2014

REPORT ON BILGE KUNDUZ INTERNATIONAL INFORMATICS CONTEST: TURKEY PILOT APPLICATION OF 2014

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Having been held in different countries since 2004, Bilge Kunduz International Informatics Contest (Bebras Contest) was organized in Turkey for the first time in 2014. Competition will continue to be held in November each year. Total 57 schools participated in the contest on voluntary basis, with the support of a total of 12 province coordinators, and 1,788 students completed the contest successfully. This report presents the results of the competition and tasks.

TABLE OF CONTENTS

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About Bilge Kunduz International Informatics Contest

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Questions of the Bilge Kunduz International Informatics Contest

Questions of the Bilge Kunduz International Informatics Contest were selected from questions prepared by representatives from more than 30 countries in a workshop. According to the procedure, questions are prepared according to predetermined criteria (Vanicek, 2014). Then, each country selects questions from two separate question pool (compulsory questions and suggested questions), and implements them after translating into the preferred language. Selection process is very important. Questions must be chosen according to sub-domains within the scope of informatics. Dagienė and Futschek (2008) explain the sub-domains as:

Sub-domains	Explanations
INF	Information comprehension, representation (symbolic, numerical, visual), coding, encryption
ALG	Algorithmic thinking including programming aspects
USE	Using computer systems (e.g. search engines, email, spread sheets), general principles but no specific systems
STRUC	Structures, patterns and arrangements, combinatorics, discrete structures (graphs, etc.)
PUZ	Puzzles, logical puzzles, games (e.g. Mastermind, Minesweeper)
SOC	ICT and society, social, ethical, cultural, international, legal issues

Problems should be selected to include all sub-fields. Questions should be interesting for the students, motivate learning, allow students to demonstrate their knowledge and skills.

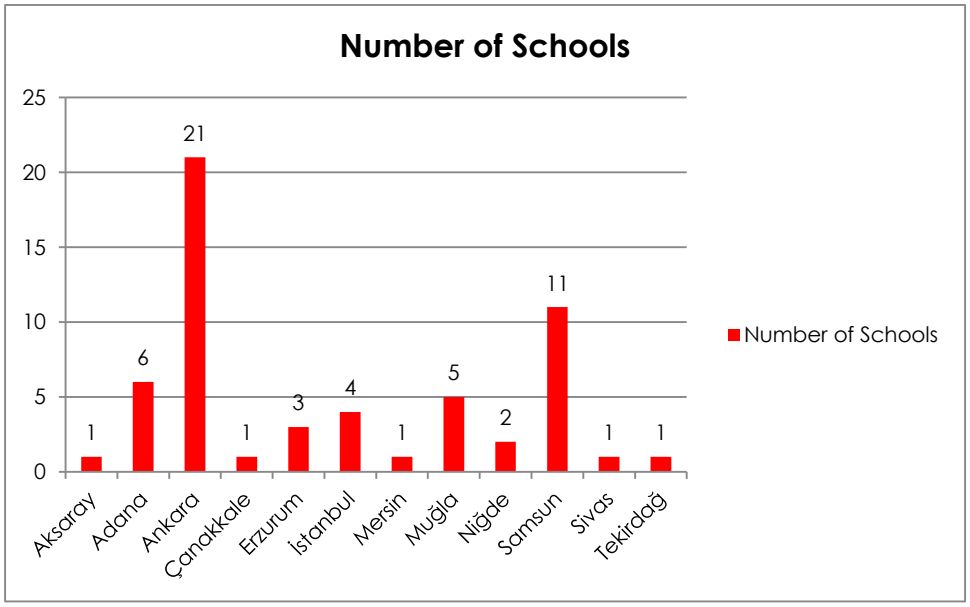
In this context, the contest was carried out by selecting five (5) easy, five (5) medium and five (5) hard questions including various sub-domains from the international pool. Sub-domains of selected questions, and number of questions are given in the table below.

