



All Ireland Linguistics Olympiad  
*The Problem Solvers' Challenge*

**Sample Set Three - November 2018**

**Teacher / Student Guide**

This pack includes:

- Introductory logic and language puzzles.
- Problem-solving career profile from a Senior Program Manager, Microsoft Ireland.
- Last year's samples, workshops and competition papers: <https://ailo.adaptcentre.ie/sample-puzzles/2018-2/>
- Free nationwide workshops: <https://ailo.adaptcentre.ie/enter/workshops-20189/>
- This year's Nov/Dec 2018 workshop materials are now online: <https://ailo.adaptcentre.ie/sample-puzzles/>

**Puzzle Guide**

The Georgian Café

- Thanks to the Babette Newsome and the UKLO.
- Ask students to write down any observations / rules they see about the new language.

Visible Speech

- Thanks to the Daniel Harbour and the UKLO.
- Ask students to write down any observations / rules they see about the new language.

Students should attempt AILO February 2017 Preliminary / Round One if they have not done it:

- <https://ailo.adaptcentre.ie/sample-puzzles/2017-2/>
- **Ask students to write down any observations / rules they see about the new languages in the problems as we are introducing this in the preliminary round.**

**Career Profile**

- Dr Declan Groves, Senior Program Manager, Microsoft Ireland.

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(Author: Babette Newsome)

## Drinking ყავა in a Georgian Café

Georgian is a language, unrelated to English, spoken by just over 4 million people, mostly in Georgia, but also in Ukraine, Russia, Turkey and Azerbaijan. It is written in the beautiful Mkhedruli alphabet which is recognised in UNESCO's List of the Intangible Cultural Heritage of Humanity.

Can you match the Georgian words and phrases to their English translations and then write **sugar spoon** in Georgian?

1. ჩაი	a. coffee
2. შაქარი	b. sugar
3. საშაქრე	c. tea cup
4. საყავე	d. spoon
5. ყავა	e. coffee-pot
6. კოვზი	f. tea
7. ჩაის ჭიქა	g. sugar-pot

The British Academy cosponsors the UK Linguistics Olympiad, a competition for schools. Information and the problem solution at:

<http://www.uklo.org/problems>

## Drinking ყაყა in a Georgian Café – Solutions

located at <http://www.uklo.org/problems>.

### Answers:

1	f
2	b
3	e
4	g
5	a
6	d
7	c

'tea spoon' = ჩაის კოვზი

### How to solve it

- #7 is the only Georgian example with two words, and 'tea cup' is the only two-word English form, so they probably match. Notice the careful use of hyphens in 'sugar-pot' and 'coffee-pot'!
- If #7 means 'tea cup', then it must contain the word for 'tea'. That must be #1, in spite of the extra letter in #7.
- #3 contains #2, and #4 contains #5; moreover in both #3 and #4 the extra letters are the same. So we can assume that these pairs are related. In the English we also find two related pairs: 'sugar'~'sugar-pot' and 'coffee'~'coffee-pot', so we can assume that these translate the Georgian pairs, with 'pot' translated by the extra letters. But which pair is which?
- Now look at the title of the problem, containing a Georgian word for something you can drink. This must be 'coffee', not 'sugar'. So #5 must be 'coffee', and the rest follows.
- The remaining word is #6, which must be 'spoon'. This is crucial for solving the bonus question, but you also have to build on the example of 'tea cup', where the word for 'tea' has an extra letter.

## Background details

Georgian is not related to the Indo-European group of languages (to which the vast majority of languages in Europe belong thanks to a common ancestor), but belongs to the Kartvelian group of languages. It is part of the South-Caucasian languages sub-group of Georgian-Zan (also Karto-Zan) and is, as far as most linguists are concerned, unrelated to the nearby North-Caucasian languages.

The Georgian alphabet has 33 letters (it used to have 38) because it avoids 'di-graphs' such as the English <sh> combination representing a single sound (represented in the International Phonetic Alphabet as ʃ).

The script may be familiar to science fiction fans, however. Recently, the BBC adapted China Miéville's novel *The City and the City*, and language consultant Alison Long from Keele University gave the characters from the fictional city of Ul Qoma the Georgian script for their language, Illitan. Illitan was invented initially by Miéville as part of the novel, but then developed by Long for the TV series. Long decided to use the Georgian alphabet because it looked so different from English and would convey an alien setting for the story.

