

APPENDIX B: INFORMATION SHEET

Project Title: Software Protection Strength Evaluation

What is this scientific study about?

Researchers seek to understand better the process by which professional and non-professional ethical hackers reverse engineer computer code that is protected by protection/obfuscation techniques, including techniques our lab has developed. We also want to research potential metrics to evaluate the strength of software protections and to assess the validity of the proposed metrics. To do that, you are invited to reverse engineer given programs while using our data collection software, i.e., software that collects information about your activities.

Is participation to the study required?

No. While you are required to perform the very same reverse engineering tasks associated with this study in order to receive points for this lab assignment as a part of the course on Software Hacking and Protection, you are free to choose whether you want to formally be a part of the study.

If you choose to be a part of the scientific study: You will sign the digital consent form by clicking a consent button (without actually providing your name) on Qualtrics and be randomly assigned a pseudonymous participant number. The participant number is used to associate the data collected on your activities (as described below in more detail) with the information you provide in the pre and post questionnaires. That association is hence made pseudonymously. You will also need it to claim your gift card pseudonymously, if you are eligible for one.

If you choose not to: You are not considered as an official “participant” to the scientific study. You will not turn on the data collection software and your activities will therefore not be recorded in any way; you will not be given the consent form to sign.

Your choice of participation has no impact on your grades or your relationship with your instructor and TAs in any way. As you are randomly assigned a participant number, your participation and your activity data, or your choice of not participating, will be completely pseudonymous. Therefore, your course instructors or TA will not be able to know which students choose to participate and which students do not.

What will I be asked to do if I agree to participate?

You will first sign the consent form (pseudonymously) and be randomly assigned a pseudonymous participant number. The participant number associates your collected activity data with your questionnaire information pseudonymously.

You will use the participant number to fill out a questionnaire to provide information including your experience with binary reverse engineering and programming. You will need to set up a Virtual Machine of your choice, if you do not already have one. On the Virtual Machine, you will also install the data collection software we provide to you, if not already installed. (Note that the same VM can be used as you use for other labs of the SHP course.)

You will then download the problem script and all relevant components, enable the data collection software, and begin solving the problem. Data, including screenshots of what you are doing, what you type, and your mouse movement, will be collected automatically on the virtual machine while you solve the reverse engineering problem. All data collected by the data collection software is uploaded pseudonymously.

If you temporarily do not wish certain data to be collected (e.g., because you are going to type in some privacy sensitive data such as a password), you have the ability to click the “stop” button to disable data collection at any time. To continue, you can click “resume” when you are ready to resume the recording of activity data again. Do note, however, that in order to receive compensation for your participation to the study, this participation needs to be complete, and the data collection needs to cover all non-privacy-sensitive activities from start to finish of the assignment. The finish is either when the foreseen time has elapsed, or when you have correctly solved all challenges, whatever comes first.

While you are solving the problem, you are also requested to annotate, i.e., describe what you are doing, using the annotation feature of the data collection software. If you have technical questions for TAs, you may hide the annotation window, so they do not know whether you are a participant. Once you completely solved all problems/tasks, you will submit the solutions along with your participant number electronically and pseudonymously using a web form.

Like all students taking the SHP course, even the ones not participating to this study, you will also submit your answers/report/solution on Ufora to receive grades and potential feedback from a course staff member who will not be a researcher in this study. Any researcher with access to the submission web form used in this study will not access Ufora submissions, and vice versa, such that no person will be able to relate information submitted on Ufora under

your known name to information collected and submitted pseudonymously for the scientific study.

We will also ask you to fill out a post-completion questionnaire pseudonymously to describe your reverse engineering approach and provide any comment and feedback.

Sometime after you filled in the post questionnaire at the end of the lab/experiment, and after our researchers have studied and analysed the information collected during the experiment and in the questionnaires, the researchers might have more questions for you, e.g., to explain your reasoning behind some of your activities. If this is the case, we will conduct a pseudonymous interview in writing, e.g., by posing the questions for specific participant numbers in an anonymous Google form.

Will I be paid if I join this study?

If you satisfactorily complete the whole study, you will receive a compensation for your participation. This means you make efforts to complete the challenge (which does not mean you must necessarily solve all tasks successfully, and which will be evidenced from the collected data), install and enable the data collection software as described above, and fill in the required surveys before and after the study.

The compensation is €50 in electronic gift cards, from a range of options. If you do not complete the whole study, you might still be eligible for either full or partial compensation on a case-by-case basis at our discretion. This depends on how long you stay for the study, how much effort you make, and the reason why you cannot complete certain tasks (e.g., if you cannot use the data collection software due to technical difficulty, you can explain it pseudonymously when you fill in the survey and we will take that into consideration).

As I participate pseudonymously, how can I receive the gift card?

Thanks to modern cryptography, you will claim that pseudonymously as well, but to do so you will need to remember the participant number you receive at the beginning of the study which will be your private key to claim your rewards.

In the post-questionnaire we will ask you to select which electronic gift cards you would like to receive from a list of options (e.g., bol.com, cinema tickets, ...)

Approximately one month after the study, we will post all electronic gift cards in encrypted files on Ufora, from which every student can download all files without us being able to track who downloaded what.

Each file will be encrypted with the corresponding participant number and the file name will be a hash of the number. We will provide you with the hash algorithm to enable you to identify the file that belongs to you. Unless you share your participant number with others, only you will know which file belongs to you and only you will be able to decrypt it.

May I stop participating at any time?

You may stop participating at any time. Choosing to stop participating has no impact on your grades or your relationship with your instructor and TAs in any way, although it may affect your ability to earn the gift card. To stop participating, you simply need to click the “stop” button on data collection software to disable any further data collection and pseudonymously fill out a “stop participation form” with your participant number, so that any data associated with you (including your questionnaire responses and any data that have already been collected by the data collection software) will be deleted permanently. Your instructor or TA will not be able to know that you stop participating, as the form is pseudonymous. However, you may not be eligible for rewards.

How long will I be in the study?

You will be in the study for the duration of the lab period, which is approximately 3-4 hours.

Would my participation in this study be kept confidential?

Your participation is pseudonymous, which means that different forms of data collected from you are linked by means of your participation number, but we have no way to link your participation number to personally identifiable information. Furthermore, any records associated with this study will be kept confidential to the greatest extent possible according to GDPR. Pseudonymous records from your participation may be reviewed by people responsible for making sure that research is done properly, including members of the Ethical Committee.

What are the risks of this research?

The risks associated with participation in this study are no greater than those encountered in your professional career. You may feel some stress and fatigue while performing reserve engineering tasks.

What are the benefits of this research?

There is no direct benefit to you from being in this study, except feeling good about helping to push the state of the art and extend human knowledge, and the gift card of course.

Will my data or specimens be sold for commercial profit?

No.

Can I learn about the results of the research project?

After experiments are over and results are analysed, interested individuals may ask for results, including the final paper. They may ask questions and discuss the results with us further.

What if I have questions?

If you have any questions about the research study itself, please contact prof. Bjorn De Sutter at bjorn.desutter@ugent.be.

Should you have any questions regarding this study and your rights as a research participant or if you wish to report any problems you have experienced related to the study, please contact prof. Bjorn De Sutter.