LATVIAN OLYMPIADS IN INFORMATICS – LESSONS LEARNED

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IOI2013 Conference
Brisbane, July 10,2013

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Norway
Finland
Oslo
Helsinki
St Petersburg
Tallinn
Baltic Sea
Gothenburg
Latvia
North Sea
Moscow
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Denmark
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Vilnius
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Poland
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Belgium
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Kraków
Kharkiv
Ukraine
Paris
Munich
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Slovakia
Dnipropetrovs'k
Vaduz
Austria
Moldova
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NATIONAL OLYMPIAD IN INFORMATICS (Latvijas informātikas olimpiāde (LIO)) :

- First competition named as “OLYMPIAD IN INFORMATICS” was organised by the young scientists of Computer Centre of the University of Latvia (now IMCS UL) at 22.02.1986 on the computer CM-4 (PDP-11) with 24 terminals.
- Officially started at 1988 as part of centralised ex-USSR school computerisation initiative and was organized by state institutions (Ministry of Education).
- After restoration of independence LIO was continued without interruptions
- At 2013 the 26th LIO was held.
- Early olympiads were strongly influenced by olympiads in mathematics and contained also theoretical round(description and analysis of algorithms on paper)
- Grading of programs was done by hand using just few test cases (including cases with wrong input format!

LIO TODAY

- Quite stable (conservative) format – almost the same organisers every year
- Starting with 2009 LIO finals every year in the different city
- Rising level of bureaucracy

STRUCTURE OF OI

Added levels

Worldwide

Baltics

Latvia

4		
6		
20		
38	43	
78	131	

Youngest group Form 8.-10.

Eldest group Form 11.-12.

WHO IS INTERESTED IN THE (L)IO ?

Still main sponsor, mainly providing just (part of) money for travel

Rarely can offer interesting enough jobs for IOI medalists, but has permanent interest in good programmers, support on case-by-case basis

Programming is not in curricula or is scheduled too late to expect good results in OI, teachers often are not able to teach at olympiad level , no young teachers

Aimed only on graduates. IOI medallists are overqualified for usual programs, academic career is rare

Small group of passionate organizers (traditionally former IOI contestants participate at least few years), spending their free time for this job.

Total workload exceeds 1200 hours per season.

DIFFERENT AIMS

Higher (best) top?

Wider basis? In the small country even basis must be built(teached) from scratch

FIRST TEST GROUP

Number of contestants receiving
0 points usually too high.

Easy to blame problem authors for setting too hard tasks.

LATVIJAS 26. INFORMĀTIKAS OLIMPIĀDES III POSMS
VECĀKĀS GRUPAS UZDEVUMI
Otrā diena (2013. gada 5. februāris)

Mozaika

Jogtaini ir B baltas, F poliksu un M melnas bumbiņas. Viena vilna notām izveidot īsāku vai garāku mozaīku, kuras pirmajā rindā būs viena, otrajā – divas, N-tajā – N bumbiņas, pie kam mozaīkas katrā rindā būs tikai vienas krāsas bumbiņas un visas bumbiņas būs izmantotas.

Piemēram, ja B=11, F=5 un M=6, tad iespējama izveidot šādu mozaīku:

Šajā piemērā mozaīku bijām iespējams izveidot arī citādāk (piemēram, samainot vietām melnās un poliksās bumbiņas).

Savukārt, ja B=5, F=4 un M=6, tad apraksītajā veidā mozaīku izveidot nav iespējams.

Uzrakstīt programmu, kas izvēlēsies baltās, poliksās un melnās bumbiņu skaitam pēc tās izveidot pēc iespējas lielāku mozaīku.

Ievaddati

Tekstā failā mozaika.dat vienā rindā dotas trīs veselu nenegatīvu skaitļu B (B≤2147483647), F (F≤2147483647) un M (M≤2147483647) vērtības. Zināms, ka B+F+M>0. Katrā divu blakus skaitļu ievaddatos atdalītājs ir tukšumzīme.

Izvaddati

Tekstā failā mozaika.out vienā rindā jāizvada simbolu virkne – mozaīkas apraksts. Virknei garumam jābūt ar mozaīkas rindu skaitu. Katram i (1≤i≤N) virknei i-tais simbolam jābūt B, ja mozaīkas i-tajā rindā ir baltas bumbiņas, M – ja melnas un F – ja poliksās. Ja mozaīku izveidot nav iespējams, failā vienā rindā jāizvada vārds NAV. Ja mozaīku iespējams izveidot dažādos veidos, failā jāizvada jebkura viena derīga mozaīkas apraksts.

