

# Group F 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/1rcBHJXfy5uiylnxLI03xigyHAW6cUtR7?usp=drive\\_link](https://drive.google.com/drive/folders/1rcBHJXfy5uiylnxLI03xigyHAW6cUtR7?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!

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\* 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 \*

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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.

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4. Please indicate your age (not mandatory)

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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: 

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## 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? \*

*Contrassegna solo un ovale.*

I have never performed code maintenance on Java code

1

☐

2

☐

3

☐

4

☐

5

☐

Excellent

### 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/1rcBHJXfy5uiylnxLIO3xigyHAw6cUtR7?usp=drive\\_link](https://drive.google.com/drive/folders/1rcBHJXfy5uiylnxLIO3xigyHAw6cUtR7?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/1rcBHJXfy5uiylnxLIO3xigyHAW6cUtR7?usp=drive\\_link](https://drive.google.com/drive/folders/1rcBHJXfy5uiylnxLIO3xigyHAW6cUtR7?usp=drive_link)).

```
private void addCosts_unsafe(ConventionalConstraint constraint, int costID, Object costMappingOptions) {
    // Creating default cost function if needed
    if (currentCostFunction == null) {
        DEFAULT_FUNCTION = createCostFunction("Default Cost Function");
        currentCostFunction = DEFAULT_FUNCTION;
    }
    // Adding constraint costs' handling to cost function
    currentCostFunction.addConstraint(constraint, costID, currentCostMapping, costMappingOptions);
    // Updating graphical component if existent
    if (constraint.graphObject instanceof NodeGraphics) {
        ((ConventionalConstraintGraphics) constraint.graphObject).updateCosts();
        ((NodeGraphics) constraint.graphObject).updateSize();
    }
}
```

*Contrassegna solo un ovale.*

- ☐ Add the costs associated with a constraint to a specific cost function.
- ☐ Update the costs of a graphical object corresponding to a constraint.
- ☐ Check if a current cost function exists and add the costs associated with a constraint.
- ☐ Create a default cost function if it doesn't already exist and add the costs associated with a constraint to the current cost function.

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

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*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
<b>Method name</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Variable names</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Usage of variables</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Comments within the method</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Methods called within the code</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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.

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### 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/1rcBHJXfy5uiylnxLIO3xigyHAW6cUtR7?usp=drive\\_link](https://drive.google.com/drive/folders/1rcBHJXfy5uiylnxLIO3xigyHAW6cUtR7?usp=drive_link)

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

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*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/1rcBHJXfy5uiylnxLIO3xigyHAW6cUtR7?usp=drive\\_link](https://drive.google.com/drive/folders/1rcBHJXfy5uiylnxLIO3xigyHAW6cUtR7?usp=drive_link)).

```
private void addCosts_unsafe(ConventionalConstraint constraint, int costID, Object costMappingOptions) {
    // Creating default cost function if needed
    if (currentCostFunction == null) {
        DEFAULT_FUNCTION = createCostFunction("Default Cost Function");
        currentCostFunction = DEFAULT_FUNCTION;
    }
    // Adding constraint costs' handling to cost function
    currentCostFunction.addConstraint(constraint, costID, currentCostMapping, costMappingOptions);
    // Updating graphical component if existent
    if (constraint.graphObject instanceof NodeGraphics) {
        ((ConventionalConstraintGraphics) constraint.graphObject).updateCosts();
        ((NodeGraphics) constraint.graphObject).updateSize();
    }
}
```

*Contrassegna solo un ovale.*

- ☐ Changing the 'if' statement from 'if (currentCostFunction == null)' to 'if (currentCostFunction != null)'.
- ☐ Remove the declaration of variable 'DEFAULT\_FUNCTION'.
- ☐ Moving the declaration of the 'DEFAULT\_FUNCTION' variable.
- ☐ Using a separate method for creating the default cost function.