	ALG	INF	STRUC	PUZ	SOC	USE
Easy[1]	3	2	-	-	-	1
Medium[2]	3	2	2	2	-	-
Hard[3]	4	2	1	3	-	-

[1] Non-ordered stars, Phone keyboard, Ice cream, Lost in a City and Assemble the Fish
[2] Abacus, Truchet, Family Tree, Broken Clock and Stairs Robot Snake
[3] Cutting down trees, Bridges¸ Price of a gift, Truth and Bagels

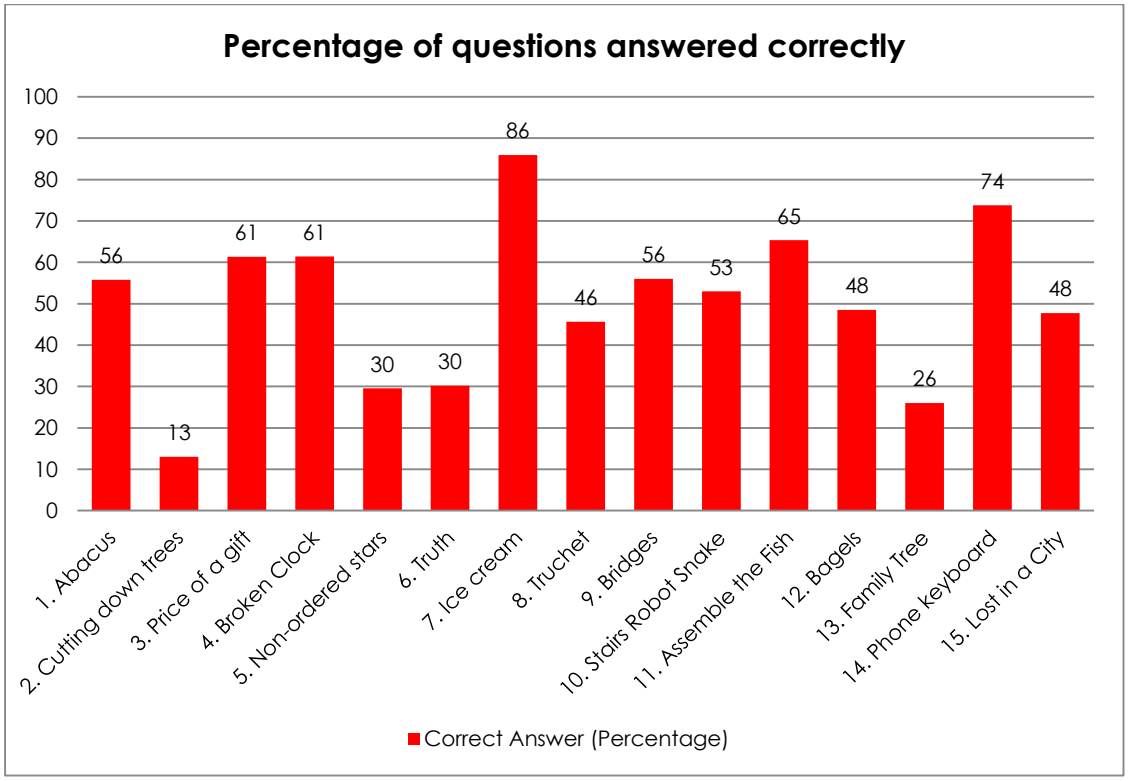
Participants

Bilge Kunduz International Informatics Contest was carried out in the pilot cities of Ankara, Izmir, Erzurum, Samsun, Adana, Muğla, Istanbul and Çanakkale in the 3rd week of December 2014. Total 57 schools participated in the contest, 31 of which (54.39%) were public and 26 (45.61%) were private schools. In addition to the pilot cities, Aksaray, Niğde, Tekirdağ and Sivas have participated in the contest. Distribution of schools as of cities is shown in graph below.