Piemēra (labākā uzdevuma testā aprakstītajiem piemēriem)

Ievaddati (mozaika.dat)	Izvaddati (mozaika.out)
11 5 6	BBBBBFM

Ievaddati (mozaika.dat)	Izvaddati (mozaika.out)
5 0 4	NAV

1. apakšuzdevuma testu ievaddati

Ievaddati (mozaika.dat)
12 12 12

Ievaddati (mozaika.dat)
25 15 35

Ievaddati (mozaika.dat)
43 49 44

Apakšuzdevumi un to vērtēšana

Nr.	Testu veidot	Punkti
1.0	Uzdevumā tekstā dotie testi	20
2.0	B=F=M=20	15
3.0	B,F,M≤5000	50
4.0	Bez papildus ierobežojumiem	50
	Kopā:	100

What can be the actual reasons?

POSSIBLE REASONS FOR 0'S

- Don't know how to work with text files
- Don't know how to submit solution in the grading system
- Problem understood, but can't solve group of the simpliest test cases generally
- Do not understand the problem statement
- Problem too hard (understand, but don't know how to solve)

Task “Mosaic” (LIO final round, eldest group, day 2)
Author: Rihards Opmanis

For the given number of white, gray and black balls it is necessary to determine whether it is possible to construct triangle pyramid with the same coloured balls in each row using all given balls, and, if yes, which balls must be placed in which rows

FIRST TEST GROUP

Piemērs (atbilst uzdevuma tekstā aprakstītajiem piemēriem)

Ievaddati (mozaika.dat)	Izvaddati(mozaika.rez)
11 5 5	BMMBPB

Ievaddati (mozaika.dat)	Izvaddati(mozaika.rez)
3 0 4	NAV

1.apakšuzdevuma testu ievaddati

Ievaddati (mozaika.dat)
12 12 12

Ievaddati (mozaika.dat)
25 15 35

Ievaddati (mozaika.dat)
43 49 44

Apakšuzdevumi un to vērtēšana

Nr.	Testu apraksts	Punkti
1.	Uzdevuma tekstā dotie testi	2
2.	B×P×M=0	18
3.	B,P,M≤300	30
4.	Bez papildus ierobežojumiem	50
	Kopā:	**100**

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ozaika

Jogā ir B baltas, P poliks un M molnas bumbiņas. Viņa vēlas no tām izveidot trīsstūrveida ozaiku, kura pirmajā līmenī ir B būtiņa, otrajā – divas, N tajā – N bumbiņas, pie kam mozaikas katrā līmenī būtiņās vienas krāsas bumbiņas un visas bumbiņas B būtiņu izmantotas.

Piemēram, ja B=11, P=5 un M=5, tad iespējams izveidot šādu mozaiku:

Savukārt, ja B=5, P=4 un M=5, tad aprakstītajā veidā mozaiku izveidot nav iespējams.

Uzrakstīt programmu, kas izveido tām baltās, poliksun molnas bumbiņu tām paltās jogā ir izveidot pēc iespējas lielāku mozaiku.

ddati

Tekstā fails mozaika.dat vienīgajā līnijā dotas trīs veselu nenegatīvu skaitļu B (B≤2147483647), P (P≤2147483647) un M (M≤2147483647) vērtības. Zināms, ka B+P+M>0. Katru divu blakus esošu skaitļu starpā ir atstarpe.

ddati

Tekstā fails mozaika.rez vienīgajā līnijā jāievada simbolu virkne – mozaikas apraksts. Virknei ir jāsastāv no mozaikas līmeņu skaita L (1≤L≤2147483647) virknes i-tajā simbolam jābūt B, ja i-tajā līmenī ir baltas bumbiņas, M – ja molnas un P – ja poliks. Ja mozaiku izveidot nav iespējams, fails vienīgajā līnijā jāievada vārds NAV. Ja mozaiku iespējams izveidot dažādos veidos, fails ivadā jābūnas vienas darīgas mozaikas apraksts.

māra (atbilst uzdevuma tekstā aprakstītajiem piemēriem)

addati/mozaika.dat	izvaddati/mozaika.rez
11 5 5	BMMBPB

addati/mozaika.dat	izvaddati/mozaika.rez
3 0 4	NAV

pakšuzdevuma testu ievaddati

addati/mozaika.dat
12 12 12

addati/mozaika.dat
25 15 35

addati/mozaika.dat
43 49 44

pšuzdevumi un to vērtēšana

Testu apraksts	Punkti
Uzdevuma tekstā dotie testi	2
B×P×M=0	18
B,P,M≤300	30
Bez papildus ierobežojumiem	50
Kopā:	100

FIRST TEST GROUP – FIRST RESULTS

- No zeroes at the final round
- Several results (2 from 36 in the youngest, 5 from 40 in the eldest group) still got less than “easy” 2×6=12 points

FEEDBACK ISSUES

Apakšuzdevumi un to vērtēšana

Nr.	Testu apraksts	Punkti
1.	Uzdevuma tekstā dotie testi	2
2.	B×P×M=0	18
3.	B,P,M≤300	30
4.	Bez papildus ierobežojumiem	50
	Kopā:	**100**

- Non-overlapping subtasks, each containing one or more test groups
- Results of one group from the each subtask are public during contest

THAT WHICH DOES NOT KILL US MAKES US STRONGER.

