

## Human Ethics Amendment Request Form

## PROTOCOL

Protocol Number: 022079

Current Title: Efficacy of the support available for a software practitioner to review an unfamiliar software code

Current Principal Investigator (PI):

Associated Department: \*Computer Science

Note: Only the PI can submit these Amendments to the existing protocol. If they are no longer available, then a delegate of the PI will need to be setup. Please contact researchoffice@auckland.ac.nz.

## FORM VERSION

V 1.2 12/07/2013

## SECTION A: Description

A:1 Proposed Title (if different from current):  
Understanding Code Review Decisions

\* A:2 Summary of changes – please provide a numbered list of the proposed changes and how these changes vary from the approved application(s). (max 2000 characters including spaces).

1. To change the audience from code review stakeholders to any employee who works in a software development organization. Questions are modified to accommodate the new audience.
2. To change the focus of the survey from general details of code review to more specific details of code review. Questions are modified to accommodate this.

If more space is required, please attach a more detailed description of the amendment which allows the Committee to assess its significance.

Files of the following formats can be uploaded: .doc, .docx, .xls, .xlsx, .pdf, .jpg

\* A:3 Are personnel being added, removed or the PI changed as part of this Amendment?

Yes ☐ No ☒

\* A:4 Are any supporting documents (such as a PIS) being modified as part of this Amendment?

Yes ☒ No ☐

Please ensure the new versions of all documents are uploaded in Section C

SECTION C: Attachments

Upload new versions of any documents that will be modified as part of this amendment request. (.doc, .docx, .xls, .xlsx, .pdf or .jpg)

|                               |   |
|-------------------------------|---|
| Document Name:                | * Upload  |
| Participant Information Sheet |  |
| Survey                        |  |
| Invitation                    |  |

# Appendix 1

**EForm**  
**Name:** Human Ethics Amendment Request Form - v1.2

**Page:**

## **SECTION C: Attachments**

**Section:** Upload new versions of any documents that will be modified as part of this amendment request. (**.doc, .docx, .xls, .xlsx, .pdf or .jpg**)

**Question:** Upload

**File Name:** PIS.pdf

## **Qualitative Decisions Survey**

Below is the Participant Information Sheet (PIS) for this survey. The University of Auckland takes its obligations to ensure research conducted by members of the University conforms to the highest ethical standards very seriously. This includes providing information to research participants about the goals and nature of the research, which is the purpose of the PIS. If you wish to participate, please read the PIS and indicate you have done so at the bottom of this page. The survey proper will begin on the next page.

### **PARTICIPANT INFORMATION SHEET**

**Project Title:** Understanding qualitative decisions

**Name of researchers:** Assoc. Prof. Ewan Tempero, Dr. Kelly Blincoe, Ms. Sanuri Gunawardena

#### **Researcher Introduction**

Dr Ewan Tempero is an Associate Professor in the Department of Computer Science at the University of Auckland. Dr Kelly Blincoe is a Lecturer of Software Engineering in the Department of Electrical and Computer Engineering at the University of Auckland. Ms. Sanuri D. Gunawardena is a student in the Department of Computer Science at the University of Auckland, working towards her PhD in Computer Science.

#### **Project description**

The nature of the qualitative decisions is that they are highly subjective. A qualitative decision varies based on many factors such as understanding, knowledge, and experience of the decision maker. The aim of this project is to identify the commonalities and the differences of decision making based on the personal backgrounds.

#### **What we are asking**

We would like you to answer a short, anonymous, web-based questionnaire that will help us to understand how you make qualitative decisions such as how you name things based on the provided information. This questionnaire will reveal the commonalities and the differences of decision making based on the personal backgrounds of the participants. We expect the questionnaire to take less than 30 minutes to complete.

#### **Storage, use and reporting of data**

The questionnaire data is completely anonymous. Submitting the questionnaire will be taken as consent to use the data for research. The data will be analyzed and the analysis of the data may be presented or published in academic venues such as journals and conferences. The data will be stored on a secure server at the University of Auckland indefinitely, but for a minimum period of six years. If the data is no longer useful after six years, then it will be destroyed by deleting the digital files.

**Participation and right to withdraw**

You may stop completing the questionnaire at any time. However, once you submit the questionnaire, your data cannot be removed since it is anonymous.