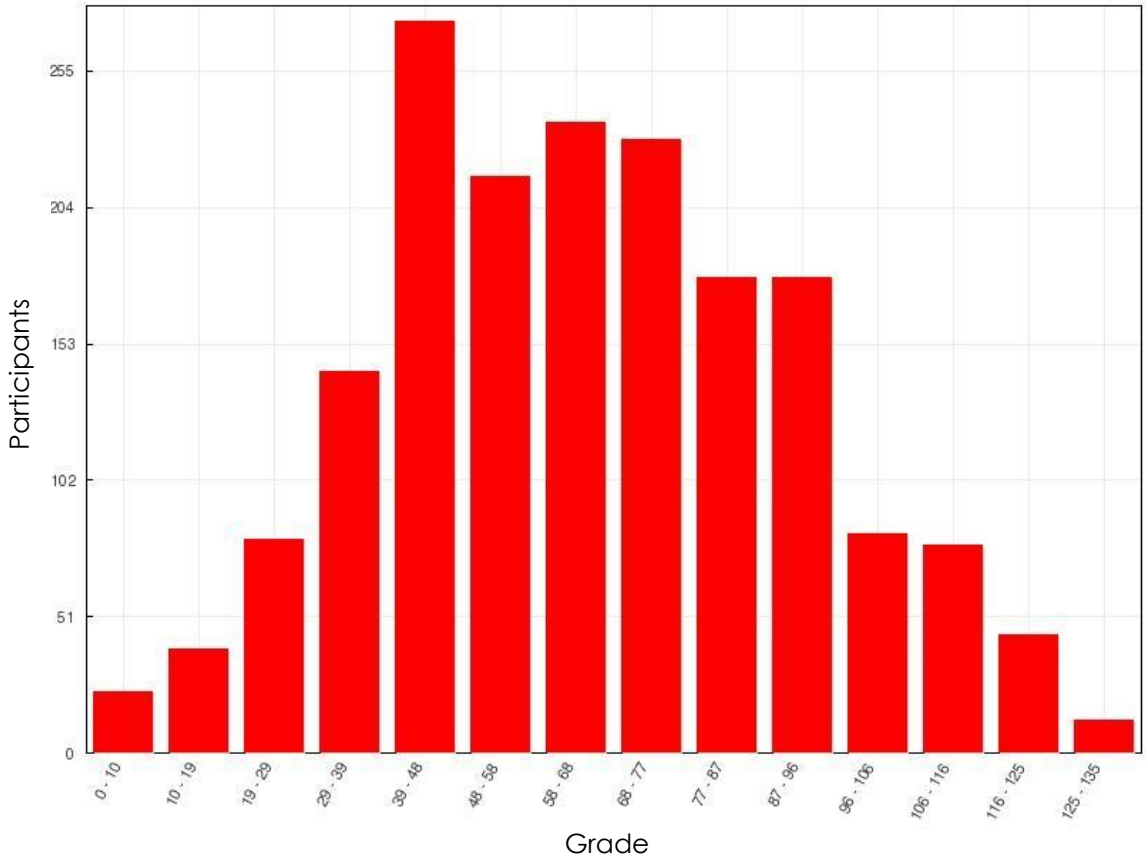


Overall Success

The overall success chart of 1,788 fifth and sixth grade students participated in the contest (see chart below). The scores varied between 0 and 129. Average was 65.01 and standard deviation was found to be 26.05. No students did all questions true. Period students remained in the contest ranged from 2 to 45 minutes. Responses are given in below graph as percentages.