You may recognise some of the Georgian words when given in Roman alphabet as they are loanwords (just as English borrowed "tea" and "coffee", so did Georgian).

	<b>Georgian</b>	<b>Transliteration in Roman alphabet</b>	<b>English Translation</b>
1	ჩაი	chai	tea
2	შაქარი	shakari	sugar
3	საშაქრე	sashakre ('pot' = sa...e)	sugar-pot
4	საყავე	saq'ave ('pot' = sa...e)	coffee-pot
5	ყავა	q'ava [q' is a k-sound produced deep in the throat]	coffee
6	კოვზი	k'ovzi	spoon
7	ჩაის ჭიკვა	chais ch'ika (notice -s on 'tea' linking it to 'cup'. This is your clue for 'sugar spoon'.)	tea cup



## Solution

Located at <http://www.uklo.org/problems>.

Alexander Melvil Bell (in the International Phonetic Alphabet: /æləkzandə məlvɪl bɛl/).

## How to solve the problem

One challenge in both constructing and solving this problem is that Bell's name has slightly different pronunciations in different English accents – for instance, in some accents the final <r> of <Alexander> is pronounced, while in others it is not. However, these differences are small, so the Received Pronunciation assumed here shouldn't cause many difficulties.

1. To read the name, you need vowels /æ ɛ a ə ɪ/ and consonants /l z n d m v b k/.
2. Of these, /v m d a ə ɪ/ are found directly in the text.
3. In addition, the text includes /ʃ ž i p t ŋ g e/, which are not in the name.
4. Using 2 and 3, the following “deductions” are possible:
  - from nasals /m ŋ/ deduce nasal /n/
  - from labial and alveolar /m n d/ deduce labial /b/
  - from labial, alveolar and velar /p t ŋ g/ deduce velar /k/
  - from sibilant /ʃ ž s/ deduce sibilant /z/
  - from high front vowels /ɪ e/ deduce mid front vowel /ɛ/
  - from high/mid front vowels /i ɪ ɛ/ deduce low front vowel /æ/

## Background details

(From Wikipedia: Visible speech)

**Visible Speech** is a system of phonetic symbols developed by [Alexander Melville Bell](#) in 1867 to represent the position of the speech organs in articulating sounds. Bell was known internationally as a teacher of speech and proper [elocution](#) and an author of books on the subject. The system is composed of symbols that show the position and movement of the throat, tongue, and lips as they produce the sounds of language, and it is a type of [phonetic notation](#). The system was used to aid the deaf in learning to speak.

In 1864 Melville promoted his first works on Visible Speech, in order to help the deaf both learn and improve upon their speech (since the profoundly deaf could not hear their own pronunciation).<sup>[1]</sup> To help promote the language, Bell created two written short forms using his system of 29 modifiers and tones, 52 [consonants](#), 36 [vowels](#) and a dozen [diphthongs](#).<sup>[2]</sup> They were named [World English](#), which was similar to the [International Phonetic Alphabet](#), and also Line Writing, used as a shorthand form for [stenographers](#).<sup>[3]</sup>

Melville's works on Visible Speech became highly notable, and were described by [Édouard Séguin](#) as being "...a greater invention than [the telephone](#) by his son, [Alexander Graham Bell](#)".<sup>[3]</sup> Melville saw numerous applications for his invention, including its worldwide use as a [universal language](#). However, although heavily promoted at the [Second International Congress on Education of the Deaf](#) in Milan, Italy in 1880, after a period of a dozen years or so in which it was applied to the education of the deaf, Visible Speech was found to be more cumbersome, and thus a hindrance, to the teaching of speech to the deaf, compared to other methods,<sup>[4]</sup> and eventually faded from use.

Bell's son [Alexander Graham Bell](#) learned the symbols, assisted his father in giving public demonstrations of the system and mastered it to the point that he later improved upon his father's work. Eventually, Alexander Graham Bell became a powerful advocate of visible speech and [oralism](#) in the United States. The money he earned from his patent of the [telephone](#) and the sale of his [Volta Laboratory patents](#) helped him to pursue this mission.

