



# Bridging the gap between Bebras and Olympiad

experiences from the Netherlands



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# Two contests

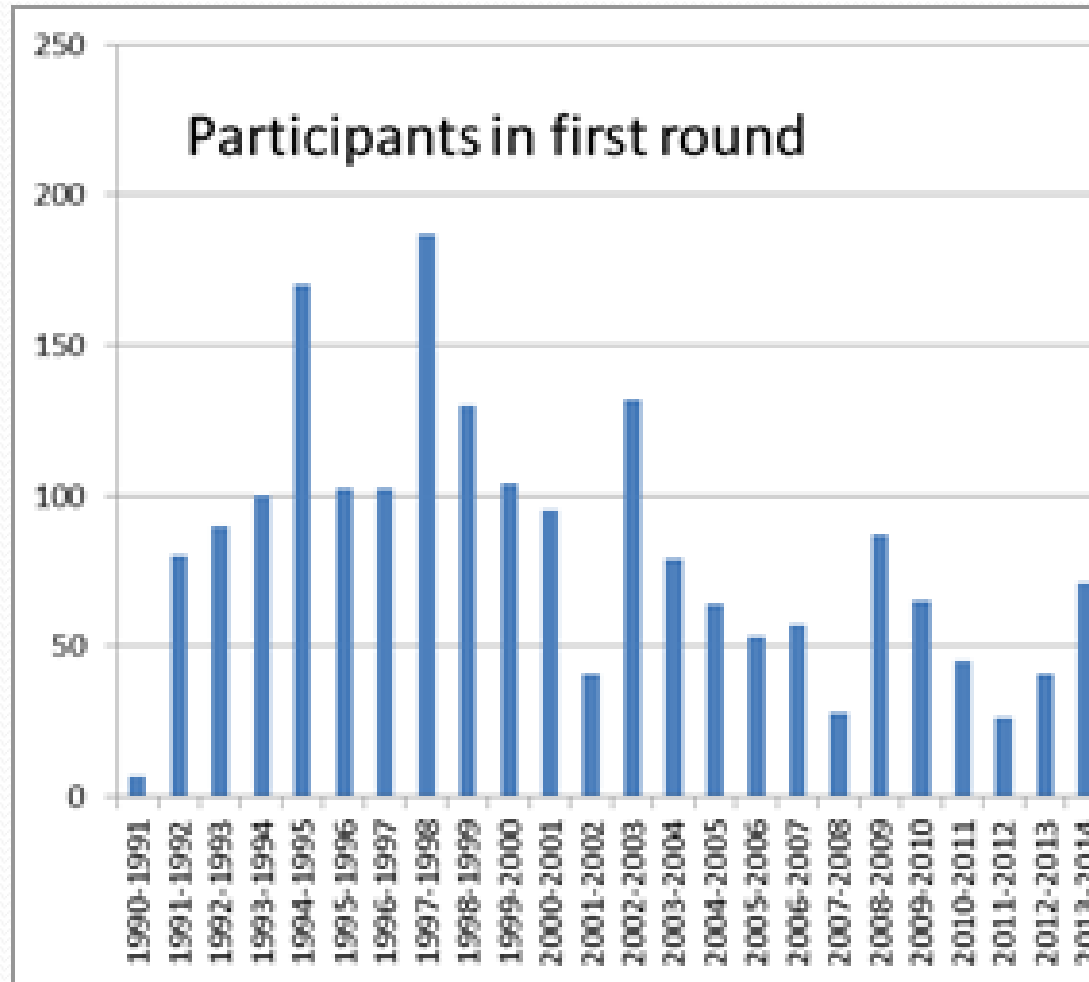
## Olympiad

- Since 1991
- Algorithmic Problems
- Writing Programs
- Three rounds
- Almost no girls
- Certificates
- Access to training and IOI

## Bebras

- Since 2005
- Computational Thinking
- Answering questions
- Two rounds
- Around 40% girls
- Certificates gold-silver-bronze after 2<sup>nd</sup> round

# Participation in the Olympiad



# 2014: New approach

Goal: We want to attract more Bebras-participants in the Olympiad

Actions:



