



Selection Mechanism and Task Creation of Chinese National Olympiad in Informatics (CCF NOI)

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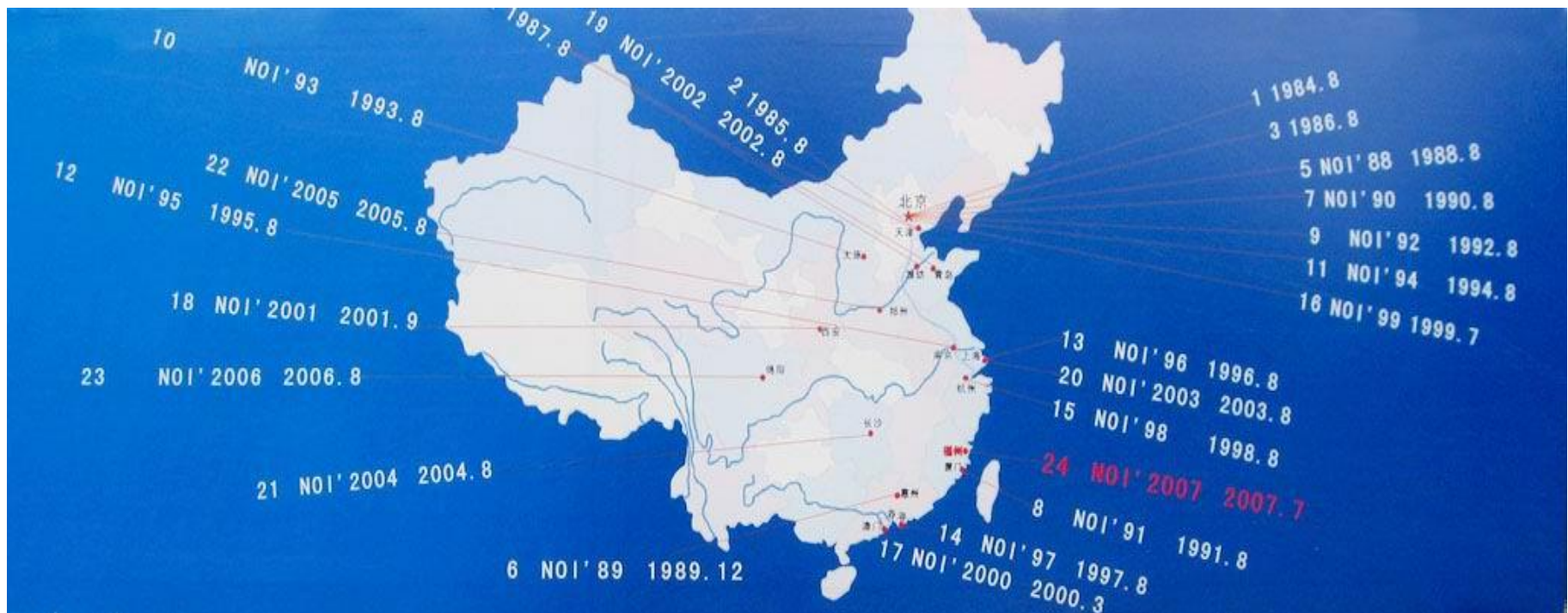
Guide Line

- Introduction
- Existing Contests and Activities of CNOI
- Selection Mechanism for the Contestants of the IOI China Team
- Several Approaches to Assure Task Quality
- Conclusion

General Review

- The 1st China Computer Programming Contest for Youth and Children was organized by CCF in 1984
- A total of 27 NOI contests have been held successfully from 1984 to 2010
- China has been presenting at every IOI contest since the first one, IOI1989.
- In 2000, the 12th International Olympiad in Informatics (IOI2000) was successfully held in Beijing.

