JSONTalk user study

Survey Flow:

We made use of Qualtrics BlockRandomizer function to automatically and evenly allocate participants to the A or B group.

BlockRandomizer: 1 - Evenly Present Elements

Group: With tool

Standard: Introduction (2 Questions)
Block: JSON recap (1 Question)
Standard: Tool briefing (2 Questions)
Standard: JSON Transcript 1 (8 Questions)
Standard: JSON Transcript 2 (6 Questions)
Standard: JSON Transcript 3 (8 Questions)
Standard: Tool feedback (1 Question)
Standard: Thank you for your help! (2 Questions)

Group: Without tool

Standard: A: Introduction (2 Questions)
Standard: B: JSON recap (1 Question)
Standard: C: JSON Transcript 1 (5 Questions)
Standard: D: JSON Transcript 2 (4 Questions)
Standard: A: JSON Transcript 3 (5 Questions)
Standard: Thank you for your help! B (2 Questions)

Page Break ————————————————————————

JSONTalk User Study

The aim of this user study is to investigate the effectiveness of JSONTalk. JSONTalk is a command-line tool that has been developed to generate natural language descriptions of JSON files. The primary use case of this tool will be to assist visually impaired programmers to quicker determine the structure and contents of a JSON file. The participants for the study have been split into two groups. One group is answering the following questions with the help of the JSONTalk tool, the other group is answering the questions without the tool. You are part of the group that will be answering the following questions *with* the JSONTalk tool.

Note: Please complete this evaluation on a laptop or PC that has Java installed on it. You will be required to download and run a jar file. If you have any issues with this please contact me, and if you don't want to install or download anything you can arrange to do the evaluation on my laptop. The UofG Boyd Orr lab machines will also work if you do not have java installed.
If you do not have Java installed on your machine the following links may assist you in doing so.
Java installation instructions:
Windows installation instructions
Mac installation instructions
Linux installation instructions
This evaluation will last roughly *15 minutes*, and will consist of the following:

1.   You will read through a quick **recap on JSON syntax and semantics.**

2.   You will **download the JSONTalk tool** (jar file) and read how to use the tool.

3.   You will be given several **screen reader transcripts** of JSON file descriptions and **asked a few questions** about them. You will then use the tool to assist you in answering the questions. *Please remember that it is the system, not you, that is being evaluated.*

4.   You will answer a series of **multiple choice questions** about the tool you just used.

You should fill in this form with your answers, which will be stored securely and anonymously on my laptop. Feel free to ask me any questions throughout the experiment. You are free to withdraw at any point during the experiment.

If you have any questions following the experiment, contact me at **2463548h@student.gla.ac.uk.**

Do you consent to take part in this user study and have your answers stored anonymously?

○ Yes (1)

JSON Recap

JSON (JavaScript Object Notation) is a text-based, lightweight data interchange format used to store and exchange data. It is based on a subset of the JavaScript programming language and is easy for humans to read and write and for machines to parse and generate.

Syntax:
- Data is represented in key-value pairs, in the form <key>:<value>.
- Objects are an unordered collection of key-value pairs, separated by commas and enclosed within curly braces {}.
- Keys are strings, enclosed in double quotes "".
- Values can be a string, number, object, array, Boolean, or null.
- Strings are enclosed in double quotes "", while numbers don't have quotes.

Semantics:
- An object is an unordered set of key-value pairs.
- An array is an ordered collection of values, enclosed in square brackets [].
- A value can be a string, number, object, array, Boolean, or null.
- Strings are sequences of Unicode characters.
- Numbers can be integers or floating-point values.
- Booleans have only two values: true and false.
- The null value represents a deliberate non-value.

Here's an example JSON object:
```
{
    "name": "John Doe",
    "age": 32,
    "isStudent": false,
    "courses": [
        "math",
        "history",
        "english"
      ],
    "address": {
        "street": "123 Main St",
        "city": "Anytown",
        "state": "XX"
    }
}
```

JSONTalk tool briefing

To complete this study, **you are required to download and execute a jar file** on your command line.
Please download the linked zip folder and extract it.
The folder contains 3 json files and a jar file. *I kindly ask you to not look directly at the JSON files included in the folder as this study will be exploring how the tool can help users understand screenreader representations of JSON files.*
You will be asked questions about 3 different JSON file screenreader transcripts, the name of the file corresponds to the transcript task. When completing tasks for transcript 1, the JSON file used is a.json, transcript 2 corresponds to b.json etc.

