6, 92, 5, 96, 3, 95, 2, 94, 1, 98, 4, 100, 61, 33, 55, 12, 67, 23, 81, 17, 39, 29, 76, 41, 53, 14, 69, 19, 84, 7, 45, 88]
```

Find the median in this array of readings

Question 4: Counting Long Module Names

Given 100 module names, count how many have more than 6 characters.

```
["alpha-core", "servo-77", "ion-boost", "gamma-node", "omega-drive", "proto-9", "xeno-chip", "ultra-link", "quantum-port", "drone-42", "zeta coil", "mecha-118", "fusion-rail", "delta-hub", "arc-17", "astro-unit", "hyper-cell", "nano-gear", "plasma-lock", "core-omega", "vortex-lens",
```

```
"robot-axle", "spectra-99", "matrix-7", "cyber-pulse", "unit-404",  
"titan-core", "synth-wave", "ionizer-5", "gearshift-88", "mech-loop",  
"nano-shield", "ultra-piston", "laser-grid", "alpha-jet", "servo-12",  
"byte-claw", "omega-circuit", "drone-77", "zeta-frame", "rho-spark",  
"core-fusion", "hyper-rotor", "nano-sphere", "arc-29", "xenon-flare",  
"plasma-rod", "ion-rider", "core-sigma", "proto-88", "flux-torque",  
"robot-armature", "stellar-bolt", "quantum-relay", "zeta-blade",  
"fusion-reactor", "delta-spark", "omega-thruster", "drone-19", "mega-  
crank", "core-dynamo", "hyper-drive", "ion-pulse", "servo-900", "alpha-  
shield", "neutron-link", "gear-lock", "vector-71", "ultra-guard",  
"plasma-wave", "robot-fang", "matrix-88", "core-helix", "arc-504",  
"synth-core", "omega-burst", "quantum-spike", "gamma-torque", "proto-  
11", "laser-core", "robot-spire", "fusion-cell", "ion-drift", "delta-  
node", "mega-unit", "core-surge", "xeno-lens", "ultra-pulse", "servo-  
55", "arc-omega", "robot-kernel", "nano-core", "hyper-blade", "plasma-  
ring", "quantum-array", "spectra-core", "drone-501", "omega-vault",  
"core-prime", "zeta-engine"]
```

Print the count

Question 5: Average of Even Energy Levels

A robot factory stores 100 energy values. Compute the average of all even values (round to 2 d.p.). If no even values exist, print 0.00.

```
[55, 42, 33, 64, 27, 81, 92, 14, 37, 86, 73, 28, 91, 48, 35, 60, 77,  
18, 84, 50, 13, 22, 79, 56, 68, 41, 90, 31, 66, 95, 12, 80, 29, 54, 88,  
39, 76, 17, 70, 24, 61, 46, 83, 30, 36, 67, 44, 97, 20, 53, 58, 15, 99,  
38, 47, 72, 19, 82, 51, 40, 63, 26, 89, 34, 93, 48, 65, 12, 78, 21, 49,  
60, 33, 88, 23, 52, 75, 94, 27, 68, 55, 90, 41, 86, 31, 70, 22, 63, 56,  
99, 18, 47, 84, 35, 62, 13, 97, 44, 79, 50, 21, 72, 29, 66, 33, 88, 24,  
91, 40, 55]
```

Print the average

Question 6: Repeating Movement Pattern

A robot repeats the steps:

[forward, left, right]

Given $N = 2911$, output the N -th step.

Question 7: Sorting Serial Numbers

Each robot has a unique 4-digit serial number. The greater the number, the more powerful the robot.

```
serial_numbers = [4532, 1298, 8765, 2341, 9087, 3456, 7821, 1112, 5678,
4321, 8760, 9080, 1234, 2345, 6789, 4320, 3450, 8761, 9081, 1111, 5671,
6543, 3210, 7654, 8762, 4322, 5679, 9082, 2346, 3457, 1235, 6780, 4323,
2347, 8763, 9083, 5670, 4324, 2348, 3458, 6781, 8764, 9084, 1236, 4325,
2349, 3459, 5672, 6782, 8766, 9085, 1237, 4326, 2340, 3451, 5673, 6783,
8767, 9086, 1238, 4327, 2342, 3452, 5674, 6784, 8768, 9088, 1239, 4328,
2343, 3453, 5675, 6785, 8769, 9089, 1240, 4329, 2344, 3454, 5676, 6786,
8770, 9090, 1241, 4330, 3455, 5677, 6787, 8771, 9091, 1242, 4331, 5678,
6788, 8772, 9092, 1243, 4332, 6789, 8773, 9093, 1244, 4333, 8774, 9094,
1245, 4334, 8775, 9095, 1246]
```

Sort the given list of serial numbers in ascending order.

Question 8: Sorting Robot Types Alphabetically

A robotics facility stores its robot types in a database, but the list has become unsorted. Your task is to sort the robot types in alphabetical order. Below is the unsorted list of 100 robot types:

Zeta, Alpha, Orion, Bolt, Cyclone, Titan, Gamma, Raptor, Sigma, Delta,
Echo, Falcon, Vector, Helix, Nova, Quantum, Atlas, Sentinel, Phoenix,

Ion, Javelin, Kappa, Lambda, Magnetron, Nebula, Omega, Photon, Quark, Reactor, Specter, Turbo, Ultron, Vortex, Warp, Xenon, Yukon, Zenith, Arc, Blaze, Comet, Dynamo, Eclipse, Forge, Glider, Horizon, Inferno, Jetstream, Krypton, Lancer, Mirage, Neptune, Obsidian, Pulse, Quantum-X, Rift, Solaris, Tempest, Umbra, Volt, Wyvern, Xylo, Yarrow, Zenith-X, Aero, Binary, Circuit, Droid, Ember, Flux, Gearbox, Hyperion, Ignite, Jaguar, Kodiak, Lumina, Matrix, Nimbus, Onyx, Prism, Quanta, Radiant, Striker, Titan-X, Ultravolt, Vector-X, Whisper, Xylon, Yarder, Zephyr, Alloy, Blitz, Cobalt, Drift, Enigma

Sort the list of 100 robot types alphabetically.

Question 9: 49th Element

A robotics database stores 100 robot component codes in the order they were added. Your task is to identify the 49th element in the list. The full list of component codes is:

VT63, BZ72, KU48, ZJ37, NH22, QG78, ZV28, IS97, IO55, LP36, ZM76, GU80, XC61, SU90, AM52, GI18, EO40, UD79, LC50, WZ72, CO25, OV79, FU80, PL86, UI40, HE33, AZ43, MC26, WY20, XY79, RV77, HV37, XP63, PL94, QS55, CP72, PI34, GT24, SJ31, IV22, UW38, BO78, PB25, QP83, DC24, AA33, SM17, YA64, QV18, FQ54, LB69, BC60, FJ70, VX31, SF17, UE30, IG86, XR11, MK82, WX93, JV42, DR68, TI15, OD71, JH55, PX89, DI63, VC86, FI40, FL96, OK61, WO94, SE18, GE77, XX87, TW73, IV16, VW63, EZ91, ZV26, ZK96, KA11, SA96, NC25, PF48, HZ22, MX90, CH67, UD42, DN93, QC29, HA15, FG50, YY15, WY87, RS68, QJ78, EJ47, AD52, IJ21

Identify the 49th element.

Question 10: Robot Count

Robots need at least 50Write code to count and print how many robots have enough battery.

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87, 12, 55, 43, 91, 64, 29, 50, 73, 8, 41, 56, 79, 32, 18, 95, 67, 24,
52, 88, 14, 99, 63, 47, 58, 21, 83, 36, 76, 60, 5, 72, 54, 11, 34, 98,
66, 25, 57, 80, 49, 51, 62, 16, 97, 33, 74, 45, 59, 90, 68, 27, 82, 39,
19, 53, 85, 44, 70, 26, 15, 93, 52, 37, 69, 7, 84, 48, 61, 22, 96, 35,
71, 13, 86, 40, 75, 28, 92, 30, 17, 65, 89, 46, 20, 81, 57, 38, 94, 9,
23, 78, 55, 31, 63, 10, 58, 42, 100, 77

Print how many robots have enough battery.

Intermediate Level Questions

Level 2

1. Intergalactic Battle Winner

A historian is documenting an intergalactic battle by recording successful attacks in a string of letters. Each attack is represented by a unique uppercase character corresponding to the alien species that executed it (e.g., 'A' for Antennaeters, 'B' for Borgons).

The battle is divided into multiple smaller wars, each consisting of exactly n consecutive attacks. For each small war, the winner is the alien species with the highest number of successful attacks (highest frequency). If there is a tie within a war, the species whose letter appears earlier in the alphabet wins.

The historian wants to determine the overall battle winner — the species that has won the most small wars. If there is a tie, output the alphabetically earlier letter.

Input format:

First line: Two integers b (total number of attacks) and n (attacks per small war)

Second line: String s of length b , containing only uppercase letters

Constraints:

$$1 \leq n \leq b \leq 10^5, b \% n = 0$$

Output format:

A single uppercase character representing the overall winner

Sample Input:

```
12 4
AABBCCCCAAAB
```

Sample Output:

```
A
```

Question Input:

```
600 30
XYZZAABBCCDDEFFGGHHIIJJKLLMMNNOOXYZZAABBCCDDEFFGGHHIIJJKLLMMNNOOXYZ
ZAABBCCDDEFFGGHHIIJJKLLMMNNOOXYZZAABBCCDDEFFGGHHIIJJKLLMMNNOOXYZZAA
BBCCDDEFFGGHHIIJJKLLMMNNOOPPQQRRSSTTUUVVWXXYYZZBBAACCDDEEGGFHHIIJJ
KKLLMMNNOOPPQQRRSSTTUUVVWXXYYZZCCDDEEFFGGHHIIJJKLLMMNNOOPPQQRRSSTTU
UUVVWXXYYZZAABBDDEEFFGGHHIIJJKLLMMNNOOPPQQRRSSTTUUVVWXXYYZZAABBCCEE
```

FFGGHHIIJJKLLMMNNOOPPQQRRSSTTUUVVWXXYYZZAABBCCDDFFGGHHIIJJKLLMMNNO
OPPQQRRSSTTUUVVWXXYYZZAABBCCDDEEGGHHIIJJKLLMMNNOOPPQQRRSSTTUUVVWXX
YYZZAABBCCDDEEFFHHIIJJKLLMMNNOOPPQQRRSSTTUUVVWXXYYZZAABBCCDDEEFFGGI
IJJJKLLMMNNOOPPQQRRSSTTUUVVWXXYYZZAABBCCDDEEFFGGHJJJKLLMMNNOOPPQQRRS
STTUUVVWXXYYZZ

2. Chef Borgort's Burgers

Since arriving on Earth, the Borgor aliens have only eaten burgers. Chef Borgort makes exactly one burger per hour and works for H hours a day. Shipments of ingredients arrive each hour with specific calorie values, and each shipment lasts exactly K hours before expiring.

At each hour, Chef Borgort can choose which available (non-expired) shipment to use to maximize the total calories cooked in one day.

Input format:

First line: Three integers H, S, K

Next S lines: Two integers t, c — hour of arrival and calories

Constraints:

$1 \leq H \leq 24, 1 \leq S \leq 1000, 1 \leq K \leq H$

Output format:

One integer: maximum total calories

Sample Input:

```
5 8 1
1 300
1 500
2 400
2 100
3 200
3 350
4 600
5 250
```

Sample Output:

```
2100
```

Question Input:

10 20 3
1 400
1 300
2 500
2, 45
3 600
3 550
4 350
4 400
5 700
5 650
6 300
6 450
7 550
7 500
8 650
8 600
9 400
9 500
10 550
10 500

3. Minimizing Workload

Chef Borgort runs a kitchen with w workers and b burgers. Each burger i takes t_i minutes to prepare. Each worker must make a contiguous sequence of burgers in order.

Find the minimum possible maximum time any worker spends cooking.

Input format:

First line: Two integers w, b

Second line: b space-separated integers $t_1, t_2, \dots, t_b$

Output format:

Single integer: minimum possible maximum time

Sample Input:

3 7

2 3 5 1 4 2 3

Sample Output:

9

Final Input:

25 100

150 200 180 220 160 240 190 210 170 230 140 250

185 195 175 215 165 235 145 225 155 205 135 245

125 255 265 275 285 295 100 110 120 130 140 150

160 170 180 190 200 210 220 230 240 250 260 270

280 290 95 105 115 125 135 145 155 165 175 185

195 205 215 225 235 245 255 265 275 285 88 92

96 100 104 108 112 116 120 124 128 132 136 140

144 148 152 156 160 164 168 172 176 180 184 188

192 196 200 204

4. Frequency Sorter

You are a worker at Alphaland Gym Houston. The member attendance data is stored as a string. Rearrange its characters so that letters with higher frequency appear first. If two characters have the same frequency, sort alphabetically.

Sample Input:

10

kanghaerin

Sample Output:

aanneghikr

Question Input:

30

steaenltrseateoaristttehnasdeih

5. Longest Streak Tracker

You, Jeff Nippard, are a personal trainer analysing your client's workout logs. Find the longest streak of consecutive days where reps strictly increase. Missing days break the streak.

Sample Input:

```
[("2025-11-01", 50), ("2025-11-02", 55), ("2025-11-03", 60), ("2025-11-05", 70), ("2025-11-06", 72), ("2025-11-07", 75)]
```

Sample Output:

3

Question Input:

Question Input:

```
[("2025-11-13", 8), ("2025-11-02", 4), ("2025-11-25", 13),  
("2025-11-12", 8), ("2025-11-03", 5), ("2025-11-21", 13),  
("2025-11-01", 4), ("2025-11-08", 7), ("2025-11-06", 5),  
("2025-11-17", 10), ("2025-11-30", 14), ("2025-11-15", 9),  
("2025-11-18", 11), ("2025-11-24", 13), ("2025-11-22", 13),  
("2025-11-07", 6), ("2025-11-04", 5), ("2025-11-29", 14),  
("2025-11-09", 7), ("2025-11-20", 13), ("2025-11-28", 14),  
("2025-11-26", 14), ("2025-11-19", 12), ("2025-11-10", 8),  
("2025-11-14", 8)]
```

6. Robot Communication Zones

During a robot invasion, signals are recorded as uppercase letters. Divide them into equal segments (zones) and find which robot wins most zones (frequency-based).

Input:

Two integers p, n , followed by string s

Sample Input:

9 3

AABBCCBAA

Sample Output:

A

Question Input:

24 6

ABBCCDAABBBCCCDDDEEEFFF

7. Signal Median Finder

A defense system analyses signals in blocks of size n . For each block, it finds the median, then outputs the most frequent median across all blocks.

Sample Input:

10 2

3 4 4 4 5 5 1 1 1 1

Sample Output:

1

Question Input:

20 4

3 5 2 8 6 9 9 9 1 4 4 4 5 5 5 5 7 8 8 8

8. Farthest Robot Finder

Each robot follows movement commands (U, D, L, R) from (0,0). Calculate which robot travels the farthest and print its ID and distance. If tied, choose the smaller ID.

Sample Input:

4

UURDDL

UUUU

LRLRLRLR

URRDDD

Sample Output:

4 5

Question Input:

32

UURDDL

UUUUUUUUU

LRLRLRLRLRLRLRLR

URRRDDD

DDDDDDDDDDRRRRRRRRUUUUUUUUULLLLLLLLLL

UUUUUUUUUUURRRRRRRRRDDDDDDDDDDLLLLLLLL

RRRRRRRRRRRR

LLLLLLLLLLLLLL

UUUUUDDDDD

RRRUUUULLLLDDDD

UDDLRLRLRLRLRLRL

RRRRRRRRRRDDDDDDDDDDLLLLLLLLLL

UUJUDDDDLLLLRRRR

[illegible]

9. Signal Compression by RPCU

During the invasion, AI drones transmit long strings of signal pulses. These signals are extremely repetitive. The RPCU compresses these transmissions so human analysts can store them efficiently.

The rule is simple: Whenever a letter repeats consecutively, compress it into <letter><count>.

Input format:

First line: An integer n — length of the signal string

Second line: A string of length n containing only uppercase letters

Output format:

A single string representing the compressed signal

Sample Input:

35

Sample Output:

AAAABBBCCCCDDDDAAAABBBBBBBEEEEFFFF

Question Input:

1233

FJJJJAAAZZZZBBBCCDDDEEEFFGGHHIIIIKKLLMMMNNNNOOOPPPQQQRRR
RSSTTTUUUVVVWWXXYYYYZZAAABBBCCCDDEEEFFGGGHHHIIJJJKKKLLL
MMMNNNOOOPPPQQQRRRRSSSSTTTUUUVVVWWXXYYYYZZAAAABBBCCCD
DDDEEEFFGGGHHHIIIIJJJKKKLLLMMMNNNOOOPPPQQQRRRRSSSSTTT
UUUVVVWWXXYYYYZZZZAAAABBBCCCDDEEEFFGGGHHHIIIIJJJJ
KKKKLLLLMMMNNNNOOOOPPPQQQRRRRSSSSTTTUUUVVVWWXXYYYYYZ
ZZAAAABBBCCCDDEEEFFGGGHHHIIIIJJJKKKKLLLLMMMNNNNOOOOP
PPQQQRRRRSSSSTTTUUUVVVWWXXYYYYZZZZAAAABBBCCCDDEE
EEFFFGGGHHHIIIIJJJKKKKLLLLMMMNNNNOOOOPPPQQQRRRRSSSSTTTU
UUVVVWWXXYYYYZZZZAAAABBBCCCDDEEEFFGGGHHHIIIIJJJJ
KKKKLLLLMMMNNNNOOOOPPPQQQRRRRSSSSTTTUUUVVVWWXXYYYYYZ
ZZAAAABBBCCCDDEEEFFGGGHHHIIIIJJJKKKKLLLLMMMNNNNOOOOP
PPQQQRRRRSSSSTTTUUUVVVWWXXYYYYZZZZ

10. Adjacent Duplicate Removal

An AI jamming device emits corrupted sequences. Whenever two adjacent identical pulses appear, the purifier must delete them. After deletion, pulses collapse together — and the check must repeat until no more adjacent duplicates exist.

Input format:

First line: An integer n — length of the signal string

Second line: A string of length n containing only uppercase letters

Output format:

A single string representing the cleaned signal

Sample Input:

28

AABBCCCDAAABBAACCDDEE

Sample Output:

AE

Question Input:

1014

AAABBCCCDDEEEFFGGGHHHIIJJJKKKLLLLMMMNNNOOOPPPQQRRRSS
TTTUUVVVWWXXYYYYZZAAABBBCCCDDEEEFFGGGHHHIIJJJKKKLLLLMM

NNNOOOPPPQQRRRSSSTTTUUUVVVWWXXXYZZZAAABBBCCDDDEEEFFGGG
HHHIIJJKKKLLLMMNNNOOOPPPQQRRRSSSTTTUUUVVVWWXXXYZZZAAABBB
CCDDDDDEEEFFGGGHHHIIJJKKKLLLMMNNNOOOPPPQQRRRSSSTTTUUUVVVWW
XXXYZZZAAABBBCCDDDEEEFFGGGHHHIIJJKKKLLLMMNNNOOOPPPQQRRR
SSSTTTUUUVVVWWXXXYZZZAAABBBCCDDDEEEFFGGGHHHIIJJKKKLLLMM
NNNOOOPPPQQRRRSSSTTTUUUVVVWWXXXYZZZ

Advanced Level Questions

Level 3

Question 1

The robots are under attack and have tracked down your location! There are n robots in a row with an initial health value of $a_i \geq 0$. Your goal is to eliminate all robots by reducing their health to 0 using a combination of different laser guns. However, your laser guns only have a limited amount of bullets, so you need to use them optimally in order to survive.

There are 3 types of laser guns you can use to eliminate the robots which use x, y, z amount of bullets respectively:

- **Photon Edge:** Choose any consecutive block of exactly k robots and reduce each of them by 1, but only if all of them currently have power ≥ 1 . (You can't reduce below 0.)
- **NovaStrike:** Choose a single robot with $a_i \geq 1$ and reduce its power by 1.
- **Lumina-X:** Choose any three consecutive pillars $i - 1, i, i + 1$, and set $a_i = \max(a_{i-1} - 1, a_i, a_{i+1}) - 1$

Your task is to find the minimum bullets required to make all $a_i = 0$. If it's impossible, print -1.

Input format:

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \leq t \leq 10^4$). The description of the test cases follows.

- The first line of each test case contains the number of robots n ($3 \leq n \leq 2 \times 10^5$) and k ($1 \leq k \leq n$)
- The second line contains the costs of bullets x, y, z ($1 \leq x, y, z \leq 10^9$) for each laser gun
- The third line contains the initial health value a_i ($0 \leq a_i \leq 10^9$) for each of the n robots

Output format:

Print a single integer → the minimum total bullets required, or -1 if it's impossible.

Sample Input:

```
1
7 3
8 2 5
2 3 1 4 2 3 2
```

Sample Output:

```
31
```

Input:

```
25
83 21
255 91 170
835 562 403 963 585 552 107 707 912 543
765 523 858 381 554 625 14 409 923 466 32
549 702 371 773 982 417 11 152 274 970 168
580 611 860
39 11
251 5 259
605 972 720 36 767 388 832 43 860 318 488
103 577 763 630 674 249 648 981 389 431 38
939 972 347 482 51 544 878 630 198 659 30
637 74 665 239 227 388
43 4
157 57 268
692 992 291 560 529 8 236 511 563 777 837
997 273 365 584 647 514 149 366 698 172 603
718 917 545 243 694 493 634 927 244 378 853
143 169 864 391 442 575 976 874 590 758
25 3
```

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331 299 64
413 142 715 267 950 619 322 315 704 785 97
502 272 718 138 481 433 252 742 799 339 619 36
773 377
70 67
264 436 410
610 869 125 946 655 267 301 815 917 231 370
805 983 788 499 470 617 459 97 654 609 711 830
560 722 954 14 438 179 789 404 614 913 49 698
420 120 945 558 454 826 558 408 77 493 834 137
595 10 570 923 433 109 62 933 798 934 55 841
303 936 987 841 522 534 50 991 254 67 485
40 4
498 332 74
471 970 211 915 96 599 119 448 113 723 916
781 897 137 473 119 382 737 55 65 26 1 720
953 618 138 80 446 126 123 501 48 381 724 543
261 576 217 132 300
43 10
439 123 107
911 357 49 891 391 670 782 382 757 25 505
671 100 760 741 308 6 628 442 862 824 652 432
895 257 795 65 713 555 420 37 104 748 153 362
367 577 949 103 426 117 516 193
25 22
44 356 498
568 431 712 654 982 322 641 830 463 407 498
85 725 278 39 199 861 548 479 96 741 511 888
870 778
16 5
232 360 410
967 37 369 584 627 446 923 86 564 904 407
620 583 862 57 854
23 14

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293 5 105

383 188 183 259 850 835 60 944 514 308 191

579 691 345 187 843 405 536 443 339 313 637

586

54 17

163 162 193

368 430 142 835 764 879 899 193 717 327 316

193 952 331 461 56 373 250 325 930 509 682 897

566 391 71 68 454 167 770 571 226 361 386 106

800 448 578 974 874 96 630 568 852 851 654 904

184 831 539 815 801 301 764

28 3

327 286 253

817 875 222 379 927 422 993 233 534 492 13

115 995 12 265 959 37 217 856 226 620 15 641

176 804 178 950 765

36 34

91 462 63

777 98 376 256 704 15 936 934 725 904 191

240 388 368 838 763 129 195 466 687 355 778

218 80 40 395 692 480 890 548 486 760 351 900

409 867

46 8

390 470 9

445 99 938 175 451 576 905 567 867 258 237

15 64 191 69 941 400 605 918 436 345 427 237

29 200 148 938 271 623 30 30 497 166 654 699

28 556 721 55 253 9 477 633 129 626 234

61 14

201 163 6

568 931 455 38 451 517 172 26 453 478 692

93 781 27 866 611 843 388 764 137 234 891 778

898 684 147 230 251 818 691 914 431 773 937 854

287 437 205 578 770 708 985 257 966 744 288

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946 815 345 263 232 152 290 912 961 139 185 638
713 969 274
60 46
415 96 177
259 882 509 222 805 302 696 792 102 743 182
567 889 671 638 25 314 602 817 981 143 134 119
423 214 68 70 733 653 942 88 758 356 72 983
381 0 835 537 341 658 806 385 477 149 571
823 800 633 152 325 666 647 877 830 19 470
799 243 552
18 8
396 308 132
595 425 252 287 464 565 712 663 633 783 676
152 783 955 673 684 560 841
55 49
378 96 251
902 761 208 419 821 389 425 361 562 742 662
14 621 906 775 941 35 414 817 672 817 717 840
831 126 759 461 965 953 902 865 80 418 736 924
563 471 376 283 778 253 78 78 661 466 648 92
529 142 952 111 789 128 478 622
5 4
315 86 444
696 93 106 593 454
23 16
422 441 329
908 985 528 724 252 888 495 591 909 3 313
335 163 45 281 193 666 272 601 418 306 385 443
59 33
296 252 283
200 608 592 746 23 638 620 659 440 734 343 11
733 417 797 486 146 751 756 496 669 25 916 621
393 20 234 610 665 504 731 176 270 270 478 386
934 675 563 997 336 918 63 620 97 332 341 255

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637 556 464 381 331 973 143 987 855 526 166
29 24
413 45 479
325 142 240 619 825 563 746 262 216 677 245
1000 948 513 142 22 111 952 790 921 862 213
282 619 724 891 793 954 104
60 14
77 437 383
381 727 187 656 767 416 166 347 533 954 230
922 771 345 252 274 318 660 898 740 888 774 44
257 737 118 171 500 302 980 752 67 354 623
956 992 535 967 889 183 634 981 484 811 31
228 946 902 540 554 959 368 545 813 765 976
746 108 928 768
66 65
388 67 461
799 875 553 222 425 270 805 128 643 899 492
768 153 260 111 914 601 553 671 987 758 956
677 327 734 935 914 11 714 277 510 278 563
124 310 583 252 636 450 176 788 981 604 407
19 371 993 878 521 824 928 266 864 689 851 140
556 43 0 25 384 334 871 171 997 293
93 54
311 84 177
25 548 691 561 90 515 219 914 919 584 784 599
327 434 748 624 722 398 936 545 984 204 688 486
83 649 667 108 358 495 194 647 511 831 413 157
181 957 555 382 601 165 243 535 102 448 108
746 456 758 206 416 308 208 801 664 487 37 418
30 821 128 114 856 455 358 24 573 569 928 744
603 162 701 404 356 55 926 126 769 131 235 187
264 7 639 238 9 34 158 676 145 633

Question 2

Oh no! While seeking a safe space to hide from the robots, you have fallen right into their human trap. Luckily, you are an incredibly smart hacker and have found a way to bypass the system.

You are given an array a of n real numbers and an integer k ($1 \leq k \leq n$). You want to select exactly k pairwise disjoint, non-empty contiguous subarrays. Let $\text{avg}(S)$ denote the arithmetic mean of elements inside subarray S . Your score is the minimum average among the k chosen subarrays:

$$\text{score} = \min\{\text{avg}(S_1), \text{avg}(S_2), \dots, \text{avg}(S_k)\}.$$

In order to escape the human trap, you have to find the maximum possible score (to the nearest integer) achievable by choosing k disjoint contiguous subarrays.

Input format:

Each test contains multiple test cases. The first line contains the number of test cases t ($1 \leq t \leq 10^4$). The description of the test cases follows.

- The first line of each test case contains integers n, k ($1 \leq n \leq 2 \cdot 10^5, 1 \leq k \leq n$)
- The second line contains n integers $a_1, a_2, \dots, a_n$ ($|a_i| \leq 10^9$)

Output format:

Print a single integer: the maximum possible score.

Sample Input:

```
1
7 2
6 6 2 3 7 7 1
```

Sample Output:

```
7
```

Question input:

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50

21 2

802 1203 4777 2191 9123 659 8357 4838 6963 6973
5211 5401 8077 9251 6264 9879 9080 3754 5757 8539
3653 13 9
9934 6866 4178 4061 1124 687 2983 3177 113 2607
9354 5488 6085

21 15

6895 5101 5268 385 9274 5432 7989 750 18 9550
9374 6994 7980 680 5702 9023 7982 8999 2174 4265
2081 18 14
3905 758 8769 9802 262 2424 4803 4537 4025 9200
2087 1041 6747 3462 7042 270 7930 9475

18 2

3062 9443 4302 195 3755 5568 3265 9444 7442 6672
4030 4755 3156 9030 9931 9581 2846 3173

18 9

2042 9731 5315 6293 8126 6225 2924 9578 2738 7514
8252 7834 2606 2734 1454 620 1308 3083

26 17

8645 1633 1080 6099 5539 7195 4245 9482 1749 1756
5298 5122 8881 4559 5846 4759 1252 5529 9145 4383
2730 1483 2015 5709 4707 2858

22 14

2556 5049 8827 9510 7583 896 5318 4163 2282 4521
2643 3710 8777 659 1605 9400 5859 7866 8309 2175
5196 315

26 16

4536 1762 4294 7022 4154 667 8027 8866 9543 7042
8024 8442 779 3558 7851 6611 9088 8 1375 2383
9734 5905 1410 7288 6099 1547

26 11

3422 6179 1472 6489 2121 5510 7659 6763 5416 6800
9678 2413 7694 1482 499 5675 891 4598 5652 3273

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5270 7216 3125 526 9868 8982

22 13

9215 4739 4757 9744 397 6670 5968 6543 675 8172

4183 9664 1347 6542 2710 7106 2003 5304 3062 2580

8319 3270

20 16

1316 8434 8890 648 8082 3723 263 8040 1435 6424

6092 2401 533 6877 4908 6692 556 2796 1975 9767

20 12

4325 8175 2261 611 5820 227 7361 3164 1812 6747

8067 5023 3820 882 5733 7114 5525 5666 4102 7713

19 8

7796 2320 3445 7840 5899 8393 3615 798 9740 8932

5945 3140 3533 1855 9273 365 1902 2349 8758

24 16

1596 6207 9748 5394 4774 2118 4347 379 1143 172 6103

8217 5472 6993 9066 6654 9337 6863 1768 4497

1293 2371 3580 8766

23 11

853 524 5801 964 6122 3195 7116 4858 8075 6214 8587

7491 9264 5096 584 2048 7983 9932 6640 183

3776 2642 2035

28 4

8705 869 4138 7437 1518 1048 8894 3816 7179 6340

2987 4002 5959 6722 9273 9276 5903 4880 5739 5990

4870 660 9172 1972 8207 4033 8741 4877

17 9

4098 4405 8895 9452 6092 2753 4000 1368 6126 3874

5805 4927 9027 5093 3014 9145 3548

20 8

3373 6496 1312 5117 9690 6871 1468 9935 9142

1972 3280 6726

16 5252 4013 3467 9335 2675 6551 2543

16 2

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5110 2392 2864 4977 6459 7004 4255 376 1880 9475

9466 5799 8985 9900 5917 5825

17 2

400 943 1824 7249 5278 1893 3166 8689 5658 7292 8253

810 7134 4051 8476 7926 3664

15 15

1388 5116 4136 9979 6044 9498 8148 4949 227 3852

3707 1292 1557 8823 5254

15 8

5964 5261 8845 7623 87 7235 6940 8903 6378 9237

4710 5636 1840 9165 2588

24 23

9463 3707 1705 5276 3724 6696 5554 9708 9169 1676

5415 7563 8538 3538 8595 2397 6305 2165 419

5351 3805 9121 3324 7504

16 1

3509 2973 2258 7517 690 8663 2679 9819 5451 4667

50 958 1645 2852 731 6179

23 18

8180 9861 2267 6809 2016 7199 7820 3849 6876 5015

8049 2736 9702 8182 3562 1951 7870

6859 3593 8748 1910 3876 9650

21 6

4237 3685 4697 3243 187 4794 6935 8140 2047

613 2228 2566 7021 5464 9229

1253 9611 1775 223 2554 1941

15 10

2189 6540 3595 9370 7526 1855 6388 1168 1688 6582

1090 4592 9687 9079 1312

19 18

5888 4605 393 8884 5115 8614 36 1242 9378 6603

6309 8297 573 4693 3963 1065 8600

2294 8709

15 5

Girls in Code SEA 2025 Fall Competition

7549 4394 6626 9215 5720 5875 36 9843 5284 2253

4579 6296 2023 5986 9096

21 17

5056 8975 2003 9825 1788 7433 3678 3704 4274

2871 7291 1634 9515 4732 3449 9185

7367 728 2184 2644 6423

15 9

2267 8597 6499 283 4823 230 277 5394 7189 1740

2587 9403 8534 9604 4836

25 21

1960 7610 683 8878 2956 276 3949 794 3166

4978 9127 3884 1134 6371 9913 9478

2979 6792 7844 1127 2192 8028 5997 7643 6583

24 16

1955 493 5030 7167 9083 4659 6216 5307 3586 780

5400 4439 8760 6306 4296 2853 1482 3432 3789

5791 6554 1435 3776 9493

20 16

3500 4845 2535 9244 8302 8937 3867 9330 7218

203 5174 2252 600 9799 9549 3231 9014

3511 406 9902

15 10

3268 2070 1378 9134 2012 1343 7630 4092 553

9986 7470 5148 5482 2243 4676

17 16

7082 3565 1322 9071 3650 9509 3520 9422 9037

2392 8953 5502 2236 8636 604 2092 6667

23 20

5946 1546 5592 1072 3482 7941 2490 6646 2139

8110 4993 8060 2528 2375 4392 1943 9051

4858 7040 3204 7374 9545 9191

17 12

9060 12 6977 6934 3917 5171 578 2589 1220 230

1385 2341 8024 7520 3361 6823 4179

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31 16

1599 2421 8984 3852 9476 9869 718 624 8575 8237

6620 361 3614 9947 2255 530 6298 3706

8371 8795 4663 7526 7682 2479 995 3496 7755 2210

798 9898 1608

25 9

6676 9744 6267 4058 9906 4590 8348 984 113 4433

2138 3814 5181 2093 2102 3889 6455 1372 3634

6439 7945 9668 9804 7001 5731

Question 3

You are exploring a rectangular robot base arranged in an $N \times M$ grid. Each cell contains a tile that emits energy when stepped on. You start at cell S , and your goal is to reach cell T . Each step increases the energy cost, depending on the difference in energy intensity between the current cell and the next one. You must escape using as little energy as possible to avoid detection.

Each cell contains:

- '0' to '9' $\rightarrow$ energy intensity (0 = inert, 9 = strongest)
- Walls '#' $\rightarrow$ blocked cells
- S $\rightarrow$ Start cell
- T $\rightarrow$ Target cell
- '.' $\rightarrow$ empty cell with energy intensity 0

Movement Cost Calculation: If you move from cell (x_1, y_1) with energy A to cell (x_2, y_2) with energy B :

$$\text{cost} = 1 + |A - B|^2$$

Examples:

- From 3 $\rightarrow$ 3: $\text{cost} = 1 + |3 - 3|^2 = 1$
- From 2 $\rightarrow$ 8: $\text{cost} = 1 + |2 - 8|^2 = 37$
- From . $\rightarrow$ 7: $\text{cost} = 1 + |0 - 7|^2 = 50$ ('.' = energy 0)

Input format:

- First line: N M ($1 \leq N, M \leq 2000$)
- Next N lines: grid rows of M columns

Output format: A single integer $\rightarrow$ minimum cost

Sample Input:

```
5 7
1..3..2
..#..#.
```

S23..4T

.#...#

9..8..7

Sample Output:

32

Input

40 80

30#.879.3390#.31844#.6##060..0038.15#97#0.7#.6#2#..#75#.#.89521234.64..#0#..88#.
77#.#9.57##1#1.#34#6#1.#36#.0##7#182870#91.507.#4516#.#.987#4979##06.4749#.3#033
8967#81.#9#81#8..7##.2#.#..39.##70.04.#8####.#27##8154#.#.287##62190##24#.5##716
428###33755#357#..8#1.#.##.9#20.9...#744..4.792##7#74749..53#095.73###9.4#533291
#3.2#.8.27####3#.8.4#4#.2#0#4##35#714182906837##438.#494.#35#283.##.#7#..###.5#.5
694##36103T289932825424612851409727#.#####2.0#.5#9...1#3#778971##8##.##7#169101#
02#7#85##566..9.710#.6#..###.#7##816#7.###25####5..#51482.##.54#7#3#75#.#610####
##9#.4.438.#7##..1991##851#..#016##6935#2.5588#619#9#3#159#8#9##7.1937..#2.#69#4
.#.4.0304#6##3#42#.907#2#5.#959###85#8#541#22.9#1..4#.9.#9##3#8#0#725..0#02#425.
402##68..8##2##98#5##.#17#91.11#.#.745##2151#.#694##38#10#3#8#84##0131##.3##7#7#
.884..35.9##1##1#0834.#7..#438#..###8#80937.62#3.2#.3#.#935#6.6#3460.55527#5#818#
.0.98.9.4441#7###8#1.1602##1#8#6###.##9##4285810##294.10.6483.7#270100#0#...2#
1427#320#6#4..3#.#.####458#43#7##.##5.14..48#920#663.3#2.37#0#282.9196417.6###5..
75.###89..3#5##..##8.9.#.199#0#2##1##2#.1791.57..##.3220174.4#8###.9##.7#####5
6#8793##7.91.2#####701.420###067.7#.#97#225.65178#92..#067268.8.3#2#1.##53.8##
516.5#86#9#9#..9#0#328#.76#1.##55.0.#8868#4#274#89.#.1#.#9.6#.9940#1.5##6.5#..3
319040159.3#.087196863.#3572##3###2.6#4#.#.####95#.6.0##92.1#70284#8###537#29687#
#597##.3##538#93#####1.##1.04#78####.#6#####76448#.#1.#685..#2.#9.0#1##99.6##6154
.0#3#883.####094##7233#49##9#6##2...536#1##60#70###032#.#####.52#..####222###.3
1.1#2#07#.54.#68714..##392.#7.5#3.76#625#017.#17696#69##.516920#62#.06.2#0#.#4#2
###8##5#.#..#42.#1289#883#####2#502373##56#422#..83#.#.###6936#5.5377#.292#760#9.#
4#.#.#1##.#6#05#53.#.5#.0##.#765#3.13#.#0###5###361##678.0##7.##.#3##20.6#14#...
####98###71#229.8#1..96###5##.29626#8#7444.##4###164#.#..36#8#0#28349##8.###2#84
968#2.##9#.#.#####7##62#..#4#145###1#7###8..9#.#.##.#39#8.#..92218#97#.#93.#####

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##9##4#.23..2##.2#.7#8##573#24#..22####428..5392.914#.822#96#300#.4#88#851.#32.3
168.16.0#89#7#46#.#25###8#.5.7#1#74#7530##63#64#8##9.#71860.6..593.#0.#2.082#9##
##27#74#70#..732007##25582###0#.315.7##24#.077..#.#56####12###.3#.3.##7.3#.930.3
.#4..#8#8#92...###.546##6#4...#2#.##3.4.9#####.544#817#27#.#0.1###1#6#4#085##.03
4..#9#7##33.36#65##2.9#7..5#.#526#.#.3.##83#.9#7#6.3879##7...3#90#.506.7##68##.0
#030#5#58481#9349102#22#3465772##5#173#1516##66#601###95.###5#08.###958.#.9#08#
92#.979#0#7...#.67##085418.#36#.4#65.##209.656#8.#0.4124##3..6.8#006327#..6.#6##
9...#0.9.3#1498594615.#4.97#0#28###8..#9##3#8.1.#.6057981398054#2.##8.93#0..1#.#
##514.#.6722.927#.7#.7##4##9#####8#7..#.478#62.33420..#11#32.#..5#.#797164##..##
#.#7#2#6.8##6#9928#3##37.3#414802.1#5722##644#10.0#9..#2.2292#4#4..541#..09##58
#41.##10#1..2#5##44#..2#7.0##8#.#8#8#..03##4.8#6.#.6#7#45616936630746.09.8.7.#
#9.5#.8#38..##48#6#.01#7##4..4#821.#0#.6#5###36198#.9.#0##6...##.8#6#766###3.#7#
#0#3#231396.#..7#.3#2.#2#.9#011918739##5#5..0#7.40##0.#98.##3#61#7#.#363..0#2#.5
22#1#98##..473181#213#8#.33#6....#50.#170603#5....##252369.12616##.4#082S86###82
83..711..7612#2.7529#2.#15.6#940#207.125##.1##.#8###37.1##9056#.89.679.883.##.0#
1##3.71.4#7526###..450###98#.5#6.51###8#6#2377###.#0##6710.###6#019#..858#.#1#7

Question 4

The city is under threat from an invasion of rogue robots. A defender robot is tasked with collecting energy cores scattered along a straight corridor to power up and stop the invasion.

The corridor contains n energy cores, represented as an integer sequence $e_1, e_2, \dots, e_n$, where e_i is the energy level of the i -th core from the entrance.

The robot needs to collect exactly m cores to fully charge. The i -th core it collects must have an energy level of at least $r[i]$ to meet its charging requirements.

However, the robot is too big and can only move forward from the entrance to the end of the corridor, and it must decide in real-time whether to pick up the core at its current position.

The robot's engineers have a special device: it can generate one artificial energy core with any energy level k and place it anywhere in the corridor (before, after, or between existing cores) at most once before the collection begins.

Your task is to determine the minimum energy level k the robot must generate to ensure it can collect exactly m cores satisfying the energy requirements.

If the robot can collect all required cores without generating a new one, output 0.

If it's impossible to meet the requirements even with one artificial core, output -1 .

Input format:

- First line: t ($1 \leq t \leq 10^4$) — the number of test cases
- For each test case:
 - First line: $n \ m$ ($1 \leq m \leq n \leq 2 \times 10^5$)
 - Second line: $e_1, e_2, \dots, e_n$ ($1 \leq e_i \leq 10^9$)
 - Third line: $r_1, r_2, \dots, r_m$ ($1 \leq r_i \leq 10^9$)

Output format: For each test case, output a single integer — the minimum energy level k the robot must generate, 0 if no generation is needed, or -1 if it's impossible.

Constraints:

- The sum of n across all test cases does not exceed 2×10^5

Sample Input:

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7
9 5
3 5 2 3 3 5 8 1 2
4 6 2 4 6
6 3
1 2 6 8 2 1
5 4 3
5 3
4 3 5 4 3
7 4 5
6 3
8 4 2 1 2 5
6 1 4
5 5
1 2 3 4 5
5 4 3 2 1
6 3
1 2 3 4 5 6
9 8 7
5 5
7 7 6 7 7
7 7 7 7 7

Sample Output:

6
3
7
0
-1
-1
7

Question Input File:

- Input: <https://shorturl.at/HS7mo>

Question 5

There are N attractions in a huge amusement park, numbered 1 to N . They are connected by $N - 1$ walkways, and these walkways form a tree (so there is exactly one simple path between any two attractions). Each walkway has a thrill rating T .

You will receive Q questions. Each question gives you a value X . For that question, you will only walk on walkways where: thrill rating $\geq X$

Starting from attraction 1, you must find:

How many attractions can be reached using only walkways with a thrill rating of at least X ?

You must output this number for every query.

Input Format:

```
N Q
u1 v1 T1
u2 v2 T2
...
u_{N-1} v_{N-1} T_{N-1}
X1
X2
...
XQ
```

- N = number of attractions
- Q = number of queries
- Each walkway connects u_i and v_i and has thrill rating T_i
- Each query X_i is the minimum thrill you allow for walking

Output Format: For each query X_i , print the number of attractions reachable from attraction 1 using only walkways where: $T \geq X_i$

Constraints:

- $1 \leq N, Q \leq 200,000$
- $1 \leq T_i, X_i \leq 10^9$

Example Input:

```
5 4
1 2 5
2 3 2
2 4 8
4 5 6
1
3
5
7
```

Example Output:

```
5
4
4
1
```

Question Input File:

- Input: <https://shorturl.at/1NHcP>

Question 6

At WonderLand Theme Park, there is a long row of N magic stalls ($2 \leq N \leq 248$), each with a power level between 1 and 40.

A magic stall can be upgraded using the following rule:

Upgrade Move: If two adjacent stalls both have the same power, you may merge them into one stall with power $(\text{power} + 1)$.

Example: Two stalls with power 7 side-by-side can merge into a single stall with power 8. After merging, the number of stalls decreases by 1.

Goal: Your goal is to maximize the highest stall power in the entire row after performing as many merges as you want. You may merge in any order.

Input Format:

- First line: N , the number of stalls
- Next N lines: the initial power of each stall

Output Format: Print one integer: The maximum stall power you can obtain by merging wisely.

Sample Input:

```
4
1
1
1
2
```

Sample Output:

```
3
```

Question Input File:

- Input: <https://shorturl.at/HrFU0>

Question 7

At WonderLand Theme Park, there are N attractions ($3 \leq N \leq 50,000$), each located at a distinct point on a 2D map.

The map is a coordinate grid. Each attraction is at a point (x, y) , where x and y are positive integers between 1 and 1,000,000,000.

The park management wants to build fences around the attractions to mark safety zones.

Single Enclosure: If they build one rectangular fence:

- The fence must have sides parallel to the x - and y -axes.
- It must contain every attraction (attractions on the boundary are allowed).
- Among all such rectangles, they will choose the smallest possible one (with minimum area) that contains all attractions.

Two Enclosures: However, the park wants to save money on maintenance by reducing the total fenced area. They consider using two separate rectangular enclosures instead of one:

- Each enclosure must also have sides parallel to the axes.
- Together, the two enclosures must still contain all attractions (every attraction must lie inside at least one of the two rectangles; being on the boundary is allowed).
- The two rectangles are not allowed to overlap, not even at the boundary (they must be completely disjoint).
- Rectangles with zero area are allowed (for example, if width = 0 or height = 0).

Goal: Compute how much total area the park can save by using two enclosures instead of one.

Input Format:

- First line: N – the number of attractions.
- Next N lines: Each contains two integers x y , the coordinates of an attraction.

All attraction positions are distinct, and $1 \leq x, y \leq 1,000,000,000$.

Output Format: Output a single integer: The maximum area saved by using two enclosures instead of one.

Sample Input:

```
6
4 2
8 10
1 1
9 12
14 7
2 3
```

Sample Output:

```
107
```

Question Input:

```
100
10 12
14 18
18 20
22 25
26 30
30 35
34 40
38 45
42 50
46 55
50 60
54 65
58 70
62 75
66 80
70 85
74 90
78 95
82 100
```

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86 105

12 14

16 22

20 28

24 34

28 42

32 48

36 52

40 58

44 63

48 68

52 73

56 78

60 83

64 88

68 92

72 96

76 102

80 108

84 114

88 120

15 130

20 135

25 140

30 145

35 150

40 155

45 160

50 165

55 170

60 175

65 180

70 185

75 190

Girls in Code SEA 2025 Fall Competition

80 195
85 200
18 150
22 144
26 138
30 132
34 126
38 120
42 116
46 112
50 108
54 104
58 100
62 96
66 92
70 88
74 84
78 80
82 76
86 72
90 68
94 64
98 60
102 56
106 52
110 48
114 44
118 40
122 36
126 32
130 28
134 24
138 20
142 16

Girls in Code SEA 2025 Fall Competition

146	12
150	18
154	24
158	30
162	36
166	42
170	48
174	54
178	60
182	66
186	72
190	78
194	84
198	90
199	95
200	100

Question 8

To defend Earth from an impending robot invasion, the human resistance has recruited a team of elite pilots to control specialized combat drones. The commander is tasked with assessing the pilots' skills during a series of simulated battles.

In each of K simulation rounds ($1 \leq K \leq 10$), the commander ranks the N pilots according to their drone-handling performance ($1 \leq N \leq 20$). After all simulations, the commander wishes to analyze the consistency of the results.

A pair of two distinct pilots (A, B) is considered **consistent** if the same pilot always ranks higher than the other in every single simulation round.

Task

Determine how many consistent pilot pairs exist after all simulations.

Input Format

- The first line contains two integers K and N .
- The next K lines each contain the integers $1 \dots N$ in some order, representing the rankings for that simulation.
- If pilot A appears before pilot B in a ranking, then A outperformed B in that round.

Output Format

Output a single integer: the total number of consistent pilot pairs.

Sample Input

```
3 4
4 1 2 3
```

4 1 3 2

4 2 1 3

Sample Output

4

Question Input

10 20

8 14 10 5 20 13 1 11 7 3 2 15 4 18 19 9 17 12 16 6
13 3 12 5 20 1 16 11 2 9 17 8 4 15 19 14 7 10 18 6
8 18 12 5 20 13 10 11 17 7 2 15 4 16 19 1 9 14 3 6
8 14 3 19 20 13 10 11 1 9 7 15 2 16 5 12 4 17 18 6
14 3 12 5 20 13 10 18 17 9 19 15 1 16 2 11 7 8 4 6
8 3 4 5 10 11 13 15 17 9 2 20 19 16 12 14 7 1 18 6
8 3 12 20 15 13 10 4 17 9 2 5 11 14 19 6 7 1 18 16
5 3 12 8 1 13 10 11 16 17 2 15 4 9 6 19 7 20 18 14
8 3 4 5 20 13 18 11 12 6 2 15 7 9 19 14 17 1 10 16
8 3 12 16 20 13 10 1 4 9 2 14 17 6 19 15 7 18 11 5

Question 9

Earth is under attack! Across a two-dimensional battlefield, N hostile robots are standing at distinct coordinates

$$(x_1, y_1), (x_2, y_2), \dots, (x_N, y_N),$$

where each x_i and y_i is a positive **odd** integer, and $1 \leq N \leq 100$.

To defend the area, Commander Nova wants to deploy two energy barriers:

- A vertical barrier along the line $x = a$,
- A horizontal barrier along the line $y = b$.

Both a and b must be **even** integers, ensuring the barriers never slice directly through a robot.

These two barriers intersect at point (a, b) , dividing the battlefield into four sectors. Commander Nova wants the robots to be as evenly distributed as possible.

For any chosen pair (a, b) , define M as the maximum number of robots contained in any one of the four sectors.

Task

Find the positions (a, b) that minimize M , achieving the most balanced possible partitioning of the robot forces.

Input Format

- The first line contains two integers N and B .
- The next N lines each contain the coordinates of a robot: an odd integer x and an odd integer y , both at most B .

Output Format

Output a single integer: the smallest possible value of M , the minimum worst-case number of robots in any sector.

Sample Input

```
7 10
7 3
5 5
9 7
3 1
7 7
5 3
9 1
```

Sample Output

```
2
```

Question Input File:

- Input: <https://shorturl.at/o9iFE>

Question 10

Dr. Zorlock, the evil alien scientist, has unleashed robotic drones to invade Earth! Agent Nova, Earth's top defender, is tasked with monitoring how many drones appear in each surveillance zone.

There are N surveillance zones ($1 \leq N \leq 10^5$), and Nova logs that a_i drones appeared in the i -th zone

$$(0 \leq a_i \leq 10^6).$$

The total number of drones detected in a single test case is guaranteed to be at most 10^6 .

However, Agent Kira wants to sabotage the report. She wants it to look like the invasion is perfectly coordinated — that every zone has the same number of enemy drones — so Earth's headquarters will panic and blame Nova.

Kira can only alter the report by merging **two adjacent zones**. For example, if

$$a = [1, 2, 3, 4, 5],$$

and she merges the 2nd and 3rd zones, the report becomes:

$$[1, 5, 4, 5].$$

Task

Determine the minimum number of merges Kira needs to perform so that **all remaining values in the report are equal**.

Input Format

- The first line contains T ($1 \leq T \leq 10$), the number of test cases.
- Each test case begins with a line containing N .
- The next line contains $a_1, a_2, \dots, a_N$.

It is guaranteed that:

- The sum of all a_i within a single test case is at most 10^6 ,
- The total sum of N over all test cases is at most 10^5 .

Output Format

Output T lines, where each line contains a single integer: the minimum number of merges required for that test case.

Sample Input

```
3
6
1 2 3 1 1 1
3
2 2 3
5
0 0 0 0 0
```

Sample Output

```
3
2
0
```

Question Input File:

- Input: <https://shorturl.at/rbrBh>

Alternative Answer Submission Page

[Google Form for Submitting Your Level 1 Answers](#)

[Google Form for Submitting Your Level 2 Answers](#)

[Google Form for Submitting Your Level 3 Answers](#)

Only submit using the Google Forms if the website does not work for you. Please email the GIC team if this applies to you.

The End

Thank you for reviewing this document.

And thank you for participating! We hope to see you next year!

– GIC SEA TEAM



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