Some venues held the past NOI





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Activity	When	What	Who
N ational O lympiad in I nformatics in P rovince (NOIP)	October — November Task Difficulty Index (TDI): 1-6	An elementary contest aiming to test the basic knowledge and skills of the contestants. Contestants are divided into two levels: junior and senior Preliminary round: A conventional paper-based test -- multiple-choice and short-answer questions. Final round: a computer-based programming contest, 3 hours for 4 tasks. The same format as IOI tasks, but are more elementary.	Over 80000 contestants participated each year from NOIP'2006 to NOIP'2009

Activity	When	What	Who
N ational O lympiads in I nformatics (NOI)	July - August Task Diff Index: 4-8	Two day competition (5 hours for 3 tasks/each day) and one week activity similar to IOI. A team competition was added in NOI2006. The top 20 contestants from NOI form the National Training Team (NTT) for the IOI of next year (candidates for the China team)	5 contestants each province Totally 150 person NOI sets 20 golds 20% silver 30% bronze medals
NOI Summer Camp.	At the same time with NOI	The competition and activity is the same as NOI.	4 -5 contestants per province.



NOI2010 Contest Site



NOI2010 Contest Site

Activity	When	What	Who
Homework Practicing and Training for NTT	August - Jan.	Training and practicing by homework. Contestants will submit their solutions, and someone will give instant feedback	20 contestants of NTT
NOI Winter Camp Competition (NOIWCC)	Jan-Feb Task Diff Index: 6-9	An intense one week training and a five-hour competition. The NTT contestants will also participate in an oral presentation and defence (10+ 5min).	20 contestants of NTT plus 4 contestants each province

Activity	When	What	Who
<p>China Team Selection Competition (CTSC) for the IOI</p>	<p>May</p> <p>Task Diff Index: 8-10</p>	<p>The final China Team Selection Competition. Two day competition (5 hours for 3 tasks each day) is similar to the IOI.</p> <p>The top six contestants will participate in an oral defence. The best four contestants will form China team for the IOI.</p> <p>The tasks are arguably the most difficult among all CNOI contests</p>	<p>20 contestants of NTT plus 3-4 contestants each province</p>

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2. *Selection Mechanism*

- Establishing a strict mechanism with a set of rules, for selecting talented students and building the IOI China team.
- They are based on different investigations and comprehensive surveys, including multiple contests and paper defence.
- It guarantees that the selected contestants have outstanding programming skills, good psychological quality and comprehensive ability.

2.1 Multi-test Selection

- The top 20 contestants from the last NOI contest form National Training Team (NTT)
- NTT members must participate in the NOI Winter Campus Training and final competition-NOIWCC. *weight score 25*
- NTT members must participate in CTSC. *weight score 60 (30 for each day).*

2.2 Multi-aspect Assessment

- Every NTT member is required to design their own contest problems as part of their obligatory homework.
- NTT member must participate in an oral presentation and defence (10min+5min).
weight score of 15.
- Top 6 students are asked to introduce himself in English and answer questions in front of the jury and hundreds of spectators.



Selection Process

- After all 20 members of NTT is selected from NOI, there are two contests and two activities that contribute to the selection process.
- Different contests and activities with corresponding weight scores.


Items	Weight score	Task Difficulty Index TDI(1-10)
Homework	10	
NOI Winter Camp Competition (NOIWCC)	25	6-9
Paper presentation and oral defence	15	
China Team Selection Competition (CTSC)	60	8-10
Total score	110	

2.3 Other Selection Rules

- **Providing more opportunity to more contestants.**
 - From 2006, if a China contestant wins a gold medal in IOI, he will not be in the Chinese team next year.
 - From 2008, if a contestant becomes an NTT member, he will not be permitted to participate in future APIO.
- **Making more contestants share medal.**

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Several Approaches to Assure Task Quality

- Task creation is essential in contest arrangement.
- High-quality tasks not only boost the overall public valuation of the competition, but also ensure effective selection of talented students and fair game.

3.1 *Organizing the Task Creation Team*

- Core members of task creation committee consist of :
 - former IOI and NOI medallist
 - experienced ACM/ICPC contestants (both present and former)
 - faculty members of universities.
- This assures the members have a good understanding of high level training and the ability of solving contest problems.



3.1 Organizing the Task Creation Team

- Members of two committees, NOISC and NOICC, play a key role in the work of contest task creation. NOISC holds meetings to discuss the tasks for every contest.
- there are also some student members in NOISC. They are undergraduate students or graduate students, including Ph.D. candidates.