Friedrich Nietzsche

!

LIO JURY EXPERIENCE

Through 26 years we got lot of possible troubles during contests:

- Incorrect test case
- Too long grading que
- Irresponsible server,
- …

As well as sued at the Latvian court due to one particular competition grading.

Not funny at all!

After 4 years verdict was “not guilty”!

LIO2013 JURY MISTAKE

- Grader for one task was run with incorrect parameters, instead of the contestant's output providing correct output file
- Any submission which compiles and fits in the time limits was reported to be correct
- Lot of contestants (23 out of 36) got "silly" points
- There is no question "How this could happen?", but "What we can/must do now?"

JURY MISTAKE (CONT.)

Submissions were regraded and in lot of cases instead of 100 points reported before, 0 was given

Real cases that later (theoretically better) submissions were not accepted because of not passing accept tests and earlier submission (last accepted) was taken for final grading

PARTIAL FEEDBACK ISSUES

Contestants stop **testing** and thinking about solution after getting positive response on all public test groups (like passing level in computer games)

… even in cases where incompleteness of the solution is obvious

I'm still speaking about partial feedback!

With full feedback things must be even worse…

FULL FEEDBACK IS COMPLETELY NEW SITUATION AND MAY NEED NEW RULES!

HOW (I)OI CAME TO FEEDBACK?

- At the early OI no feedback at all (self-testing is the only option on serious tasks).
    - Stupid formatting errors
- Some format checker
    - Stupid mistakes like variable “N” instead of “M” (giving 0 points instead of 100).
- Technically became possible with grading systems / accepttests/ partial feedback for easiest tasks / full feedback
    - To give some hint for contestant that he is on the right track. Live scoreboard to attract spectators.

PROMISES

Is the playing (grading/testing/etc.) according the rules is some kind of **promise**?

DEFINITELY

Are the points announced is some kind of **promise**? – i.e. – you will receive at least (exactly, approximately) such amount of points.

YES

Can these points be changed afterwards?

YES / NO

WITH VS WITHOUT FEEDBACK (WE ARE MOVING TOO FAST)?

With full feedback contestant is competing against the particular task set and is not forced to show his BEST but just GOOD ENOUGH result.

“83 point must be enough for me on this task.”

Impossible to estimate precise number of points without FF or strong confidence that your algorithm is perfect.

Partial feedback gave just feeling about total points.

FULL FEEDBACK ISSUES

With immediate feedback jury loses time gap between receiving submission and announcing results.

What is allowed and what is not if something goes wrong?

- Change wrong test case “on the fly”
- Substitute whole test set “on the fly”
- Look into submission code and decide anything according to these investigations
- Try to define “fairness” according to quantitative measures

LIVE (ONLINE) JURY/REFEREE/JUDGE – LOOKING FOR ANALOGIES

If we want to keep (old) scientific approach (i.e. Our aim is perfect program working on all data within given limits), it is very hard (if not impossible) to find such analogy

If we are not so strict, then we can try to find analogies in sports

LIVE (ONLINE) JURY/REFEREE/JUDGE – LOOKING FOR ANALOGIES

Football

Tennis

WHAT WE CAN FIND ABOUT JUDGING ERRORS?

OBSERVATIONS

- There may be described simpliest possible error cases ("**Correctable** errors" in basketball, "Correcting errors" in tennis). Also arithmetical (calculation) errors
- There is no unique approach for all sports
- General rule is that errors must be corrected (or decision must be taken) immediately (it can not be postponed) or as fast as possible .
- Always there is strict deadline after what result can't be changed. Like "signing a protocol" by referee (basketball).
- "… If the error is not noticed until after the awards ceremony, the time to correct errors has passed and the original call stands" (ice-skating)"

IMPORTANT TO ANSWER STRATEGIC QUESTIONS AT IOI LEVEL, BECAUSE RISING SIMILAR QUESTIONS AT NATIONAL CONTESTS IS JUST MATTER OF TIME

THANK YOU!

ANY QUESTIONS?