**Results**

If you would like a summary of the results, then there will be an opportunity to add your email address after the survey is complete. If you do this, the email will not be linked to your data in any way.

**Contact Details**

If you have any questions about the project, please contact the researchers.

Assoc. Prof. Ewan Tempero <e.tempero@auckland.ac.nz> +64 9 923 923 3765

Dr. Kelly Blincoe <k.blincoe@auckland.ac.nz> +64 9 923 4715

Ms. Sanuri Gunawardena <sgun571@aucklanduni.ac.nz> +64 22 589 3270

For any queries regarding ethical concerns you may contact the Chair, The University of Auckland Human Participants Ethics Committee, The University of Auckland, Research Office, Private Bag 92019, Auckland 1142. Telephone 09 373-7599 x 83711. Email: ro-ethics@auckland.ac.nz

APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE ON <d> <m> 2018 for three years, Reference Number <ref>

## Appendix 2

**EForm**  
**Name:** Human Ethics Amendment Request Form - v1.2

**Page:**

### **SECTION C: Attachments**

**Section:** Upload new versions of any documents that will be modified as part of this amendment request. (**.doc, .docx, .xls, .xlsx, .pdf or .jpg**)

**Question:** Upload

**File Name:** SurveyV1.2.pdf

# Qualitative Decisions

**Qualitative Decisions Survey** Below is the Participant Information Sheet (PIS) for this survey. The University of Auckland takes its obligations to ensure research conducted by members of the University conforms to the highest ethical standards very seriously. This includes providing information to research participants about the goals and nature of the research, which is the purpose of the PIS. If you wish to participate, please read the PIS and indicate you have done so at the bottom of this page. The survey proper will begin on the next page.

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You may stop completing the questionnaire at any time. However, once you submit the questionnaire, your data cannot be removed since it is anonymous.

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Assoc. Prof. Ewan Tempero <e.tempero@auckland.ac.nz> +64 9 923 923 3765

Dr. Kelly Blincoe <k.blincoe@auckland.ac.nz> +64 9 923 4715

Ms. Sanuri Gunawardena <sgun571@aucklanduni.ac.nz> +64 22 589 3270 For any queries regarding ethical concerns you may contact the Chair, The University of Auckland Human Participants Ethics Committee, The University of Auckland, Research Office, Private Bag 92019, Auckland 1142. Telephone 09 373-7599 x 83711. Email: ro-ethics@auckland.ac.nz APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE ON 07 Nov 2019 for three years, Reference Number 022079.

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Agreement I am 18 years of age or older and I agree to participate in this survey.

☐ Yes

☐ No

Q0 How will you rate your *programming expertise* according to the definitions given below?

☐ **I have no programming knowledge or experience.**

☐ **Novice:** has little or no experience wants unambiguous rules to accomplish his/her tasks is able to handle small, isolated tasks

☐ **Advanced Beginner:** has gained some experience can work more independently than a novice knows general principles in a limited context, but does not have a holistic understanding

☐ **Competent:** has a holistic understanding of the problem domain bases his/her work on deliberate planning and extensive past experience can apply general maxims (e.g. design patterns) easily to specific contexts

☐ **Proficient:** has a vast amount of experience that he/she can intuitively apply to new contexts can easily differentiate between irrelevant and important details constantly reflects on what he/she has done and revises own approach to perform better in the future

☐ **Expert:** he/she is a major source of knowledge and information for others primarily works from his/her intuition

Q1 We use many nouns or noun phrases to refer to tangible or intangible entities in everyday conversations. The quality of these nouns or phrases have a significant effect on the understanding of the party that we are communicating with. For an example, if you need to buy a red apple, you



have to specifically ask for a "red apple" from the fruit vendor. If you use just "apple", the vendor might provide you a green apple instead. Thus, selecting your nouns/noun phrases specifically and meaningfully is vital.

In this set of questions, you are expected to select the most suitable noun or phrase to name the entity described by the given description, from the provided set of nouns/phrases. The context is a Bank ATM system. If you do not see the best suitable noun/phrase in the given list, select *None*. If you feel that the information given in the description is insufficient to make a decision, select *Insufficient Information*.



