HKOI 2016/17

BRIEFING FOR FINALIST

2016-12-10

Content

- HKOI Background & Goals
- Final Event
- Useful Techniques
- Unuseful Techniques
- Strategies
- HKOI Online Judge System
- Q & A
- Workshop

HKOI Goals - Goal

- Aims
  - Select potential candidates for competitions
- International Competitions
  - IOI (International Olympiad in Informatics)
  - NOI (China National Olympiad in Informatics)
  - APIO (Asia-Pacific Informatics Olympiad)

HKOI Goals - Benefits

- Improve your problem solving skills
- Prizes
- Chances to represent Hong Kong in international
- competitions
- Make new friends
- Prepare for other competitions
  - ACM ICPC
  - Google Codejam
  - Facebook Hacker Cup

Final Event

A WEEK LATER

Final Event - Details

- Date
  - 17th December, 2016 (Saturday)
- Time
  - Senior: 9:30 a.m. – 12:30 p.m.
  - Junior: 2:00 p.m. – 5:00 p.m.
  - Please arrive 30 minutes prior to competition
- Venue
  - Rm 924, Ho Sin Hang Engineering Building, CUHK
  - 香港中文大學 何善衡工程學大樓 924 室

Final Event - Equipment

- Desktop Computer
  - Windows 7
- Your own stationery
- NO other electronic device is allowed (including calculator)
- You can use ANY software provided
  - IDE, compilers, mspaint, notepad, calc, etc.
- You are NOT allowed to
  - Install any software
  - Access to the Internet except the contest environment

Final Event - Compilers

- Programming Languages
  - Pascal, C or C++11
- Programming Environment
  - FreePascal **3.0.0**
  - Dev-C++ 5.11

Final Event – I/O Format

- Standard Input / Output
  - Input from keyboard
  - Output to screen
- DO NOT use special consoles such as “crt” or “wincrt”
- DO NOT access any files
- DO NOT perform system calls
  - Eg. System(“PAUSE”);

Final Event – Tasks

- Number of questions: 4
- 100-mark Question x 4 = 400 marks
- NO open question
- Total 400 marks

Final Event - Scoring

- Multiple subtasks for each task
  - Each subtask may carry different points
- Batch scoring
  - To get score for a subtask, one must pass ALL test cases inside
- NO partial scores unless specified
- **ACCUMULATED** marks for subtasks
  - Once the contestant get the marks from a subtask, those marks will be counted even if the latter (or the last) submissions are incorrect for that subtask

Final Event – Scoring

- Accumulated mark example

Submission 139002

2016-07-16 16:00:11 | microtony - 微Tony | M1644 - Moliu Queries | Contest: 2016 Pre-I ...mpetition

Time Limit Exceeded | Score: 30.000

Judge Results

Subtask	Test	Result	Score
1	6	Accepted	100.000
2	Including tests in Subtask 1		100.000
2	8	Accepted	100.000
3	1	Time Limit Exceeded	
4	Including tests in Subtask 2		100.000

Summary

Subtask	Prev	This	Score	Max Score
1	0	10	10	10
2	0	20	20	20
3	0	0	0	25
4	0	0	0	45

Submission 139019

2016-07-16 16:39:11 | microtony - 微Tony | M1644 - Moliu Queries | Contest: 2016 Pre-IOI/NOI Mini Competition

Wrong Answer | Score: 55.000

Judge Results

Subtask	Test	Result	Score
1	1	Wrong Answer	
2	Including tests in Subtask 1		0.000
2	Skipped		
3	8	Accepted	100.000
4	Including tests in Subtask 2		0.000

Summary

Subtask	Prev	This	Score	Max Score
1	10	0	10	10
2	20	0	20	20
3	0	25	25	25
4	0	0	0	45

Final Event - Judging

- We will compile your program using the HKOI Online Judge System configuration
  - TDM-GCC 4.9.2 and Free Pascal **3.0.0**
  - Linux (Not Windows)
- There might be differences in compiler behaviors in very rare occasions
  - We will not help resolving errors related to this during contest
  - Please test it using your practice account in this week to avoid using "strange" syntax

Final Event - Judging

- Definition of "Correct"
  - Correct answer
  - Program exits properly
- Follow the specified Output Format
- Doing less gets NO marks
  - Missing separator
  - Missing line break at end of file (in most cases, this will be autofixed)
- Doing more gets NO marks
  - Trailing spaces (in most cases, this will be autofixed)
  - Extra line or characters

Final Event – Submission

- Upload source code with the browser
- 100 submission per task
- 1 submission per minute, per task (unless Compile Error)
- Shortly after submitting your program, we will test it with ALL test cases
- ~~FULL FEEDBACK will be returned~~
- Verdicts and Scores will still be returned
  - Only the overall verdict and the verdicts of each subtasks will be shown
- HIGHEST-SCORED submission shall be counted

Final Event – Feedback (Verdicts)

- Accepted
  - Your program output and terminated normally.
- ~~Wrong Output Format~~
- Wrong Answer
  - Program output and terminated normally but the output is incorrect
  - Incorrect output format, such as extra lines, multiple spaces for separating numbers, incorrect case for strings
- Runtime Error
  - Error(s) during execution
  - Memory limit exceeded (Memory Error)
- Time Limit Exceeded
  - Program did not end within the time limit
- Partial Score

J142 - Magic Stones *Test Contest (reusable)*	Pascal	Wrong Answer	30 *Score*
J142 - Magic Stones *Test Contest (reusable)*	C++	Compilation Error	0 *Score*
J142 - Magic Stones *Test Contest (reusable)*	Pascal	Wrong Answer	30 *Score*
J133 - Dryads *Test Contest (reusable)*	C++	Partial Score (10.000)	10 *Score*

