



Karlsruhe Institute of Technology



IT Systems Engineering | Universität Potsdam

Competitive Programming

Winter Term 23/24

Live Contest: Rules and Tips

Kirill Simonov

Algorithm Engineering Group

HPI

Christopher Weyand

Scalable Algorithms Group

KIT



- the contest is next Tuesday (21.02.2023) from 10:00 to 15:00
 - be there 15 min early
 - solutions are presented afterwards
- for KIT, contest will be in room -101
- problems can be from all covered topics
 - flows
 - data structures
 - trees
 - numbers
 - strings
- unrated topics are excluded
 - DFS
 - FFT

- ✓ Use multiple computers at the same time
- ✓ Use any software/IDE, Python+C++
- ✓ Talk within the team
- ✓ Ask the teaching team for clarifications and hints
- ✓ Use slides from the course
- ✓ Use your **own** code from previous problems
- ✓ Use public information from the internet
 - ✓ Please cite copied code with the source in a comment
- ✗ Do not post on the internet
- ✗ Do not talk to anyone outside your team and teaching team

Ranking (for prestige)

- Number of solved problems
- Sum of problem penalties
 - Per solved task: (time since contest start in min)
+ 20 min · (number of fails before first correct solution)

Grading (for ECTS)

- Solve 6 out of 8 tasks for full 30%
 - 5% per solved task
- 7th and 8th tasks have no effect, but more choices

- Bring snacks + water
- Bring pencil+paper
- Set up IDE
- Have reading material ready

- Read all tasks
- Draw examples
- Talk to your partner!
- Use pair programming
- Look at the scoreboard
- Don't look at the scoreboard



Have fun!

Wrong Answer

- check for overflow
`int` until $2e9$; `long long` until $9e18$
- check for overflow again; even `long`, `size_t` can be 32 bit
- make sure IO is not optimized
- edge case missing? e.g. $n=0$
- discuss solution with pair programming partner again
- If you did greedy, better try DP

Timelimit

- `ios::sync_with_stdio(false)?`
- compute worst case number of operations in python shell
 $> \approx 100k$ is too slow. You get a feel for these numbers!
- change `std::endl` to `'\n'`
have a look at Jason Turner's "C++ Weekly - Ep 7 Stop Using std::endl"
- passed container by value?
- (■ check that input and output are not interleaved; or use `cin.tie(nullptr)`)
- discuss solution with pair programming partner again

Contest Over. What now?

- you are now perfectly trained to represent your university in ICPC competitions
- Wintercontest, GCPC, NWERC are every year
- consider joining our student community and keep training
 - join the discord server
`discord.gg/fAu5QM6CBx`
 - attend our weekly meetings
Do 15:00 in 305
 - be active on codeforces
 - remember us after winning World Finals

Don't think I would let you go this easy.

Given array of length $n \leq 10^5$. Answer $q \leq 10^5$ range queries that ask for the number of unique elements in a subarray.

5s timelimit

Don't think I would let you go this easy.

Given array of length $n \leq 10^5$. Answer $q \leq 10^5$ range queries that ask for the number of unique elements in a subarray.

5s timelimit

Hint: $O(n\sqrt{n}\log n)$