Bebras Contest
An International Contest on Informatics and Computer Fluency for all Secondary School Pupils

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Aim of Information Technology contest BEBRAS (Beaver)

Problem solving oriented international contest on informatics and computer fluency

- To **motivate** pupils
  - to be interested in informatics topics
  - to solve problems using informatics methods
- To **stimulate** pupils’ interest in informatics and information technology
- To **encourage** pupils to think deeper while using computers and information technologies
International Bebras Contest

IT-contest like Kangaroo in Mathematics  
Adresses all secondary school students  
Is usually performed at school  
Pupils have to solve 18 - 24 problems within 45 - 60 minutes  
Easy, medium and hard problems  
Interactive and multiple choice answers  
Different tasks for several age groups, e.g.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Age Range</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benjamins</td>
<td>10-12 years</td>
<td>5-6</td>
</tr>
<tr>
<td>Cadetts</td>
<td>13-14 years</td>
<td>7-8</td>
</tr>
<tr>
<td>Juniors</td>
<td>15-16 years</td>
<td>9-10</td>
</tr>
<tr>
<td>Seniors</td>
<td>17-19 years</td>
<td>11-13</td>
</tr>
</tbody>
</table>
International Bebras History

Invented 2003 by Valentina Dagiene, Lithuania

Candidate countries: Bulgaria, Egypt, Finland, Israel, Italy

<table>
<thead>
<tr>
<th>Country</th>
<th>Participants 2008</th>
<th>First Bebras contest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lithuania</td>
<td>6616</td>
<td>2004</td>
</tr>
<tr>
<td>Estonia</td>
<td>4039</td>
<td>2005</td>
</tr>
<tr>
<td>Netherlands</td>
<td>5120</td>
<td>2005</td>
</tr>
<tr>
<td>Poland</td>
<td>8725</td>
<td>2005</td>
</tr>
<tr>
<td>Latvia</td>
<td>700</td>
<td>2005</td>
</tr>
<tr>
<td>Germany</td>
<td>53602</td>
<td>2006</td>
</tr>
<tr>
<td>Austria</td>
<td>3910</td>
<td>2007</td>
</tr>
<tr>
<td>Slovakia</td>
<td>9317</td>
<td>2008</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>4069</td>
<td>2008</td>
</tr>
<tr>
<td>Ukraine</td>
<td>1429</td>
<td>2008</td>
</tr>
</tbody>
</table>

2008: nearly 100000 participants
2009: more than 200000 expected
Learning Concepts

• Students may learn concepts by appropriate tasks

• Concepts of
  – Information Comprehension
  – Algorithmic Thinking
  – Modelling
  – Basic Logic
  – Discrete Structures
  – Functionality of Computer Systems
  – Use of Computer Systems
  – etc.
Given is a graph for properly setting a table. Beaver Bob has a job in a restaurant. He has to set the tables. The given graph defines in what way things may be put on each other.

An arrow $A \rightarrow B$ means that a thing of type $B$ may be put on a thing of type $A$. A thing of type $B$ must not be put on a thing of type $A$, if there is no arrow from $A$ to $B$.

Which of the following tables is set correctly according to this picture? 

*Juniors, medium/hard*
Way of length 14

Beaver Ami wants to go home on a fast way. In the drawing you see minutes needed to come from one point to the other.

Can you help her to find the way which takes exactly 14 minutes? Please click on the path that takes exactly 14 minutes!

Benjamin, hard
Traffic Jam

In Beaver Town there are some tracks. Because Beavers don't go backwards there are some parallel tracks to give way. Look at the figure. In each cell can be only one beaver. In which situation a total traffic jam is unavoidable?

Benjamins, medium
Naughty beaver

Beavers are unhappy about the electricity pylons appearing everywhere. Fortunately, they can eat them down. Whenever they eat the pylon down, it goes down with all wires connecting this pylon to the other pylons.

Ben, a well-known naughty beaver, wants to damage the whole network as quickly as possible.

Which of the following networks can be completely destroyed by eating down only two pylons?

Juniors, easy
The compression rate of a video depends on how much two adjacent frames differ.

The *difference* of two adjacent frames $A$ and $B$

$= \quad \text{The number of objects that are in frame } A \text{ and not in frame } B$

$+ \quad \text{The number of objects that are in frame } B \text{ and not in frame } A$

Then the *total difference* is the sum of differences of all adjacent pairs. What is the *total difference* of the frames below?
Beaver has encoded the word BEAVER with the presented key (see at the right):

<table>
<thead>
<tr>
<th>5</th>
<th>B</th>
<th>R</th>
<th>E</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>M</td>
<td>A</td>
<td>O</td>
<td>N</td>
</tr>
<tr>
<td>5</td>
<td>V</td>
<td>T</td>
<td>E</td>
<td>É</td>
</tr>
<tr>
<td>11</td>
<td>L</td>
<td>R</td>
<td>I</td>
<td>S</td>
</tr>
</tbody>
</table>

Use the same key to decode the following:

<table>
<thead>
<tr>
<th>6</th>
<th>M</th>
<th>I</th>
<th>N</th>
<th>I</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>C</td>
<td>N</td>
<td>O</td>
<td>M</td>
</tr>
<tr>
<td>4</td>
<td>I</td>
<td>P</td>
<td>S</td>
<td>W</td>
</tr>
<tr>
<td>2</td>
<td>E</td>
<td>E</td>
<td>U</td>
<td>P</td>
</tr>
<tr>
<td>15</td>
<td>M</td>
<td>I</td>
<td>Z</td>
<td>E</td>
</tr>
<tr>
<td>10</td>
<td>T</td>
<td>E</td>
<td>R</td>
<td>R</td>
</tr>
</tbody>
</table>

○ minister ○ minicomputer ○ minisweeper ○ minimize
Good International Tasks

- Are independent from any school curriculum
- Are independent from any specific software or hardware
- Don’t ask for already learned facts
- Allow problem solving
- Allow learning experiences
- Give satisfaction in solving the task
- Are challenging, thinking is necessary
- Involve Informatics (Computing) concepts
Learning Informatics Concepts in Bebras Contest

Finding a problem solution
by using informatics concepts
by exploring informatics concepts

Learning by doing
Learning by exploring

Even advanced concepts possible
A proper task story can ease a task essentially
Bebras Workshops

International Bebras Committee creating tasks


2008 Torun, Poland
Influence of Bebras Contest

• On teaching informatics (computing)
  – Introduces concepts to pupils
  – Encourages exploring
  – Gives examples of good tasks
  – Stimulates learning a variety of informatics topics

• On curriculum
  – Sets an international standardization

• On teacher training
  – Challenges teachers to deal with new concepts
  – Improves deeper understanding of informatics
Invitation

In future the Bebras Contest could be applied in more countries

We invite countries to join the Bebras Contest

How to join the Bebras Contest?
Participate in task development and in the Bebras workshop!
Bebras International Contest on Informatics and Computer Fluency

Thank you for your attention!

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www.bebras.org