Visit the following link to download the required files (to avoid leaving the survey, right click and open the link in a new tab): Link to download required files
 Copy and paste the following into your browser if the above link does not work:
 https://drive.google.com/file/d/1rjRs0WTPAMoXtgELdLLxNGpgrNDMJefe/view?usp=sharing

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JSONTalk is a command line tool that takes an input JSON file and generate various different natural language descriptions of the file.
 Usage: java -jar jsontalk.jar [-fhlrV] [-oa] [-tl] [-d=] [-o=] filename

 Usage Example:
Suppose I had extracted the folder to my downloads folder, and I want to generate a full description and top level description of the a.json file.
 1. cd into the "files for evaluation" directory
 2. run the following command
java -jar jsontalk.jar -f -tl "C:\Users\User\Downloads\lFiles for evaluation\a.json"
 Note that for the filename, enclose the <u>absolute file path</u> in quotation marks.

 The options are shown below:
<We were unable to export this to the dissertation but a screenshot of the command line tool help message was pasted here>

The following questions make use of three different transcripts, these transcripts are what a user would hear if they were to use a screen reader with a JSON file. The first two transcripts will be presented as text and the third as audio.
- **For each transcript, there is a corresponding JSON file included in the folder you downloaded. Transcript A corresponds with a.json etc.**
- **Before you answer questions about each transcript, run the JSONTalk tool on the command line with the corresponding file. This will help you answer the questions.**

Transcript A:

"Object, name: 'store', brace open. Object, name: 'store', brace open. Property: 'book', value: Array, bracket open. Object, brace open. Property: 'category', value: 'reference', comma. Property: 'author', value: 'Nigel Rees', comma. Property: 'title', value: 'Sayings of the Century', comma. Property: 'price', value: 8.95, brace close, comma. Object, brace open. Property: 'category', value: 'fiction', comma. Property: 'author', value: 'Evelyn Waugh', comma. Property: 'title', value: 'Sword of Honour', comma. Property: 'price', value: 12.99, brace close, comma. Object, brace open. Property: 'category', value: 'fiction', comma. Property: 'author', value: 'Herman Melville', comma. Property: 'title', value: 'Moby Dick', comma. Property: 'isbn', value: '0-553-21311-3', comma. Property: 'price', value: 8.99, brace close, comma. Object, brace open. Property: 'category', value: 'fiction', comma. Property: 'author', value: 'J. R. R. Tolkien', comma. Property: 'title', value: 'The Lord of the Rings', comma. Property: 'isbn', value: '0-395-19395-8', comma. Property: 'price', value: 22.99, brace close, bracket close, comma. Property: 'bicycle', value: Object, brace open. Property: 'color', value: 'red', comma. Property: 'price', value: 19.95, brace close, brace close, comma. Property: 'expensive', value: 10, brace close."

Run the jsonTalk tool with file A using the following command:
 java -jar jsontalk.jar -h "<insert path to files for evaluation>\Files for evaluation\a.json"
When you run this command successfully a help option should show the available options for describing the file. You can generate multiple descriptions at a time by specifying multiple options. Play around with the different options available.

With the 'store' object being at depth 1 and the depth increasing by 1 with each level of nesting, what depth is the 'Bicycle' object at?

_____

Did you use the JSONTalk tool to help you answer the above question?

○ No (1)

○ Yes (2)

JSON objects with the same structure can have different values but the same keys. The following 3 objects are all of the same structure:
object1 : { name: Holly,
        age: 22,
        siblings: True},
object2: { name: Thomas,
        age: 100,
        siblings: False},
object3: { name: Fiona,
        age: 24,
        siblings: True}

Are there any objects with the same structure within the described JSON file?

○ Yes (1)

○ Unsure (2)

○ No (3)

Did you use the JSONTalk tool to help you answer the above question?

○ No (1)

○ Yes (2)

End of Block: JSON Transcript 1

The following questions make use of three different transcripts, these transcripts are what a user would hear if they were to use a screen reader with a JSON file. The first two transcripts will be presented as text and the third as audio.
- **For each transcript, there is a corresponding JSON file included in the folder you downloaded. Transcript A corresponds with a.json etc.**
- **Before you answer questions about each transcript, run the JSONTalk tool on the command line with the corresponding file. This will help you answer the questions.**

Transcript B:

"Object, name: 'name', brace open. Property: 'name', value: 'Jane Doe', comma. Property: 'email', value: 'jane.doe@example.com', comma. Property: 'address', value: Object, brace open. Property: 'street', value: '123 Main St', comma. Property: 'city', value: 'Anytown', comma. Property: 'state', value: 'CA', comma. Property: 'zip', value: '12345', brace close, comma. Property: 'phoneNumbers', value: Array, bracket open. Object, brace open. Property: 'type', value: 'home', comma. Property: 'number', value: '555-555-1234', brace close, comma. Object, brace open. Property: 'type', value: 'work', comma. Property: 'number', value: '555-555-5678', brace close, bracket close, comma. Property: 'age', value: 35, comma. Property: 'isMarried', value: true, comma. Property: 'hobbies', value: Array, bracket open. Value: 'reading', comma. Value: 'traveling', comma. Value: 'cooking', bracket close, brace close."