- Introduction course in programming

- Other contest format

- New certification strategy

# Help from Canada:

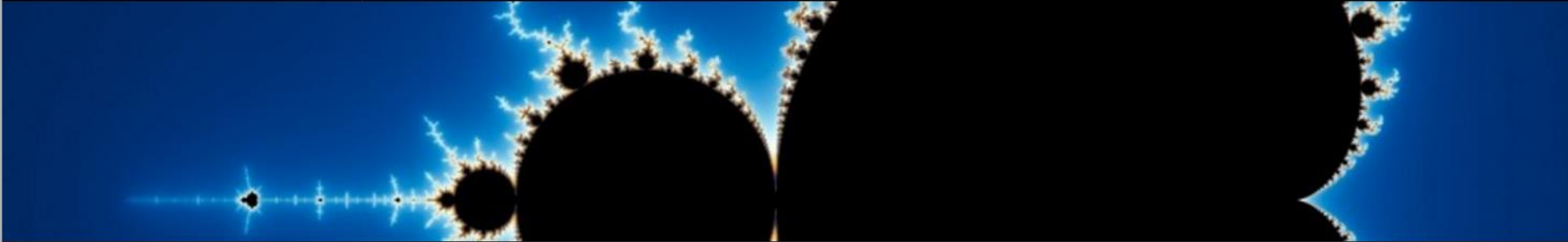
cscircles.cemc.uwaterloo.ca/nl/

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## 0: Hallo!

Ben je hier voor het eerst? Lees dan [de instructies over deze website](#). Je kunt ook [hier klikken om een account aan te maken of in te loggen](#).

# More work in the first round

- We offered three programming tasks in the first round, one about a game.
- Now we give four type of tasks
  - A Simple programming exercises
  - B Bebras-like questions
  - C Traditional programming tasks
  - D Our game exercise

# B-tasks

- Algorithmic task
- Only the answer has to be submitted
- A program can be helpful, but you don't need to use it to solve the problem
- Every contestant get an own problem instance
- The answer has to be given within a week

# An example – Coins, 2015

You are given 11 coins of the following values:

7, 300, 35, 83, 1, 17, 2, 1, 17, 170, 5.

What is the smallest (positive integer) amount of money, that cannot be paid using the coins?

From Kubica and Radoshevski (2010)

11 random numbers, within specific boundaries



# Palindromes - 2015

## Palindromes

*(AIC 2007, Intermediate & Senior)*

Given a sequence of digits, we can change it according to the following rules:

- (i) If three consecutive digits are palindromic (i.e., the first is the same as the third), then all three digits can be removed. For instance, the sequence 163235 can be changed to 165.
- (ii) Any digit except for 9 may be increased by one. For instance, 166725 could be changed to 176725 (thus allowing the 767 in the middle to be removed).

What is the least number of times that rule (ii) must be used in order to remove all the digits from the sequence 294563011 ?

Burton (2015)