Q1.1 Select the best suitable noun/phrase that matches the description.

|   | Account               | Bank Account          | None                  | Insufficient Information |
|---|-----------------------|-----------------------|-----------------------|--------------------------|
| Created by the bank for a customer to keep track of the amount of customer's money deposited in the bank and to withdraw customer's money from, when needed | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    |

Q1.2 Select the best suitable noun/phrase that matches the description.

|  | ATM                   | Automated<br>Teller Machine | None                  | Insufficient<br>Information |
|--|-----------------------|-----------------------------|-----------------------|-----------------------------|
| Acts as an interface between the customer and the bank and handles the interactions between the customer and the bank. | <input type="radio"/> | <input type="radio"/>       | <input type="radio"/> | <input type="radio"/>       |

Q1.3 Select the best suitable noun/phrase that matches the description.

|   | I O Manager           | Display<br>Manager    | Screen<br>Manager     | None                  | Insufficient<br>Information |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------------|
| Displays instructions on the ATM screen and reads user input. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>       |

Q1.4 Select the best suitable noun/phrase that matches the description.

|                              | User                  | Customer              | Person                | ATM<br>User           | Client                | None                  | Insufficient<br>Information |
|------------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------------|
| The person who uses the ATM. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>       |

Q1.5 Select the best suitable noun/phrase that matches the description.

|  | Transaction           | Operation             | Activity              | Action                | Bank Transaction      | ATM Transaction       | None                             | Insufficient Information |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----------------------------------|--------------------------|
| A deposit, withdrawal or another action performed by the ATM user. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/>    |

Q1.6 Select the best suitable noun/phrase that matches the description.

|  | Account Type 1        | Savings Account       | SA                    | None                  | Insufficient Information |
|--|-----------------------|-----------------------|-----------------------|-----------------------|--------------------------|
| A basic type of bank account that allows you to deposit money, keep it safe, and withdraw funds, all while earning interest. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    |

Q1.7 Select the best suitable noun/phrase that matches the description.

|   | Retirement Account    | Account Type 2        | Individual Retirement Account | IRA                   | None                  | Insufficient Information |
|---|-----------------------|-----------------------|-------------------------------|-----------------------|-----------------------|--------------------------|
| An account where you stash your money for retirement. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    |

Q1.8 Select the best suitable noun/phrase that matches the description.

|   | Transaction<br>Log    | Transactions<br>List  | Log                   | None                  | Insufficient<br>Information |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------------|
| An official<br>record of the<br>transaction<br>history. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>       |

Q1 Explain If you have any comments/explanations about the the answers you selected for the above questions, please mention here. (Optional)

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Q2 Now that you know what a best suitable entity name should look like, please select (according to your knowledge) whether the given entity name is the best suitable or whether a better name exists, for each of the entity name - description pair given below. If you feel that the information given in the description is insufficient to make a decision, select Insufficient Information.

|   | Best suitable         | A better name exists  | Insufficient information |
|---|-----------------------|-----------------------|--------------------------|
| Performance - An act of presenting a play, concert, or other forms of entertainment.                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    |
| Ticket - A piece of paper or card that gives the holder the right to enter the theatre.                                 | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    |
| Person- A person who performs.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    |
| Cinema - A building or outdoor area in which plays and other dramatic performances happen.                              | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    |
| User - A person who buys something from a shop.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    |
| Machine - A machine that dispenses small articles such as food, drinks, or cigarettes when a coin or token is inserted. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    |
| Food - An edible item.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    |
| Food Type 1 - "Canned food" from the food items that a vending machine dispenses.                                       | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    |

Q2 Explain If you have any comments/explanations about the the answers you selected for the above question, please mention here. (Optional)

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Description

**CHARACTERISTICS of entities**

Any entity has a set of data that characterizes it. We use nouns or noun phrases to refer to these characteristics. If we consider a university, it may have a "Name", "Address", "Lecturers", "Courses", etc. If we consider the "Address", it can be further characterized as "Building Number", "Street", "Suburb", "Province" and "Country". If we consider a single lecturer from the "Lecturers" that characterize the university, he/she may also have his/her own characteristics such as "First Name", "Family Name", "Responsible Subjects", etc. However, the "Name" characteristic of the university would not need its own characteristics because it is a simple characteristic that does not need further characterization.