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

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*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
<b>Method name</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Variable names</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Usage of variables</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Comments within the method</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Methods called within the code</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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

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### 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/1rcBHJXfy5uiylnxLIO3xigyHAW6cUtR7?usp=drive\\_link](https://drive.google.com/drive/folders/1rcBHJXfy5uiylnxLIO3xigyHAW6cUtR7?usp=drive_link)

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

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*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/1rcBHJXfy5uiylnxLIO3xigyHAW6cUtR7?usp=drive\\_link](https://drive.google.com/drive/folders/1rcBHJXfy5uiylnxLIO3xigyHAW6cUtR7?usp=drive_link)).

```
//Code summary: converts the bounding box to a query string

protected void bboxToQuery(String bbox, ArrayList<String> fqList) {
    // e.g. bbox=122.013671875,-53.015625,172.990234375,-10.828125
    if (bbox != null && !bbox.isEmpty()) {
        String[] bounds = StringUtils.split(bbox, ",");
        if (bounds.length == 4) {
            String fq1 = "longitude:[" + bounds[0] + " TO " + bounds[2] + "]";
            fqList.add(fq1);
            String fq2 = "latitude:[" + bounds[1] + " TO " + bounds[3] + "]";
            fqList.add(fq2);
        } else {
            logger.warn("BBOX does not contain the expected number of coords (4). Found: "
                + bounds.length);
        }
    }
}
```

*Contrassegna solo un ovale.*

- ☐ Adds a filter string to the 'fqList' representing the range of a bounding box.
- ☐ Extracts the longitude and latitude coordinates from an input string 'bbox'.
- ☐ Checks if a 'bbox' string is empty or contains null values.
- ☐ Logs a warning if the bounding box does not contain exactly four coordinates.

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

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*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	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Code summary	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Variable names	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Usage of variables	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Comments within the method	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Methods called within the code	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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

## Maintenance of Method2

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/1rcBHJXfy5uiylnxLIO3xigyHAW6cUtR7?usp=drive\\_link](https://drive.google.com/drive/folders/1rcBHJXfy5uiylnxLIO3xigyHAW6cUtR7?usp=drive_link)

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

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*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/1rcBHJXfy5uiylnxLIO3xigyHAW6cUtR7?usp=drive\\_link](https://drive.google.com/drive/folders/1rcBHJXfy5uiylnxLIO3xigyHAW6cUtR7?usp=drive_link)).

```
//Code summary: converts the bounding box to a query string

protected void bboxToQuery(String bbox, ArrayList<String> fqList) {
    // e.g. bbox=122.013671875,-53.015625,172.990234375,-10.828125
    if (bbox != null && !bbox.isEmpty()) {
        String[] bounds = StringUtils.split(bbox, ",");
        if (bounds.length == 4) {
            String fq1 = "longitude:[" + bounds[0] + " TO " + bounds[2] + "]";
            fqList.add(fq1);
            String fq2 = "latitude:[" + bounds[1] + " TO " + bounds[3] + "]";
            fqList.add(fq2); }
        else {
            logger.warn("BBOX does not contain the expected number of coords (4). Found: "
+ bounds.length);
        }
    }
}
```

*Contrassegna solo un ovale.*

- ☐ Change the logical operator in the first 'if' statement from && to ||.
- ☐ Modification of the 'if' statement, if (!(bbox != null && !bbox.isEmpty())).
- ☐ Add an initial check to verify if 'bbox' is null or empty. In such case, the function terminates immediately.
- ☐ Modification of the 'if' statement, if (bounds.length > 0).

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

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*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
<b>Method name</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Code summary</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Variable names</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Usage of variables</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Comments within the method</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>Methods called within the code</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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.

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### 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

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1 ☐

---

2 ☐

---

3 ☐

---

4 ☐

---

5 ☐

---

Very complex

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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.

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Questi contenuti non sono creati né avallati da Google.

Google Moduli

