

Department of Computer Science

COMP232 Individual coursework

Assignment 2

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1 Overall marking scheme

The coursework for COMP232 consists of four assignments, contributing to 40% of the final mark. The contribution of the single assignments is as follows:

Assignment 1	10%
Assignment 2	10%
Assignment 3	20%
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TOTAL	40%

Failure in any assignment may be compensated for by higher marks in other components of the module.

This document describes Assignment 2. Assignment 2 will be marked according to the following broad criteria:

- correctness of the arguments;
- presence/absence of the evidence on the experiments;
- original contribution either in implementation, or analysis.

Aims of the Assignment 2

- to illustrate the practical aspects of using asymmetric cryptography, hash functions, digital signatures for the message authentication;
- to illustrate the practical aspects of key exchange algorithms
- to test the students skills of using cryptographic primitives in programming with JCA;
- to test the students skills in the analysis of the experiments.

This assignment consists of two parts: on message authentication and on key exchange.

Comparison of methods for message authentication

This part of the assignment asks you to overview and compare the following methods for message *integrity*, *authentication* and *non-repudiation* considered at lectures and Labs 4-5 and 8:

- hash functions (for example SHA-256);
- RSA + SHA1 method considered at Lab 4-5;
- DSA method considered at Lab 4-5;
- HMAC-SHA256 considered at Lab 8.

For each method please give a short description, including the statement of what it can be used for and under which assumptions, as well as what are possible advantages and disadvantages of these methods.

Key Exchange for Four parties

This part of the assignment asks you to design and implement a variant of Diffie-Hellman Key exchange protocol which would allow to exchange the secrets between four parties. Please

- describe a theoretical design, similar to that presented at the lecture for two-party DH protocol;
- using provided reference implementations of DH for two and three parties (Labs 7-8) implement your design and demonstrate it works;
- Write a report on the above, providing an evidence for your arguments.

2 Submission

You need to submit:

- Report (in *.pdf, *.doc, or *.docx format)
- Java code for your implementation

The work must be submitted electronically via Canvas.
This must be done by

17.00 on Friday, 24th of March, 2023

Please be aware that the standard University policies

- on plagiarism, collusion and fabricated data
www.liv.ac.uk/tqsd/pol_strat_cop/cop_assess/cop_assess.doc, Section 8 and
- on late submission www.liv.ac.uk/tqsd/pol_strat_cop/cop_assess/cop_assess.doc,
Section 6 are applied to this assignment.