**BEHAVIORS of entities**

Most entities also have behaviors associated with them. We use verbs or verb phrases to refer to these behaviors. Behaviors can be of two types:

1. If we consider a car, it can "move", "turn" and "reverse". When those behaviors happen, characteristics of the car such as location and fuel level change. Thus, those behaviors belong to the Car entity and they change the state of the car.
2. If we consider the same car, in order to check the fuel level, "check fuel level" behavior should be performed. At a glance, this behavior looks like it belongs to the Driver entity. However, since this behavior is revealing an information of the Car entity, it is closer to the Car entity. Thus, the right thing to do is to tie it with the Car entity as well.

Accordingly, we can tie a behavior to the entity that is changed by it or the entity that it provides information about.

**LESSON (The most important part)**

Accordingly, any system in the real world can be represented with a set of entities, and their

characteristics and behaviors. As explained above, a CHARACTERISTIC can be a simple one such as "Name", an entity such as "Address" or a collection of an entity such as "Lecturers". When it comes to a BEHAVIOR, as a general rule, it should be tied to the entity that is most changed by it or the entity that it provides information about.

Q3 Which of the following are characteristics and which are behaviors?

|                 | Characteristic (noun) | Behavior (Verb)       | Not Sure              |
|-----------------|-----------------------|-----------------------|-----------------------|
| Color           | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Withdraw        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Height          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Number of pages | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Balance         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Calculate sum   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Q3 Explain If you have any comments/explanations about the the answers you selected for the above question, please mention here. (Optional)

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**Q4.0 Do you regularly use ATMs to perform transactions such as deposits or withdrawals?**

☐ Yes

☐ No

Description

**CHARACTERISTICS of entities**

Any entity has a set of data that characterizes it. We use nouns or noun phrases to refer to these characteristics. If we consider a university, it may have a "Name", "Address", "Lecturers", "Courses", etc. If we consider the "Address", it can be further characterized as "Building Number", "Street", "Suburb", "Province" and "Country". If we consider a single lecturer from the "Lecturers" that characterize the university, he/she may also have his/her own characteristics such as "First Name", "Family Name", "Responsible Subjects", etc. However, the "Name" characteristic of the university would not need its own characteristics because it is a simple characteristic that does not need further characterization.

As explained above, a CHARACTERISTIC can be a simple one such as "Name", an entity such as "Address" or a collection of an entity such as "Lecturers".

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Characteristics

**In this set of questions, you are expected to identify the CHARACTERISTICS (nouns) that characterizes the entities given at the top. The characteristics are given on the left side. Select the entity that is characterized by each characteristic. Otherwise, if the characteristic does not make sense to you, select *"The word/phrase is not meaningful"* ; if the item is a meaningful word or phrase but does not characterize any of the given entities, select *"Does not belong anywhere"* ; if it is hard to decide, select *"Hard to decide"*. PLEASE DO NOT GUESS OR ASSUME ANYTHING.**

The column labels in the questions below are entities related to the Bank ATM system and few other options defined as:

Bank Account - Created by the bank for a customer to keep track of the amount of customer's money deposited in the bank and to withdraw customer's money from, when needed.

ATM - Acts as an interface between the customer and the bank and handles the interactions between the customer and the bank.



ATM User - The person who uses the ATM.

Transaction - A deposit, withdrawal or another action performed by the ATM user.

NM - The word/phrase is not meaningful (Eg: xyz, slow tree).

NB - Meaningful, but does not belong to any given entity.

HD - Hard to decide because the word/phrase is not specific enough.

Q4.1 Please select the entity (or the other option) that the characteristic belongs to the most.

|                | Bank Account          | ATM                   | ATM User              | Transaction           | NM                    | NB                    | HD                    |
|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Account Number | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Q4.2 Please select the entity (or the other option) that the characteristic belongs to the most.

|         | Bank Account          | ATM                   | ATM User              | Transaction           | NM                    | NB                    | HD                    |
|---------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Balance | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Q4.3 Please select the entity (or the other option) that the characteristic belongs to the most.

|   | Bank Account          | ATM                   | ATM User              | Transaction           | NM                    | NB                    | HD                    |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| x | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Q4.4 Please select the entity (or the other option) that the characteristic belongs to the most.