Final Event – Feedback (Scores)

- Status of each **SUBTASK** and overall status
- Subtask score and overall score
- All submission results are reviewable

Submission 139002

2016-07-16 16:00:11 | microtony - 微Tony | M1644 - Moliu Queries | Contest: 2016 Pre-IOI/NOI Mini Competition

Time Limit Exceeded | Score: 30.000

Judge Results

Subtask	Test	Result	Score
1	6	Accepted	100.000
2	Including tests in Subtask 1		100.000
2	8	Accepted	100.000
3	1	Time Limit Exceeded	
4	Including tests in Subtask 2		100.000
4	Including tests in Subtask 3		0.000
4	Skipped		

Summary

Subtask	Prev	This	Score	Max Score
1	0	10	10	10
2	0	20	20	20
3	0	0	0	25
4	0	0	0	45
Total			30	100

M1641	Inspectors	100	30	30 / 30			0 / 70	Submit Submissions
M1644	Moliu Queries	100	100 / 1:28	10 / 10	20 / 20	25 / 25	45 / 45	Submit Submissions

Final Event - Prizing

- Base on ranking
- ONLY results in the Final Event will be counted
- Approximately half (45) candidates from each group will be awarded prizes
- Gold : Silver : Bronze ≈ 1 : 2 : 3
- All prize winners will be invited to join the HKOI training team as trainees

Final Event - Clarification

- Questions in the Final Event
- Feel free to ask for clarifications by RAISING YOUR HAND
- Most probable response:
  - Please read the problem statement more carefully
  - If necessary, clarifications may be announced to all candidates

Useful Techniques

ONE WEEK TO PRACTICE

Useful Techniques - Basics

- Some simple algorithms/skills
  - Data Processing
    - Mainly tested skill in Junior
    - Basic skill for Senior
- Simple mathematics
- Algorithm performance evaluation

Useful Techniques - Searching

- Linear Search
- Binary Search
- Depth First Search

Useful Techniques - Optimization

- Exhaustion
  - Brute force, search all cases and compare
- Useful but not required
  - Dynamic Programming

Unuseful Techniques

YOU SHOULD PREVENT DOING THESE

Unuseful Techniques

- Complicated standard algorithms
  - Hungarian Algorithm
  - Min Cost Max Flow
  - Fourier Transform
- Naïve Hardcoding
  - printf("Impossible\n");
  - Printf("%d\n", rand() % n);
- Unuseful Optimization
  - Small constant time reduction

Strategies

WHAT YOU SHOULD DO

Strategies – Preparation for HKOI final

- Revision on simple/basic algorithms (these are examples only)
  - Sorting
  - Binary Search
- Try some past problems
- Get familiar with the IDE you are going to use (eg. Dev-c++ 5.11)
- Practice on HKOJ
- Direction of practice (Depends)
  - Problem solving oriented
  - Coding oriented

Strategies – Before contest starts

- Check the equipment carefully
  - Mouse
  - Keyboard
- Check the programming environment carefully
  - Eg. Compiling method, output, path of executable
- Try writing some simple programs (for testing the machine)

Strategies – at the beginning stage

- Read ALL problem descriptions
- Raise questions if needed
- Pick problem to solve
- From easy ones to difficult ones
  - Task
  - Subtask
- Most candidates CANNOT solve ALL problems
- Most candidates CANNOT completely solve ONE problem
- High chance of getting a medal if you solve some/part of the problems

Strategies – During competition

- Try every problems
  - Early subtasks are often easier
- Don’t do un-needed things
  - No need to validate input
  - No need to write ‘Please input a number: ’ which will cause wrong answer
- Follow the output format strictly
  - Don’t output extra things
- Save your programs periodically

Strategies - Tricks

- Safeguard some marks first
  - You may write separate programs for difference subtasks
  - Some subtasks are designed to be REALLY EASY
- Test case is your friend
  - Work on the sample test cases BY HAND first
  - Design your own test cases often provide INSIGTS
  - Generate own test cases using program (Advance)
- Debugging skill helps
  - Check sample/corner cases
  - Use slow but accurate program to debug (Advance)

Strategies – possible reasons for not accepted attempts

- If you think your program should past certain subtask but failed
  - If the verdict is runtime error (only part of the reasons)
    - Divide by 0?
    - Array size not large enough?
  - If the verdict is Time Limit Exceed (only part of the reasons)
    - Infinite loop?
  - If the verdict is Wrong Answer (only part of the reasons)
    - Wrong output format?
    - Corner cases?
    - Debug messages?
- Or maybe your algorithm is not correct or really not fast enough

Strategies – Approaching the end

- Give up some tasks/subtasks and focus on what you could achieve
  - Some subtasks are designed to be REALLY HARD

HKOI Online Judge System (HKOJ)

- https://judge.hkoi.org
- Contain HKOI Past Paper
- Please familiarize yourself with the interface
- Please make sure you understand the verdicts by submitting programs
- Practice and experience do helps

Reference

- HKOI Online Judge System
  - https://judge.hkoi.org/
- Past Paper Solutions
  - http://hkoi.org/en/final-event-solutions/
- Competition Syllabus
  - http://hkoi.org/en/competition-syllabus/
- HKOI Facebook Page
  - http://www.facebook.com/hkoi.org
- HKOI Facebook Group
  - https://www.facebook.com/groups/212335352178368/

Q & A