Group B Experiment

Experiment Description

In the following questionnaire, you will be asked to read and analyze 2 short methods written in the Java programming language.
Regarding these methods, you will be presented with questions related to understanding the functionality expressed in the method and a maintenance process for it.

At the beginning of this questionnaire, you will be asked some personal questions that will be used solely for the purpose of conducting this study.
At the end of it, you will be asked a few more questions regarding your impressions and opinions about the experience of the just-conducted experiment.
The expected duration for this experiment is approximately 15 minutes. During this time period, you will be presented with various code comprehension and maintenance activities.
The experiment has been structured to make the experience interesting and engaging, while also being clear and understandable.

For the conduct of this questionnaire, it is planned to use materials shared in the drive folder available at the following address:
https://drive.google.com/drive/folders/14Udw7OA795f-cQOETo8o0PAIMoqAusWA?usp=drive_link

Participation in the survey is entirely voluntary.
You have the autonomy to stop answering and exit the survey at any time should you choose to do so.

About data:
Your participation in this study will primarily contribute to scientific research. The results of this research will be accessible through the dissertation or scientific publications resulting from this study.
The researchers gather social and demographic data in a manner that ensures anonymity and does not reveal personal identifying information.
The researchers assure that any personal information obtained through this research will be treated as confidential and will not be shared or disclosed to third parties. This questionnaire utilizes the Google Docs app package, meaning that any information collection and utilization through it are governed by the Google Privacy Policy (https://www.google.co.uk/policies/privacy/).

Thanks in advance for your effort and time!

* Indica una domanda obbligatoria

1. I consent to the use of this data for the purpose of conducting the experiment. *

Seleziona tutte le voci applicabili.

- [ ] I consent

Pre-Experiment Questionnaire

Thank you for choosing to participate in this experiment. Below are the initial demographic questions for the pre-experiment questionnaire.

2. Please provide your PROLIFIC ID *

_____

3. Create and provide a custom ID code for this experiment. *
The code should have the first two characters equal to the respective first letters of your first parent's name and your second parent's name, followed by a two-digit number of your birth month.
The code should appear as follows in the example: AF07
A = first parent's name is Andrea;
F = second parent's name is Fran;
07 = you were born in July.

_____

4. Please indicate your age (not mandatory)

_____

5. Please indicate your highest level of education. *

Contrassegna solo un ovale.

- ◯ High school diploma
- ◯ Bachelor's degree in Computer Science
- ◯ Bachelor's degree in other fields
- ◯ Master's degree in Computer Science
- ◯ Master's degree in other fields.
- ◯ Ph.D. degree in Computer Science
- ◯ Ph.D. degree in other fields
- ◯ Prefer not to say
- ◯ Altro: _____

6. Currently *

Contrassegna solo un ovale.

- I am a student
- I am a working student
- I am employed in a company
- I am self-employed
- I am unemployed
- Prefer not to say
- Altro: _____

7. How would you rate your knowledge of the Java programming language? *

Contrassegna solo un ovale.

	I am not familiar with this language
1	
2	
3	
4	
5	
	Excellent

8. How would you rate your skills in code maintenance on Java code? *

Contrassegna solo un ovale.

	I have never performed code maintenance on Java code				Excellent
	1	2	3	4	5

Comprehension of Method 1

This section of the questionnaire will be dedicated to the analysis and comprehension of the first proposed method. It is possible to view and download the method from the following shared drive folder: https://drive.google.com/drive/folders/14Udw7OA795f-cQOETo8o0PAIMoqAusWA?usp=drive_link

9. Specify the **start** time in the format hh:mm. *

Esempio: 08:30

10. What is the main functionality expressed in this method? *
(It is possible to view and download the method from the following shared drive folder: https://drive.google.com/drive/folders/14Udw7OA795f-cQOETo8o0PAIMoqAusWA?usp=drive_link).

```
//Code summary: dumps the contents of the term

public void dumpSpecies(){
    try{
        OutputStreamWriter fileOut = new OutputStreamWriter(new FileOutputStream("/data/species.txt"), "UTF-8");
        Term term = new Term("rank", "species");
        TopDocs hits = cbSearcher.search(new TermQuery(term), 2000000);
        for(ScoreDoc sdoc : hits.scoreDocs){
            Document doc = cbReader.document(sdoc.doc);
            if(doc.getField("synonym") == null){
                String lsid = StringUtils.trimToNull(doc.getField("lsid").stringValue());
                if(lsid == null)
                    lsid = doc.getField("id").stringValue();
                fileOut.write(lsid + "\n");
            }
        }
        fileOut.flush();
    }
    catch(Exception e){
        e.printStackTrace();
    }
}
```

Contrassegna solo un ovale.