|               | Bank Account          | ATM                   | ATM User              | Transaction           | NM                    | NB                    | HD                    |
|---------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Interest Rate | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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Q4.5 Please select the entity (or the other option) that the characteristic belongs to the most.

|                  | Bank Account          | ATM                   | ATM User              | Transaction           | NM                    | NB                    | HD                    |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Transactions Log | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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Q4.6 Please select the entity (or the other option) that the characteristic belongs to the most.

|                  | Bank Account          | ATM                   | ATM User              | Transaction           | NM                    | NB                    | HD                    |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Transaction Type | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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Q4.7 Please select the entity (or the other option) that the characteristic belongs to the most.

|                        | Bank Account          | ATM                   | ATM User              | Transaction           | NM                    | NB                    | HD                    |
|------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Authentication Details | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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Q4.8 Please select the entity (or the other option) that the characteristic belongs to the most.

|                | Bank<br>Account       | ATM                   | ATM<br>User           | Transaction           | NM                    | NB                    | HD                    |
|----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Card<br>Number | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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Q4.9 Please select the entity (or the other option) that the characteristic belongs to the most.

|               | Bank<br>Account       | ATM                   | ATM<br>User           | Transaction           | NM                    | NB                    | HD                    |
|---------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Pin<br>Number | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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Q4.10 Please select the entity (or the other option) that the characteristic belongs to the most.

|        | Bank<br>Account       | ATM                   | ATM<br>User           | Transaction           | NM                    | NB                    | HD                    |
|--------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Choice | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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Q4.11 Please select the entity (or the other option) that the characteristic belongs to the most.

|                 | Bank<br>Account       | ATM                   | ATM<br>User           | Transaction           | NM                    | NB                    | HD                    |
|-----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Current<br>User | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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Q4.12 Please select the entity (or the other option) that the characteristic belongs to the most.

|    | Bank<br>Account       | ATM                   | ATM User              | Transaction           | NM                    | NB                    | HD                    |
|----|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| ID | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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Q4.13 Please select the entity (or the other option) that the characteristic belongs to the most.

|         | Bank<br>Account       | ATM                   | ATM<br>User           | Transaction           | NM                    | NB                    | HD                    |
|---------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Account | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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Q4.14 Please select the entity (or the other option) that the characteristic belongs to the most.

|      | Bank<br>Account       | ATM                   | ATM<br>User           | Transaction           | NM                    | NB                    | HD                    |
|------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Name | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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Q4.15 Please select the entity (or the other option) that the characteristic belongs to the most.

|               | Bank<br>Account       | ATM                   | ATM<br>User           | Transaction           | NM                    | NB                    | HD                    |
|---------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Time<br>Stamp | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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Q4.16 Please select the entity (or the other option) that the characteristic belongs to the most.

|   | Bank Account          | ATM                   | ATM User              | Transaction           | NM                    | NB                    | HD                    |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| i | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Q4.17 Please select the entity (or the other option) that the characteristic belongs to the most.

|        | Bank Account          | ATM                   | ATM User              | Transaction           | NM                    | NB                    | HD                    |
|--------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Amount | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Q4 Explain If you have any comments/explanations about the the answers you selected for the above questions, please mention here. (Optional)

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Description  
BEHAVIORS of entities

Most entities also have behaviors associated with them. We use verbs or verb phrases to refer to these behaviors. Behaviors can be of two types:

1. If we consider a car, it can "move", "turn" and "reverse". When those behaviors happen, characteristics of the car such as location and fuel level change. Thus, those behaviors belong to the Car entity and they change the state of the car.

2. If we consider the same car, in order to check the fuel level, "check fuel level" behavior should be performed. At a glance, this behavior looks like it belongs to the Driver entity. However, since this behavior is revealing an information of the Car entity, it is closer to the Car entity. Thus, the right thing to do is to tie it with the Car entity as well.

Accordingly, we should tie a behavior to an entity that is changed by it or the entity that it provides information about.

