

GA Meeting

Discussion about Future IOI Competitions

ISC

IOI 2002-1

GA Discussion about Future IOI Competition

Topics

- Competition Tasks
 - Problem domains, solution methods
 - Difficulty levels
- Determination of Scores

IOI 2002-2

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Competition Tasks

- "... are designed to be algorithmic in nature"
- ... focus on problem solving
- ... are solvable by elementary methods from informatics

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Problem Domains, Solution Methods

- Complex Numbers (unfamiliar)
- Max-Flow Network Algorithms (complicated)
- High-Complexity Problems (NP, approximation, heuristics)
- Numerical Computations (floating point, stability, condition)
- Parallel Computations (unfamiliar)

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Examples of Numerical Issues

- $\sqrt{S} + \sqrt{T} = \sqrt{U} + \sqrt{V}$

- One solution of $ax^2 + bx + c = 0$ is $x = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$

If $4ac \approx 0$, then cancellation in $-b + \sqrt{b^2 - 4ac}$

With 32-bit floats, $a, b, c = 10^{-16}, 1, -1$ yields $x = 1.11022\dots$ instead of $x = 1.00000\dots$

Alternative formula: $x = \frac{2c}{-b - \sqrt{b^2 - 4ac}}$

Difficulty Levels of Tasks

- All tasks **hard** to solve 'perfectly' versus
- One **easier**, one **medium**, one **harder** to solve 'perfectly'

Determination of Scores

- **Mystery** (less information)

$r \in$	$\dots B$	$B+1 \dots 2B$	$2B+1 \dots 400$	$401 \dots$
Score	5	3	1	0

r = number of rect calls

B = unknown bound dependent on N

- **Transparency** (more information)

$r \in$	$\dots 100$	$101 \dots 200$	$201 \dots 400$	$401 \dots$
Score	5	3	1	0

Relative Scoring

Relative scoring was used for a technically-hard problem (XOR)

- Organizers have no 'perfect' solution
- Contestants have no stopping criterion

How many tasks with relative scoring in the future?

Questions and Suggestions

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Further Discussion

- **IOI Web Site** <http://olympiads.win.tue.nl/ioi/>
- **IOI Mailing List with Archive**
- **Send suggestions and comments to ISC**

IOI 2002–10

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General ISC Meeting

- Immediately after 8th GA meeting
- Date: **Friday, 23 August 2002**
- Time: **22:00 – 23:00**
- Location: **ISC Room in Library Building**

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IOI 2002–12

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