Run the jsonTalk tool with file B using the following command:
 java -jar jsontalk.jar -h "<insert path to files for evaluation>\Files for evaluation\b.json"
When you run this command successfully a help option should show the available options for describing the file. You can generate multiple descriptions at a time by specifying multiple options. Play around with the different options available.

Re-write the JSON file transcript into the standard JSON syntax.

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Did you use the JSONTalk tool to help you answer the above question?

○ No (1)

○ Yes (2)

The following questions make use of three different transcripts, these transcripts are what a user would hear if they were to use a screen reader with a JSON file. The first two transcripts will be presented as text and the third as audio.
- **For each transcript, there is a corresponding JSON file included in the folder you downloaded. Transcript A corresponds with a.json etc.**
- **Before you answer questions about each transcript, run the JSONTalk tool on the command line with the corresponding file. This will help you answer the questions.**

This question is slightly different from the others. You are not given a textual version of a screen-reader reading out a JSON file, instead you are just given an audio clip of what a user would hear if they were to read file C.json using a screen-reader. Feel free to play the audio clip as many times as you like. In the same way as the previous questions, you will now be asked a few questions about the file being described.

Run the tool on the command line with the -r flag enabled, in addition to any other options you would like to enable. The -r flag will allow the tool to read aloud the description.
Do not read what is printed on the command line. Instead try to answer the questions using the only the audio description of the JSON file generated by the JSONTalk tool. You may need to run commands a few times if you want to listen again.

Run the jsonTalk tool with file C using the following command:
java -jar jsontalk.jar "<absolute filepath to where you saved the files for evaluation folder>\Files for evaluation\c.json"
When you run this command successfully a help option should show the available options for describing the file. You can generate multiple descriptions at a time by specifying multiple options. Play around with the different options available.

With the 'title' property being at depth 1 and the depth increasing by 1 with each level of nesting, what depth is the 'items' object at?

_____

Did you use the JSONTalk tool to help you answer the above question?

○ No (1)

○ Yes (2)

JSON objects with the same structure can have different values but the same keys. The following 3 objects are all of the same structure:
object1 : { name: Holly,
         age: 22,
         siblings: True},
object2: { name: Thomas,
         age: 100,
         siblings: False},
object3: { name: Fiona,
         age: 24,
         siblings: True}
Are there any objects with the same structure within the described JSON file?

○ Yes (1)

○ Unsure (2)

○ No (3)

Did you use the JSONTalk tool to help you answer the above question?

○ No (1)

○ Yes (2)

End of Block: JSON Transcript 3

	1: Strongly disagree (1)	2: Disagree (2)	3: Undecided (3)	4: Agree (4)	5: Strongly agree (5)
I think that I would like to use this system frequently (1)	○	○	○	○	○
I found the system unnecessarily complex (2)	○	○	○	○	○
I thought the system was easy to use (3)	○	○	○	○	○
I think that I would need the support of a technical person to be able to use this system (4)	○	○	○	○	○
I found the various functions in this system were well integrated (5)	○	○	○	○	○
I thought there was too much inconsistency in this system (6)	○	○	○	○	○
I would imagine that most people would learn to use this system very quickly (7)	○	○	○	○	○
I found the system very cumbersome to use (8)	○	○	○	○	○
I felt very confident using the system (9)	○	○	○	○	○
I needed to learn a lot of things before I could get going with this system (10)	○	○	○	○	○

Thank you for taking part in this user study. The main aim of this study was to investigate whether the JSONTalk tool accurately represents the content of a JSON file, and whether the tool allows for quicker understanding of JSON file representation from a screen reader. We have been running the study with 2 groups of participants, 1 groups answering the previous questions using the JSONTalk tool we developer, and 1 group answering the questions without help from the tool. You were part of the group of participants that did have access to the tool.