### Behaviors

In this set of questions, you are expected to identify the BEHAVIORS (Verbs) related to the entities given at the top. The behaviors are given on the left side. Select the entity that each behavior belongs to. Otherwise, if the behavior does not make sense to you, select "The word/phrase is not meaningful" ; if the item is a meaningful word or phrase but does not belong to any of the given entities, select "Does not belong anywhere" ; if it is hard to decide, select "Hard to decide". PLEASE DO NOT GUESS OR ASSUME ANYTHING.

The column labels in the questions below are entities related to the Bank ATM system and few other options defined as:

Bank Account - Created by the bank for a customer to keep track of the amount of customer's money deposited in the bank and to withdraw customer's money from, when needed.

ATM - Acts as an interface between the customer and the bank and handles the interactions between the customer and the bank.

ATM User - The person who uses the ATM.

Transaction - A deposit, withdrawal or another action performed by the ATM user.

NM - The word/phrase is not meaningful (Eg: xyz, run jump).

NB - Meaningful, but does not belong to any given entity.

HD - Hard to decide because the word/phrase is not specific enough.

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Q5.1

Please select the entity (or the other option) that the behavior belongs to the most.

|         | Bank<br>Account       | ATM                   | ATM<br>User           | Transaction           | NM                    | NB                    | HD                    |
|---------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Deposit | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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Q5.2 Please select the entity (or the other option) that the behavior belongs to the most.

|          | Bank<br>Account       | ATM                   | ATM<br>User           | Transaction           | NM                    | NB                    | HD                    |
|----------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Withdraw | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

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Q5.3 Please select the entity (or the other option) that the behavior belongs to the most.

|                  | Bank<br>Account       | ATM                   | ATM<br>User           | Transaction           | NM                    | NB                    | HD                    |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Check<br>Balance | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Q5.4 Please select the entity (or the other option) that the behavior belongs to the most.

|                         | Bank<br>Account       | ATM                   | ATM<br>User           | Transaction           | NM                    | NB                    | HD                    |
|-------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Handle<br>User<br>Login | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Q5 If you have any comments/explanations about the answers you selected for the above questions, please mention here. (Optional)

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Q6.1 Consider yourself using an ATM to perform transactions with the bank. If following message appears on the ATM screen,

|                       | I'm confident about what to do next | I'm somewhat confident about what to do next | I will need customer care help to proceed |
|-----------------------|-------------------------------------|--|---|
| Insufficient funds... | <input type="radio"/>               | <input type="radio"/>                        | <input type="radio"/>                     |

Q6.2 Consider yourself using an ATM to perform transactions with the bank. If following message appears on the ATM screen,

|                   | I'm confident about what to do next | I'm somewhat confident about what to do next | I will need customer care help to proceed |
|-------------------|-------------------------------------|--|---|
| Wrong pin number. | <input type="radio"/>               | <input type="radio"/>                        | <input type="radio"/>                     |

Q6.3 Consider yourself using an ATM to perform transactions with the bank. If following message appears on the ATM screen,

|  | I'm confident about what to do next | I'm somewhat confident about what to do next | I will need customer care help to proceed |
|--|-------------------------------------|--|---|
| Transaction successful!<br>Your new balance is \$150 | <input type="radio"/>               | <input type="radio"/>                        | <input type="radio"/>                     |



Q6.4 Consider yourself using an ATM to perform transactions with the bank. If following message appears on the ATM screen,

|   | I'm confident about what to do next | I'm somewhat confident about what to do next | I will need customer care help to proceed |
|---|-------------------------------------|--|---|
| Transaction unsuccessful! Please try again. | <input type="radio"/>               | <input type="radio"/>                        | <input type="radio"/>                     |

Q6.5 Consider yourself using an ATM to perform transactions with the bank. If following message appears on the ATM screen,

|  | I'm confident about what to do next | I'm somewhat confident about what to do next | I will need customer care help to proceed |
|--|-------------------------------------|--|---|
| You have specified a wrong amount. Enter only multiples of 10. | <input type="radio"/>               | <input type="radio"/>                        | <input type="radio"/>                     |

Q6.6 Consider yourself using an ATM to perform transactions with the bank. If following message appears on the ATM screen,

|  | I'm confident about what to do next | I'm somewhat confident about what to do next | I will need customer care help to proceed |
|--|-------------------------------------|--|---|
| You have selected an invalid choice. Please enter your choice again. | <input type="radio"/>               | <input type="radio"/>                        | <input type="radio"/>                     |