## Career Profile

	<p><b>Name:</b> Dr Declan Groves</p> <p><b>Job title:</b> Senior Program Manager, Language Technology</p> <p><b>Employer:</b> Microsoft</p> <p><b>Industry:</b> Software Localization / Language Technology</p>
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### Education and Work Experience

#### Undergraduate and Career

BSc. in Applied Computational Linguistics from DCU (2003)

PhD in Machine Translation funded via an Irish Research Council (IRCSET) Postgrad Fellowship Award (2007)

Commercial Development Researcher & Research Integration Officer at CNGL (ADAPT) (2011-2013)

Joined Microsoft as a Linguistic Engineer (2013) in Xbox; joined Office International Engineering in 2016 as a Program Manager.

#### Work at CNGL / ADAPT

In CNGL, and then ADAPT, my primary duties were the management of a number of different EU research projects concerning Machine Translation and Language Technologies and also managing and implementing industrial and commercial projects (including projects jointly-funded by Science Foundation Ireland and Enterprise Ireland). This position focused on all aspects of both research and resource management - managing the local team of researchers, team recruitment & interviewing, budget/financial management, working with commercial and research partners, and leading the composition and submission of funding applications.

### Current Role

#### Main Tasks and Responsibilities

The group I work with are responsibly for localizing all of Office's products and services into over 100 languages around the globe. My work is focused on looking at language technology and how it can help us produce high quality localized products for our international Office customers in a smart and efficient way, which includes the application of artificial intelligence

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## Career Profile

and machine learning. This means I need good listening and problem-solving skills, as well as engineering skills to work with a larger team of software developers to design and develop solutions and tools that will scale to the large number of languages we work with daily.

### **How important is problem solving in your role?**

Problem solving is essential to my role. Every day there are new and interesting problems to solve and challenges to overcome. I need to be able to think about problems broadly and think of smarter ways to solve them.

### **What kinds of problems do you need to solve in your job on a day-to-day basis?**

Typical problems I have to solve involve things like how can we make automated translation work better for all languages, how can we take a tool that was written to process and categorize English text work as well for Spanish, Russian or Japanese; or how can we respond better to the feedback our international customers provide us with on the quality of our products and services.

### **What is your favourite thing about your work?**

The favourite thing about my work is that I am able to learn from cutting-edge research and apply it to real-world problems. I also love working with a large team of diverse people, from different backgrounds and different experiences. Microsoft has a real commitment to diversity and inclusion and it is something that I am particularly passionate about; it is a company where you really can come as you are and do what you love.

## About me

### **What kind of puzzles/problems do you enjoy?**

My favourite puzzles are brain teasers, algebra problems and dingbats. I remember even at primary school my teachers always commented that I seemed to enjoy problem solving, without realising a lot of those basic math problems were rooted in algebra!

### **What school subjects influenced your career path?**

As my career lies on the border between computer science and linguistics, both mathematics and languages (I studied French in school) were the biggest influence on my career path. I remember loving both equally in school, in particular the problem-solving aspects of maths and also learning how cultural aspects influence how we communicate, so I was happy to be able to choose a career path that involved combining both language and technology.

### **Who inspired you?**

Initially I would have to say my parents – they always put a huge importance on learning and education growing up and were always supportive of anything my siblings or I wanted to do career-wise. Noam Chomsky would be another big inspiration to me – he is a great example of someone with a growth mindset and has contributed so many great ideas to the areas of language, linguistics and cognitive science, amongst many others.

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## Career Profile

### Work/life balance

Work/life balance is something I have to make a continual conscious effort to maintain, and it becomes more important and more challenging the further my career has progressed. Luckily, Microsoft has an excellent attitude towards this and provide great flexibility in work. Part of the challenge for me is learning how to manage my time and how to make realistic timelines for delivering completed projects. It's easy to get sucked into an interesting problem and forget that it is important to also make time for the things that really matter, including friends and family.

### Your top tips?

I think they would need to have excellent problem-solving skills and the ability to approach problems with an objective, scientific and practical point of view. Research and experimental design skills are important for the ability to have a structured and planned approach to your work. The need for good presentation and writing skills should not be neglected as there's no point in doing really interesting work if you can't communicate it effectively to your colleagues. In terms of education, a background in computer science and knowledge of machine learning would be essential, as well as a good understanding of challenges in natural language processing, particularly for languages other than English.

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