3.2 *Preserving Task Innovation*

- Core members of task creation team are usually active in the various programming contests. They participate in the ACM/ICPC and other programming competitions with strong competency.
- Introducing the ideas from novel algorithms and data structures for the task creation.

3.2 *Preserving Task Innovation*

- Trying to make problems interesting to attract more contestants.
- There were some tasks with interesting stories behind, such as the task
“Plants vs Zombies” (NOI 2009),
N² digital games (puzzle, CTSC 2009),
Target-shaped Sudoku (NOIP 2009).



3.3 *Task Discussions and Publications*

- Summing-up and idea-exchanging are also very important to improve the task quality.
- When the manuscript of a task is finished, we arrange different discussion and to ask for suggestions.



3.3 *Task Discussions and Publications*

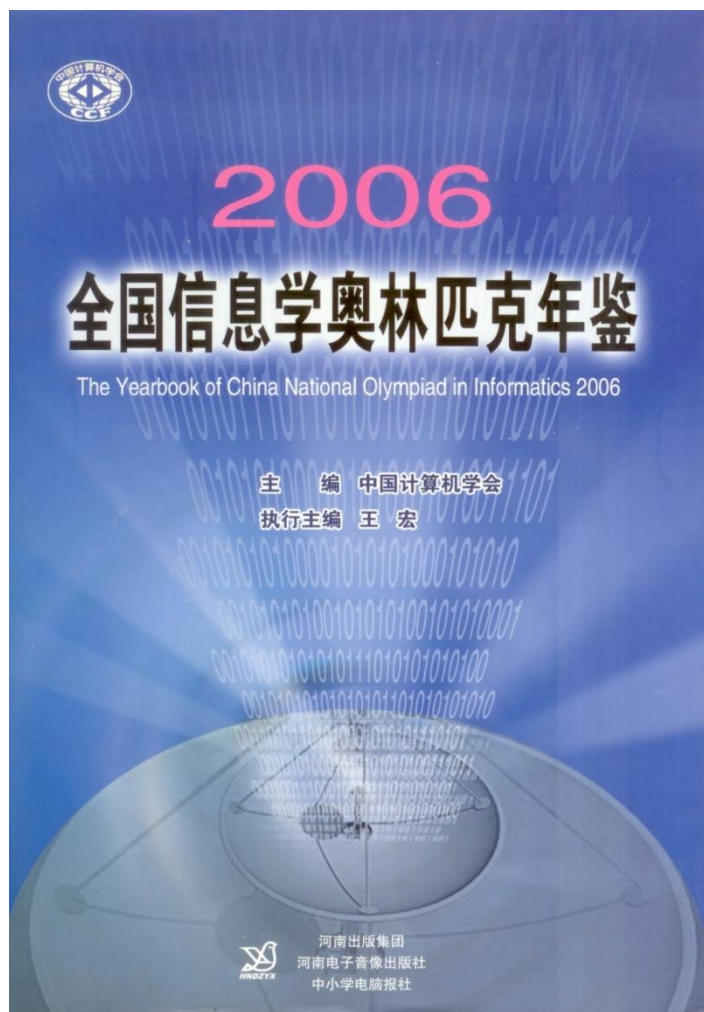
- There is a task solution report and discussion after every contest. It is usually arranged in the afternoon of each contest day.
- Contestants are encouraged to ask questions and join discussions during the session.
- It is very helpful to find out the imperfection of tasks and this usually leads to quality improvement for the future.