We changed it from multiple choice to open integer

# Follow up in the second round

Task Puzzeling Palindromes: Input is one 12 letter-word

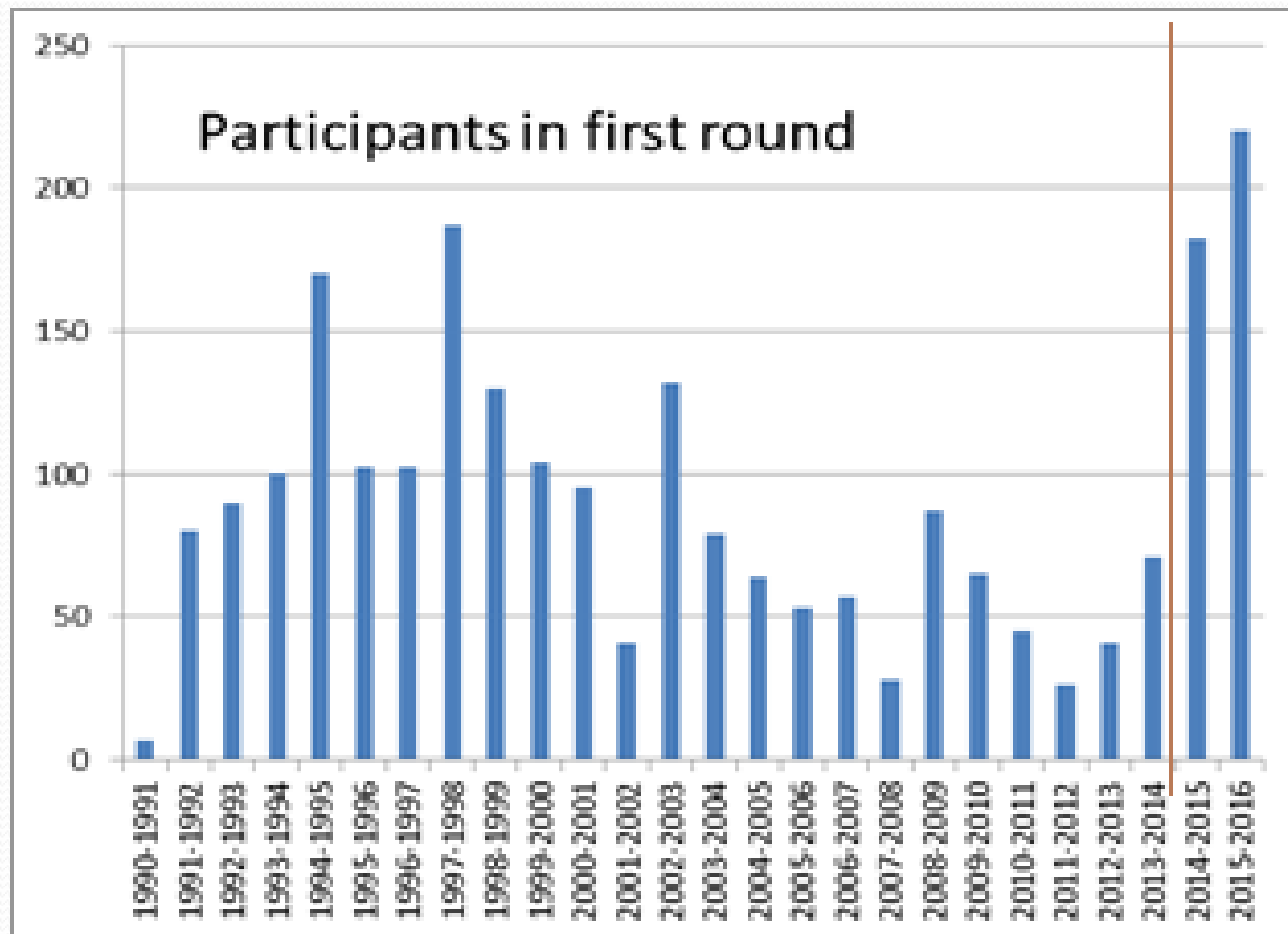
- A: Output the number of different characters
- B: What is the longest palindrome?
- C: Count the palindromes in the input word
- D: Transform the input into one palindrome
- E: Let the word disappear in an optimal way
- F: Create a hard input case (output only)

# Certification system

Task type	Description	Number of tasks	Points per task	Points per group
A	Introductory programming tasks	5	40	200
B	Theoretical, Bebras-like tasks	4	50	200
C	Advanced programming tasks	2	100	200
D	Game programming task	1	100	100

Type of certificate	Total score
Bronze	200-399
Silver	400-599
Gold	600-700

# How did it turn out?



# Some observations

- Even very young Bebras contestants tried the tasks of the Olympiad (one was 11 years old)
- Contestants using Python:

Till 2014	around 18%
Since 2015	around 45%

Due to the introductory course

- The girls returned!

# Overview last two years

Results first round	2014-2015		2015-2016	
	Total	Girls	Total	Girls
Gold	13	0	23	0
Silver	35	0	65	1
Bronze, proceed	54	9	36	9
Bronze, not proceed	9	2	25	6
No certificate	71	12	71	9
Total with score	182	23	220	25
No score	47	12	94	16
Total users	229	35	314	41

# More work to be done

- We need to attract still more contestants
  - By approaching Bebras contestants
  - By reaching teachers (to include some of our tasks in their assessment procedures)
- We will be working on new task types, to be able to meet new developments in computer science education
- We still like to have more girls competing

# Thanks to all of you

- For publishing on contest setups
- For sharing tasks and ideas
- The Olympiad community
  - Journal
  - Conference
  - exchange of experiences