 If you haven't already, please take a note of my email address **(2463548h@student.gla.ac.uk)** and don't hesitate to contact me if you have any further questions.
 Thank you for your help.

Space for comments/feedback about this experiment:

_____

Start of Block: A: Introduction

JSONTalk User Study

The aim of this user study is to investigate the effectiveness of JSONTalk. JSONTalk is a command-line tool that has been developed to generate natural language descriptions of JSON files. The primary use case of this tool will be to assist visually impaired programmers to quicker determine the structure and contents of a JSON file. The participants for the study have been split into two groups. One group is answering the following questions with the help of the JSONTalk tool, the other group is answering the questions without the tool. You are part of the group that will be answering the following questions *without* the JSONTalk tool.

This evaluation will last roughly *10 minutes*, and will consist of the following:

1. You will read through a **recap on JSON syntax and semantics.**

2. You will be given **3 different screen reader transcripts** of JSON file descriptions and **asked a few questions about them.** Please remember that your ability is not being evaluated.

You should fill in this form with your answers, which will be stored securely and anonymously on my laptop. Feel free to ask me any questions throughout the experiment. You are free to withdraw at any point during the experiment.

If you have any questions following the experiment, contact me at **2463548h@student.gla.ac.uk.**

Do you consent to take part in this user study and have your answers stored anonymously?

○ Yes (1)

End of Block: A: Introduction

JSON Recap

JSON (JavaScript Object Notation) is a text-based, lightweight data interchange format used to store and exchange data. It is based on a subset of the JavaScript programming language and is easy for humans to read and write and for machines to parse and generate.

Syntax:
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Here's an example JSON object: {

```
    "name": "John Doe",
    "age": 32,
    "isStudent": false,
    "courses": [
        "math",
        "history",
        "english"
      ],
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        "street": "123 Main St",
        "city": "Anytown",
        "state": "XX"
    }
}
```

The following questions make use of three different transcripts, these transcripts are what a user would hear if they were to use a screen reader with a JSON file.
- **Read each transcript and try to answer each of the questions below it.**
- **Do not make use of any external tools to assist you.**
- **The first two transcripts will be presented as text and the third as audio.**

Transcript A:
"Object, name: 'store', brace open. Object, name: 'store', brace open. Property: 'book', value: Array, bracket open. Object, brace open. Property: 'category', value: 'reference', comma. Property: 'author', value: 'Nigel Rees', comma. Property: 'title', value: 'Sayings of the Century', comma. Property: 'price', value: 8.95, brace close, comma. Object, brace open. Property: 'category', value: 'fiction', comma. Property: 'author', value: 'Evelyn Waugh', comma. Property: 'title', value: 'Sword of Honour', comma. Property: 'price', value: 12.99, brace close, comma. Object, brace open. Property: 'category', value: 'fiction', comma. Property: 'author', value: 'Herman Melville', comma. Property: 'title', value: 'Moby Dick', comma. Property: 'isbn', value: '0-553-21311-3', comma. Property: 'price', value: 8.99, brace close, comma. Object, brace open. Property: 'category', value: 'fiction', comma. Property: 'author', value: 'J. R. R. Tolkien', comma. Property: 'title', value: 'The Lord of the Rings', comma. Property: 'isbn', value: '0-395-19395-8', comma. Property: 'price', value: 22.99, brace close, bracket close, comma. Property: 'bicycle', value: Object, brace open. Property: 'color', value: 'red', comma. Property: 'price', value: 19.95, brace close, brace close, comma. Property: 'expensive', value: 10, brace close."

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Transcript B:
"Object, name: 'name', brace open. Property: 'name', value: 'Jane Doe', comma. Property: 'email', value: 'jane.doe@example.com', comma. Property: 'address', value: Object, brace open. Property: 'street', value: '123 Main St', comma. Property: 'city', value: 'Anytown', comma. Property: 'state', value: 'CA', comma. Property: 'zip', value: '12345', brace close, comma. Property: 'phoneNumbers', value: Array, bracket open. Object, brace open. Property: 'type', value: 'home', comma. Property: 'number', value: '555-555-1234', brace close, comma. Object, brace open. Property: 'type', value: 'work', comma. Property: 'number', value: '555-555-5678', brace close, bracket close, comma. Property: 'age', value: 35, comma. Property: 'isMarried', value: true, comma. Property: 'hobbies', value: Array, bracket open. Value: 'reading', comma. Value: 'traveling', comma. Value: 'cooking', bracket close, brace close."

Re-write the JSON file transcript into the standard JSON syntax.

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_____

_____

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 Thank you for your help.

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