



Manual
Grading

Black Box
Testing in IOI
Competitions

Manual
Grading in
Bundeswett-
bewerb
Informatik

Example Task

Manual
Grading in
IOI?

Summary

Manual Grading in an Informatics Contest

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Olympiads in Informatics, 2008



Outline

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- 1 Black Box Testing in IOI Competitions
- 2 Manual Grading in Bundeswettbewerb Informatik
- 3 Example Task
- 4 Manual Grading in IOI?



IOI Grading

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Summary

- automatic evaluation of submission performance on test data
- full score: submission perfectly reproduces expected I/O relation within given performance limits



Criticism of IOI Grading

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Summary

- choice of test data influences scores
- flaws in submissions may remain undetected
- submissions with slight mistakes may be severely punished



Bundeswettbewerb Informatik

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Summary

- task-based
- homework rounds
- mixed submissions
 - solution description
 - implementation (executable and source code)
 - examples
- manual grading



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Summary

- grading scheme: list of grading criteria
- each criterion:
 - refers to model solution
 - describes a possible flaw
- negative (subtraction) grading: $\max(5 - \text{penalty}, 0)$
- jury members work through grading scheme and may apply penalties



Feedback for Participants

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Summary

- score sheet with (negative) marks, corresponds to grading scheme
- sample solution: description of ideas, examples



Prämienjagd (Bonus Hunt)

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Summary

“Given a list of prices, determine the maximum number of pairs that sum up to an amount with a cent part of 11, 33, 55, 77, or 99. Every price may appear in at most one pair.”

Example:

For the price list [1.99, 4.13, 6.64, 8.98, 9.91, 1.99], two matching pairs can be found: (4.13, 8.98) and (6.64, 9.91).



Prämienjagd (cont'd)

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Summary

- OI-style task with test cases
- a bunch of (obligatory) input files were published, including output values for some of them.
- maximum input size: 500 000
- perfect solution for the largest cases was explicitly not required



Solve Using Flow Graph

Manual
Grading

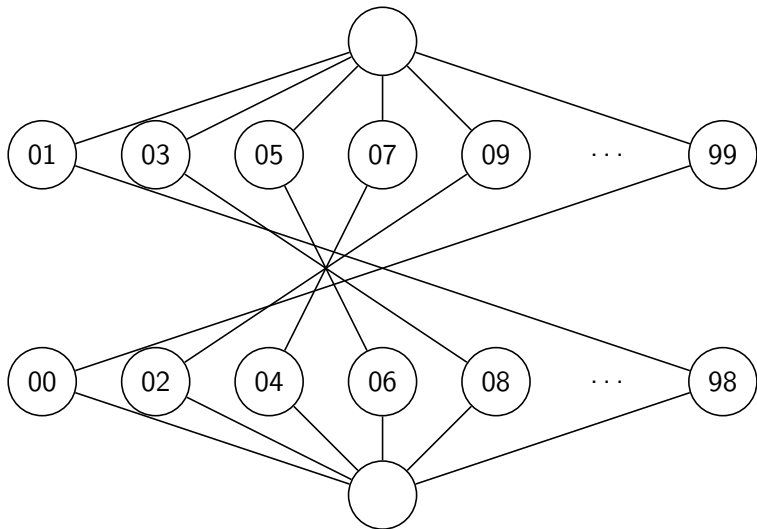
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Grading Scheme

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Summary

submission does not discover that pairings can be limited	-1
program too inefficient for other reasons	-1
no statement about performance	-1
incorrect results	-2
program does not output the pairs themselves	-1
submission does not contain output data for the published test cases	-1
self-invented test cases are missing or are not meaningful	-1
problem reduced to looking at cent amounts only	+1



Pros

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Summary

- need for grading scheme guides task development
- makes SC expectations / rationale explicit
- grading scheme allows for easy way of giving explicit feedback



Cons

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Summary

- requires contestants to use speaking identifiers, add comments, ...
- requires leaders to do additional translation work
- involvement of team leaders might introduce bias



For IOI: manual grading without bias!

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Summary

- use a grading scheme
- stick to source code submissions (at first ...)
- leaders do translation only, not grading, of their contestants' submissions
- translation process ensures that source code remains (semantically) unaltered
- do double-blind grading, based on translation



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- Black-box testing has severe disadvantages.
- Manual grading may help to avoid those disadvantages.
- An implementation of manual grading in IOI is possible.