- ◯ It performs a search for documents containing the term "species" and returns the total number of results.
- ◯ It removes documents with the "synonym" field from the reader and saves the changes to the output file.
- ◯ It writes the identifiers of species without synonyms to a text file called "species.txt".
- ◯ It reads the content of a text file called "species.txt" and returns the synonyms of species.

11. Specify the **end** time in the format hh:mm. *

Esempio: 08:30

12. How confident are you in the answer given to the previous question? *

Contrassegna solo un ovale.

	Not confident at all
1	
2	
3	
4	
5	Extremely confident

13. Please indicate for each of the following items how important it was to understand the functionality expressed by the code. *

Contrassegna solo un ovale per riga.

	Not useful at all	Slightly useful	Neither useful nor useless	Useful	Very useful
Method name	◯	◯	◯	◯	◯
Code summary	◯	◯	◯	◯	◯
Variable names	◯	◯	◯	◯	◯
Usage of variables	◯	◯	◯	◯	◯
Methods called within the code	◯	◯	◯	◯	◯

14. Which of the following is a vegetable? *

Contrassegna solo un ovale.

- ◯ Eggs
- ◯ Pizza
- ◯ Broccoli
- ◯ Salmon
- ◯ Milk

15. Did you rely on other aspects to understand the code? If yes, please mention them here.

Maintenance of Method 1

This section of the questionnaire will be dedicated to the maintenance process of the previously analyzed method. You will be able to review the resulting codes for the different modifications we will propose. The codes are available and can be downloaded from the following shared drive folder: https://drive.google.com/drive/folders/14Udw7OA795f-cQOETo8o0PAIMoqAusWA?usp=drive_link

16. Specify the **start** time in the format hh:mm. *

Esempio: 08:30

17. Which of the following modifications would you make to the code? Here follows the method. *
(You can view and download the codes related to the proposed modifications in the following Google Drive folder: https://drive.google.com/drive/folders/14Udw7OA795f-cQOETo8o0PAIMoqAusWA?usp=drive_link).

```
//Code summary: dumps the contents of the term

public void dumpSpecies(){
    try{
        OutputStreamWriter fileOut = new OutputStreamWriter(new FileOutputStream("/data/species.txt"), "UTF-8");
        Term term = new Term("rank", "species");
        TopDocs hits = cbSearcher.search(new TermQuery(term), 2000000);
        for(ScoreDoc sdoc : hits.scoreDocs){
            Document doc = cbReader.document(sdoc.doc);
            if(doc.getField("synonym") == null){
                String lsid = StringUtils.trimToNull(doc.getField("lsid").stringValue());
                if(lsid == null)
                    lsid = doc.getField("id").stringValue();
                fileOut.write(lsid + "\n");
            }
        }
        fileOut.flush();
    }
    catch(Exception e){
        e.printStackTrace();
    }
}
```

Contrassegna solo un ovale.

- ◯ Replace the 'for' loop with a 'while' loop.
- ◯ Completely remove the try-catch block.
- ◯ Use a BufferedWriter to improve file writing performance. By using a BufferedWriter, the data is written to a buffer before being actually written to the disk.
- ◯ Use System.out.println() to write to the file.

18. Specify the **end** time in the format hh:mm. *

Esempio: 08:30

19. How confident are you in the modification made to the code in the previous question? *

Contrassegna solo un ovale.

	Not confident at all
1	◯
2	◯
3	◯
4	◯
5	◯
	Extremely confident

20. What did you base your decisions on when choosing the changes to make during code maintenance? Rate the importance of each of the following items. *

Contrassegna solo un ovale per riga.

	Not useful at all	Slightly useful	Neither useful nor useless	Useful	Very useful
Method name	◯	◯	◯	◯	◯
Code summary	◯	◯	◯	◯	◯
Variable names	◯	◯	◯	◯	◯
Usage of variables	◯	◯	◯	◯	◯
Methods called within the code	◯	◯	◯	◯	◯

21. Did you consider any other aspects for code maintenance? If yes, please mention them here.

Comprehension of Method 2

This section of the questionnaire will be dedicated to the analysis and comprehension of the second proposed method. It is possible to view and download the method from the following shared drive folder: https://drive.google.com/drive/folders/14Udw7OA795f-cQOETo8o0PAIMoqAusWA?usp=drive_link

22. Specify the **start** time in the format hh:mm. *

Esempio: 08:30

23. What is the main functionality expressed in this method? *
(It is possible to view and download the method from the following shared drive folder: https://drive.google.com/drive/folders/14Udw7OA795f-cQOETo8o0PAIMoqAusWA?usp=drive_link).

```
public void findMatchType(String name){
    try{
        NameSearchResult result = cbSearcher.searchForRecord(name, null);
        if(result != null)
            System.out.println(name +" had a " + result.getMatchType() + " match. Clean name: "
            + result.getCleanName());
        else{
            System.out.println(name + " could not be found in index");
        }
    }
    catch(SearchResultException e){
        if(e.getResults()!= null && e.getResults().size()>0){
            System.out.println(name + " (homonym) had a " + e.getResults().get(0).getMatchType() +
            " match. Clean Name: " + e.getResults().get(0).getCleanName());
        }
    }
}
```

Contrassegna solo un ovale.