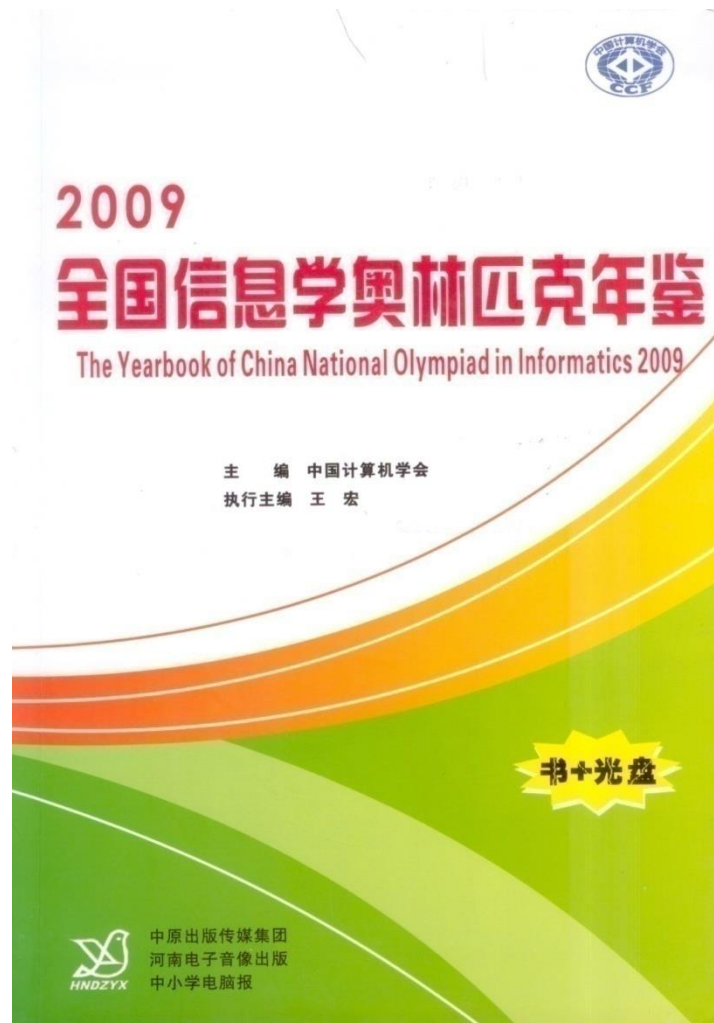
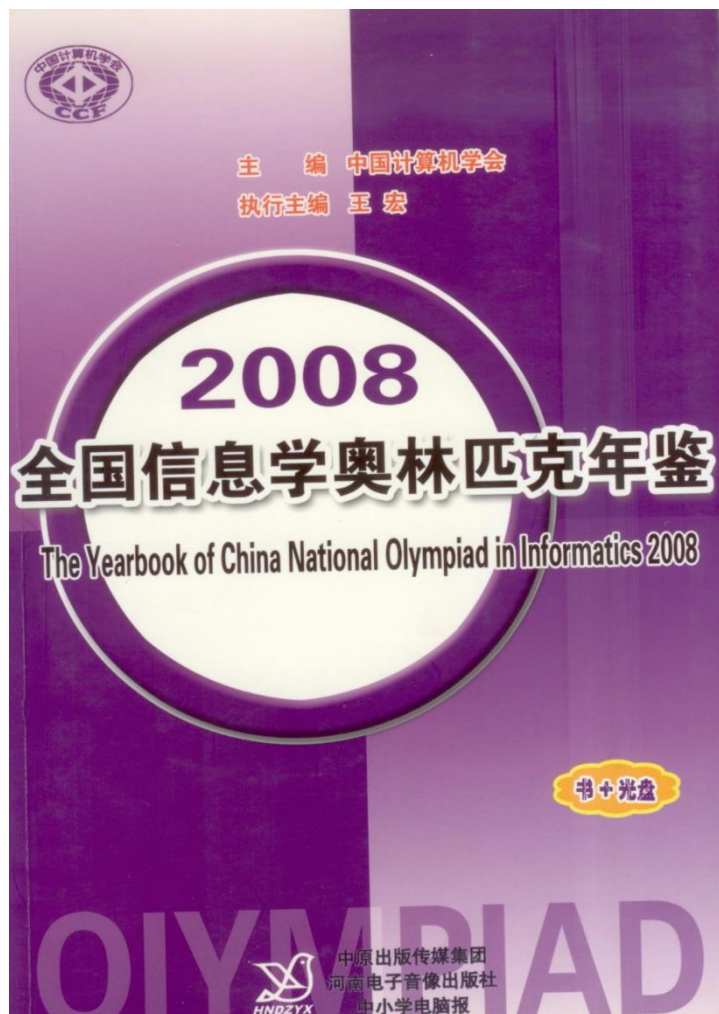
3.3 *Task Discussions and Publications*

- We have published a Yearbook of NOI each year since 2006.
- Each Yearbook covers all the tasks of NOI. Official test data and reference solutions can also be found in the companion CD.
- The Yearbook has become the necessary reference material for Informatics Olympiad field in China. We began to publish NOI tasks in English since 2009.