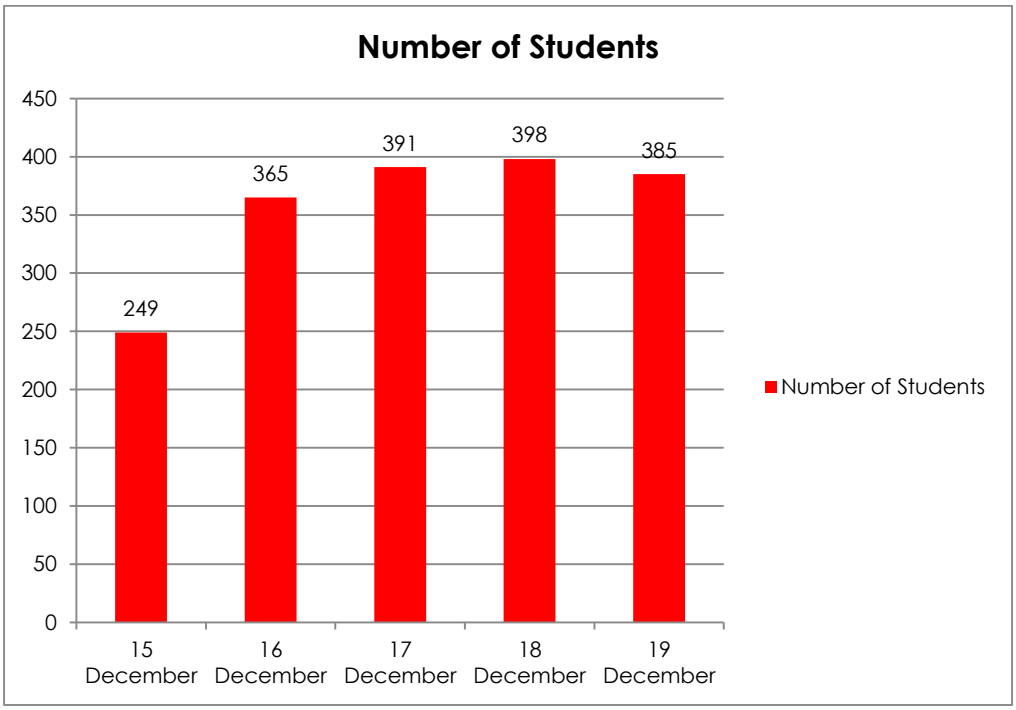


The overall success of students (the highest grade being 135) are shown in below graph.



Number of students participating in the competition on different days

Below graph gives the number of students participated in the competition on different days.



Success ratio according to the degree of difficulty of questions

Success ratio as of the degree of difficulty of questions is shown in below graph.

Easy	**60,50%**
Medium	**48,38%**
Hard	**41,81%**

As expected, students' success also decreases as questions get difficult.

Success ratio according to the sub-fields

Success ratio according to the sub-fields is shown in the graph below.

Sub-field	Number of questions	Average score
ALG	**10**	**40,88**
INF	**6**	**27,74**
PUZ	**5**	**19,89**
STRUC	**3**	**13,17**
USE	**1**	**3,93**

As seen, the sub-field where students are the most successful is algorithmic thinking. Appropriate ways and methods will continue to be investigated to improve other sub-fields.

Item analysis

Detailed analysis of the each questions is as follows.

	Facility Index	Std. Dev	Random guess score	Intended weight	Effective weight	Discrimination index	Discriminative efficiency
1. Abacus	55.80%	49.68%	25.00%	7%	7.96%	37.04%	46.24%
2. Cutting down trees	13.21%	33.87%	25.00%	9%	3.63%	-3.95%	-5.90%
3. Price of a gift	61.30%	48.72%	25.00%	9%	8.58%	25.20%	32.09%
4. Broken Clock	61.63%	48.64%	25.00%	7%	7.66%	34.13%	43.55%
5. Non-ordered stars	29.71%	45.71%	25.00%	4%	4.87%	21.37%	27.04%
6. Truth	30.15%	45.90%	25.00%	9%	8.80%	32.67%	41.86%
7. Ice cream	86.01%	34.70%	25.00%	4%	4.56%	28.98%	49.19%
8. Truchet	45.64%	49.82%	25.00%	7%	7.74%	33.56%	41.20%
9. Bridges	55.80%	49.68%	25.00%	9%	9.53%	36.09%	45.03%
10. Stairs Robot Snake	52.92%	49.93%	25.00%	7%	7.88%	35.40%	43.81%
11. Assemble the Fish	65.41%	47.58%	25.00%	4%	5.10%	22.77%	29.52%
12. Bagels	48.53%	49.99%	25.00%	9%	7.74%	13.91%	16.86%
13. Family Tree	25.99%	43.87%	25.00%	7%	4.49%	3.33%	4.25%
14. Phone keyboard	73.96%	43.90%	25.00%	4%	5.71%	36.18%	50.55%
15. Lost in a City	47.75%	49.96%	25.00%	4%	5.78%	30.16%	36.83%

Conclusion

The purpose of this report is to examine the student performance of the Bilge Kunduz International Informatics Contest held on 15-19 December 2014. Based on the student performance and overall success graphs, it can be said that the average value is normal. Considering that this is the first time that students have participated in such a contest, success level can be considered good. As questions get difficult, students' success decreases. Results can be regarded as normal because of the quality and difficulty of the questions as well as requirements of algorithmic skills to solve. Detailed item analysis shows that "Family Tree", "Cutting down trees" and "Bagels" questions have particularly low discrimination index. This means that high-performing students would not select the correct answer for each question more often than the low-performing students. These items should be revised and statements should be examined.

References

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