

National Language Competition (NLC)

Sample Challenge 1

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National
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Competition

Set-Up

The NLC sample challenge is a printable document (*NLC Sample Challenge 1*) which can be printed out, included in newsletters/blog posts, or posted on social media.

Depending on ability, the challenge can take anywhere between 5 and 30 minutes. The idea is that you can get them working in teams to try and complete the puzzle and get a sense for the kind of things the NLC will involve.

If you have any questions about the NLC Sample Challenge or about the NLC itself, then please feel free to contact the NLC mailbox (nlc@gchq.gov.uk) and we'd be happy to answer any queries and provide help in whatever way we can.

Accessible Alternative

Below is a text-only summary of all the information included in the NLC Sample Challenge 1 file where the made-up script has been converted to letters in the English alphabet for students who may require a text-based machine-readable alternative.

We've obtained a list of directions which are written in an unknown foreign script:

- sno x tce zl gal xst
- sno x tce lz gal xsx
- sno x tce zl gal xs
- sno x tce zl gal u
- sno i tce ri dee gal f

The directions correspond to the following route:

- turn right onto 13th Avenue
- turn left onto 11th Avenue
- turn right onto 10th Avenue
- turn right onto 9th Avenue
- on the roundabout take the 2nd exit onto 7th Avenue

Can you use the directions and corresponding translation to help translate the following unknown numerical code?

f xsx isi

If there is any other way that we can make this challenge pack more accessible for specific students, please reach out to us on the NLC mailbox (nlc@gchq.gov.uk).

Solution

To help direct students if they are struggling, we have included here a detailed walkthrough of how to complete the puzzle. Please use these resources to encourage students or point them in the right direction if they are stuck.

To solve this challenge, you'll need to focus on the numbers which is hinted to you since you are told that the characters to translate are actually a numerical code. You should start by

looking at the map and at the 5 lines of text which are described as directions for the route shown on the map. If you look at the route on the map, you'll notice that there are 5 distinct instructions that would be given to follow the orange line to 7th Avenue.

Now we assume from this that each line of text corresponds to one instruction. You can then notice that the 3rd and 4th lines look almost identical except the last characters.

(sno x tce zl gal xs)
(sno x tce zl gal u)

If you inspect the map, you'll see that the 3rd and 4th instruction correspond to 'turning right onto 10th Avenue' and 'turning right onto 9th Avenue', hence the differing characters correspond to the numbers 9 and 10.

9 = " (u)
10 = x2 (xs)

Using this logic and comparing all lines 1 to 4, you could then figure out the numbers 9, 10, 11 and 13. Note that although line 2 looks slightly different in the middle to the other lines, the direction is also different as it refers to a left turn rather than a right turn. We can still deduce which characters refer to the number 11 by following the sentence structure pattern where the numbered avenue comes at the end.

9 = " (u)
10 = x2 (xs)
11 = x2x (xsx)
13 = x2t (xst)

Hence, we now know that the middle characters in the numerical code translate to the number 11.

11 = x2x (xsx)

(f xsx isi)

The next step is to look at the last line.

(sno i tce ri dee gal f)

Unlike the others, this instruction corresponds to 'taking the 2nd exit on the roundabout onto 7th Avenue'. Comparing to the other lines, we can assume the latter end of this line (the 5th line) is the 'onto 7th Avenue' part of the sentence since it looks similar to the other lines. Note that this means the former part of the sentence must translate to 'take the 2nd exit on the roundabout'.

If we know the latter part of the 5th sentence is 'onto 7th Avenue', we can apply our assumption of sentence structure to assume that the last character must be the number 7.



(sno i tce ri dee gal f)


7 =  (f)

Now we have translated another section of the numerical code.


(f xsx isi)

Finally, this leaves us with the last characters of the numerical code to translate. First, notice that the upside down 'y'-looking character ('i' in the text-based alternative) is in the first section of the 5th line.


(f xsx isi)


(sno i tce ri dee gal f)

As we know the numerical code contains only number, upside down 'y'-looking character ('i' in the text-based alternative) must be a number. We also established earlier that the first section of the 5th line corresponds to 'take the 2nd exit on the roundabout', so we conclude that this upside down 'y'-looking character ('i' in the text-based alternative) must be a 2.

2 =  (i)

So, what does the following group of characters correspond to?


(isi)

If we look at the numbers 10, 11 and 13 which we worked out previously,

10 =  (xs)

$$11 = \text{xrx} \quad (\text{xsx})$$

$$13 = \text{xrt} \quad (\text{xst})$$

we can notice a pattern between the number. So, we can assume that the numbering system is written in the form:

$$- 10 = 1 \text{ and } 10 = \text{xs} \quad (\text{xs})$$

$$- 11 = 1 \text{ and } 10 \text{ and } 1 = \text{xrx} \quad (\text{xsx})$$

$$- 13 = 1 \text{ and } 10 \text{ and } 3 = \text{xrt} \quad (\text{xst})$$

So, the group of characters we want to translate must correspond to 2 and 10 and 2 i.e. 22.

$$22 = 2 \text{ and } 10 \text{ and } 2 = \text{isi} \quad (\text{isi})$$



(f xsx isi)

Thus, all together we have that the numerical code is:

7 11 22

Note that this was the date of the first iteration of GCHQ's National Language Competition.

Vocabulary Index

See below a list of essential vocabulary used in this challenge with its corresponding translation (note that it is only necessary to translate the numbers in this challenge):

$$- 2 = \text{i} \quad (\text{i})$$

$$- 7 = \text{f} \quad (\text{f})$$

$$- 9 = \text{u} \quad (\text{u})$$

$$- 10 = \text{xs} \quad (\text{xs})$$

$$- 11 = \text{xrx} \quad (\text{xsx})$$

$$- 13 = \text{xrt} \quad (\text{xst})$$

$$- 22 = \text{isi} \quad (\text{isi})$$