The Yearbook of CCF NOI 2006 and 2007



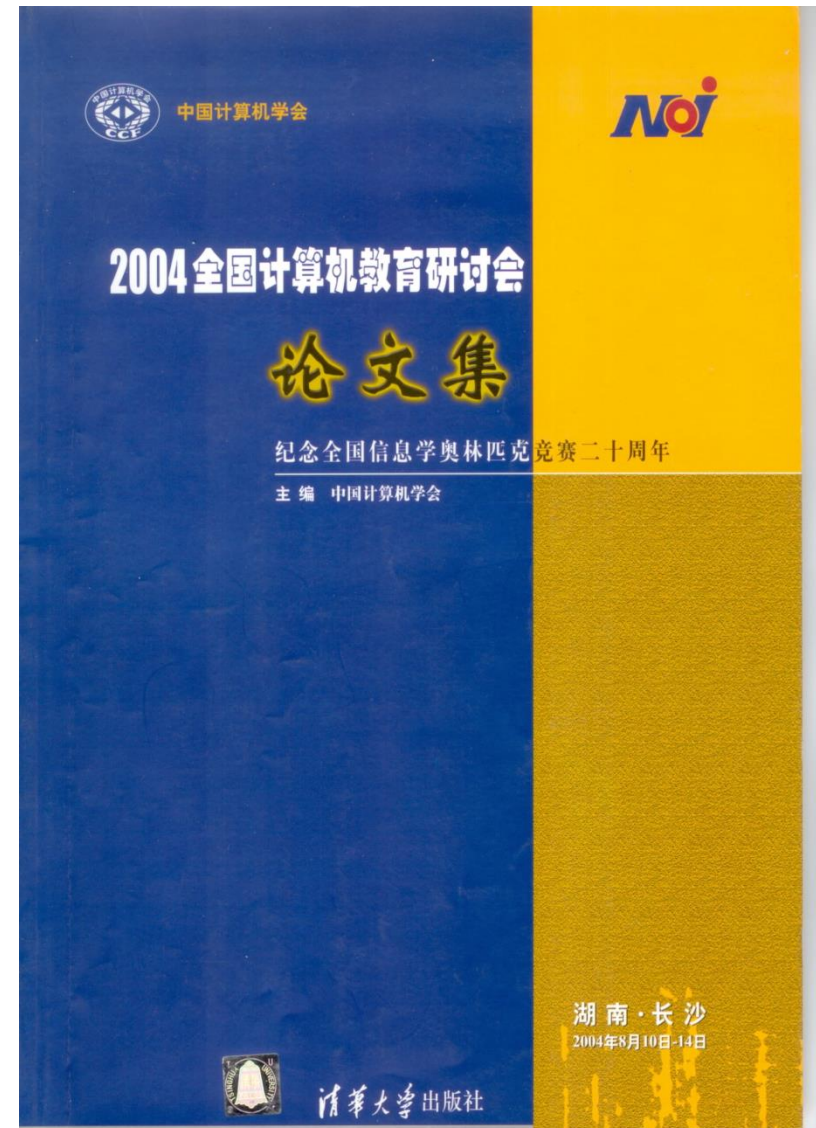
The Yearbook of CCF NOI 2008 and 2009



3.3 *Task Discussions and Publications*

- We also encourage the publication of books related to NOI trainings and contests.
 - Mr. Rujia Liu, past NOISC student member and current NOICC member, has designed over 30 tasks for CNOI and ACM/ICPC Asia regional contests.
 - He published his first book “*The Art of Algorithms and Programming Contests*” in 2004. Then he translated “*Programming Challenge*” into Chinese and published it in 2009.

- The National Symposium on Computer Education of China was held with the official proceedings published in 2004 which was the 20th Anniversary of China National Olympiad in Informatics





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Conclusion

- The selection mechanism and assessments for the best contestants has been proven to be effective.
- The guidance and sponsorship of the CCF plays an important role in the selection procedure.



Thank you for your attention!