Q6.7 Consider yourself using an ATM to perform transactions with the bank. If following message appears on the ATM screen,

|  | I'm confident about what to do next | I'm somewhat confident about what to do next | I will need customer care help to proceed |
|--|-------------------------------------|--|---|
| Welcome to the Bank. Please enter your pin number: | <input type="radio"/>               | <input type="radio"/>                        | <input type="radio"/>                     |

Q6.8 Consider yourself using an ATM to perform transactions with the bank. If following message appears on the ATM screen,

|                       | I'm confident about what to do next | I'm somewhat confident about what to do next | I will need customer care help to proceed |
|-----------------------|-------------------------------------|--|---|
| Something went wrong. | <input type="radio"/>               | <input type="radio"/>                        | <input type="radio"/>                     |

Q6.9 Consider yourself using an ATM to perform transactions with the bank. If following message appears on the ATM screen,

|                      | I'm confident about what to do next | I'm somewhat confident about what to do next | I will need customer care help to proceed |
|----------------------|-------------------------------------|--|---|
| NullPointerException | <input type="radio"/>               | <input type="radio"/>                        | <input type="radio"/>                     |

Q6.10 Consider yourself using an ATM to perform transactions with the bank. If following message appears on the ATM screen,

|   | I'm confident about what to do next | I'm somewhat confident about what to do next | I will need customer care help to proceed |
|---|-------------------------------------|--|---|
| Please choose an option: 1. Deposit 2. Withdraw 3. View Transaction Log 4. Quit | <input type="radio"/>               | <input type="radio"/>                        | <input type="radio"/>                     |

Q6.11 Consider yourself using an ATM to perform transactions with the bank. If following message appears on the ATM screen,

|                          | I'm confident about what to do next | I'm somewhat confident about what to do next | I will need customer care help to proceed |
|--------------------------|-------------------------------------|--|---|
| Please enter the amount: | <input type="radio"/>               | <input type="radio"/>                        | <input type="radio"/>                     |

Q6.12 Consider yourself using an ATM to perform transactions with the bank. If following message appears on the ATM screen,

|                                | I'm confident about what to do next | I'm somewhat confident about what to do next | I will need customer care help to proceed |
|--------------------------------|-------------------------------------|--|---|
| Wrong amount. Please re-enter: | <input type="radio"/>               | <input type="radio"/>                        | <input type="radio"/>                     |

Q6 If you have any comments/explanations about the the answers you selected for the above questions, please mention here. (Optional)

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## Information

We thank you for your time spent taking this survey.  
Your response has been recorded.

If you would like to have the results of this survey or would like to participate in our future studies, please click "Next". Your contact information will be collected and recorded separately from your survey responses and thus you will not be identified as its source.

If you do not need the results of the survey or are not willing to take part in our future studies, you may leave this survey by closing this window.

## Participant Information

I would like to,

- ☐ Receive the results.
- ☐ Participate in future studies of this research.

Email:

Powered by Qualtrics

## Appendix 3

**EForm**  
**Name:** Human Ethics Amendment Request Form - v1.2

**Page:**

### **SECTION C: Attachments**

**Section:** Upload new versions of any documents that will be modified as part of this amendment request. (**.doc, .docx, .xls, .xlsx, .pdf or .jpg**)

**Question:** Upload

**File Name:** Invitation.pdf

Hello,

We are conducting a survey to identify how people make qualitative decisions based on their background.

This survey is completely anonymous and will take no more than 30 minutes. Please forward this message to your network, requesting them to participate. There are no specific prerequisites to participate in this survey. You are also welcome to participate. The participation in this survey is voluntary.

For more information, including details regarding our motivation and goals and, to participate in the survey, please visit:

<Once the survey is published, a link will be provided here>

Please note that this survey is conducted by Ms. Sanuri D. Gunawardena in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Computer Science, supported by the supervisors Associate Professor Ewan Tempero and Dr. Kelly Blincoe. This survey is not conducted by The University of Auckland.

Best Regards,

Ms.Sanuri D. Gunawardena

Associate Professor Ewan Tempero

Dr. Kelly Blincoe

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APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE ON <d> <m>  
2018 for three years, Reference Number 022079.