- ◯ Check if a name is present in the index and return the match result.
- ◯ Perform a record search based on a name and return the match type and clean name.
- ◯ Print an error message if the specified name is not found in the index.
- ◯ Print the clean name and match type for a found record using a search object.

24. Specify the **end** time in the format hh:mm. *

Esempio: 08:30

25. How confident are you in the answer given to the previous question? *

Contrassegna solo un ovale.

	Not confident at all
1	
2	
3	
4	
5	
	Extremely confident

26. Please indicate for each of the following items how important it was to understand the functionality expressed by the code. *

Contrassegna solo un ovale per riga.

	Not useful at all	Slightly useful	Neither useful nor useless	Useful	Very useful
Method name					
Variable names					
Usage of variables					
Methods called within the code					

27. Did you rely on other aspects to understand the code? If yes, please mention them here.

Maintenance of Method 2

This section of the questionnaire will be dedicated to the maintenance process of the previously analyzed method. You will be able to review the resulting codes for the different modifications we will propose. The codes are available and can be downloaded from the following shared drive folder: https://drive.google.com/drive/folders/14Udw7OA795f-cQOETo8o0PAIMoqAusWA?usp=drive_link

28. Specify the **start** time in the format hh:mm. *

Esempio: 08:30

29. Which of the following modifications would you make to the code? Here follows the method. *
(You can view and download the codes related to the proposed modifications in the following Google Drive folder: https://drive.google.com/drive/folders/14Udw7OA795f-cQOETo8o0PAIMoqAusWA?usp=drive_link).

```
public void findMatchType(String name){
    try{
        NameSearchResult result = cbSearcher.searchForRecord(name, null);
        if(result ≠ null)
            System.out.println(name +" had a " + result.getMatchType() + " match. Clean name: "
            + result.getCleanName());
        else{
            System.out.println(name + " could not be found in index");
        }
    }
    catch(SearchResultException e){
        if(e.getResults()≠ null && e.getResults().size()>0){
            System.out.println(name + " (homonym) had a " + e.getResults().get(0).getMatchType() +
            " match. Clean Name: " + e.getResults().get(0).getCleanName());
        }
    }
}
```

Contrassegna solo un ovale.

- ◯ Change the logical AND operator with the logical OR operator in the 'if' statement if(e.getResults()!= null && e.getResults().size()>0).
- ◯ Creation of three new methods: 'displayMatchResult', 'displayNotFoundResult' and 'displayHomonymResult', in order to move the printing logic of the results inside these methods.
- ◯ Replacing `catch(SearchResultException e)` with `catch(NullPointerException e)`.
- ◯ Changing the 'if' statement from 'if(result != null)' to 'if(result != " ")'.

30. Specify the **end** time in the format hh:mm. *

Esempio: 08:30

31. How confident are you in the modification made to the code in the previous question? *

Contrassegna solo un ovale.

	Not confident at all
1	◯
2	◯
3	◯
4	◯
5	◯
	Extremely confident

32. What did you base your decisions on when choosing the changes to make during code maintenance? Rate the importance of each of the following items. *

Contrassegna solo un ovale per riga.

	Not useful at all	Slightly useful	Neither useful nor useless	Useful	Very useful
Method name	◯	◯	◯	◯	◯
Variable names	◯	◯	◯	◯	◯
Usage of variables	◯	◯	◯	◯	◯
Methods called within the code	◯	◯	◯	◯	◯

33. Which of the following is not a month?

Contrassegna solo un ovale.

- [ ] January
- [ ] February
- [ ] Wednesday
- [ ] April
- [ ] May
- [ ] June

34. Did you consider any other aspects for code maintenance? If yes, please mention them here.

Post-Experiment Questionnaire

Thank you again for participating in this experiment. Below are the concluding questions for the post-experiment questionnaire.

35. How would you evaluate the level of complexity encountered during the code comprehension activity? *

Contrassegna solo un ovale.

	Very easy
1	◯
2	◯
3	◯
4	◯
5	◯
	Very complex

36. Please indicate the level of fatigue you experienced during the code comprehension phase. *

Contrassegna solo un ovale.

Not tiring at all

1
2
3
4
5

Very tiring

37. How would you evaluate the level of complexity encountered during the code maintenance process? *

Contrassegna solo un ovale.

Very easy

1
2
3
4
5

Very complex

38. Please indicate the level of fatigue you experienced during the code maintenance phase. *

Contrassegna solo un ovale.

Not tiring at all

1
2
3
4
5

Very tiring

39. Feel free to share any thoughts or observations you have regarding the code comprehension phase or about the code maintenance process, if you wish.