

Group Coursework – Guidelines

This coursework is part of **COMP0163** and comprises **70%** of the total points for this module. The coursework consists in writing a report discussing one application or issue related to the blockchain technology (guidance on topics is provided in Section 1). The purpose of the assignment is for you to get some experience in critically evaluating and comparing distributed ledgers and blockchain-based platforms, identifying issues hindering their adoption or highlighting potential areas where the features of those platforms could be beneficial and why.

The deadline for handing in this report is **Monday 18/12/2023 at 16:00 (UK time)**. By the deadline, you will need to submit an electronic copy in **pdf** via Moodle.

Guidance on topics

The following are potential themes around which you may build your report together with an associated reference.

Blockchain for business

- Supply chain management
- Healthcare
- Distributed ledger platform comparison & consortia (Corda, Hyperledger, etc.)

Decentralized finance

- Decentralized exchanges
- Lending protocols
- Yield aggregators
- Insurtech
- Governance

Market security/manipulation

- Crypto wash trading
- Crypto pig butchering
- Crypto related money laundering
- Pump and dump
- DeFi security (etc. rug pulls, MEV-maximum extractable value)

The reference below is provided as a starting point to familiarise yourself with the topic; however, you are encouraged to consult more references and build up the relevant bibliography for your report.

Blockchain for business: platforms, use cases, adoption.

Hamida, E. B., Brousmiche, K. L., Levard, H., & Thea, E. (2017, July). Blockchain for enterprise: overview, opportunities and challenges.

Blockchain and healthcare.

Kassab, M., DeFranco, J., Malas, T., Destefanis, G., & Neto, V. V. G. (2019, May). Investigating quality requirements for blockchain-based healthcare systems. In 2019 IEEE/ACM 2nd International Workshop on Emerging Trends in Software Engineering for Blockchain (WETSEB) (pp. 52-55). IEEE.

Supply chain management and distributed ledger technologies.

Kshetri, N. (2018). Blockchain's roles in meeting key supply chain management objectives. *International Journal of Information Management*, 39, 80-89.

Decentralized exchanges with AMM protocols.

Xu, J., Paruch, K., Cousaert, S., & Feng, Y. (2022). SoK: Decentralized Exchanges (DEX) with Automated Market Maker (AMM) protocols. *ACM Computing Surveys*. <https://doi.org/10.1145/3570639>

Lending protocols

Xu, Jiahua, and Nikhil Vadgama. 2021. "From banks to DeFi: the evolution of the lending market." In *Enabling the Internet of Value: How Blockchain Connects Global Businesses*, edited by Nikhil Vadgama, Jiahua Xu, and Paolo Tasca.

Yield aggregators

Xu, J., & Feng, Y. (2022). Reap the Harvest on Blockchain: A Survey of Yield Farming Protocols. *IEEE Transactions on Network and Service Management*. <https://doi.org/10.1109/TNSM.2022.3222815>

Insurtech and blockchain: approaches and challenges.

Gatteschi, V., Lamberti, F., Demartini, C., Pranteda, C., & Santamaría, V. (2018). Blockchain and smart contracts for insurance: Is the technology mature enough? *Future Internet*, 10(2), 20.

Crypto Wash Trading

Cong, L. W., Li, X., Tang, K., & Yang, Y. (2022, December). **Crypto Wash Trading**. *National Bureau of Economic Research*. <https://doi.org/10.3386/w30783>

Pump and dump

Xu, J., & Livshits, B. (2019, August). The Anatomy of a Cryptocurrency Pump-and-Dump Scheme. In 28th USENIX Security Symposium (USENIX Security 19) (pp. 1609-1625). Santa Clara, CA: USENIX Association. Retrieved from <https://www.usenix.org/conference/usenixsecurity19/presentation/xu-jiahua>

DeFi security

Zhou, L., Xiong, X., Ernstberger, J., Chaliasos, S., Wang, Z., Wang, Y., Qin, K., Wattenhofer, R., Song, D., & Gervais, A. (2023). SoK: Decentralized Finance (DeFi) Attacks. In 2023 IEEE Symposium on Security and Privacy (SP) (pp. 2444-2461). <https://doi.org/10.1109/SP46215.2023.10179435>

In the report, you may approach the topics from different angles of your choice. The report may consist of either

- (i) A case study of an implementation of the blockchain technology in one of the above-listed domains.

or

- (ii) A short discussion of an application of blockchain technologies in one of the above-mentioned domains and a prototype of a new platform or smart contract templates using DAML/Solidity.

Guidelines on report preparation

The report should have a **maximum length 2000 words excluding the reference list**. It should be submitted in pdf. The report can be conducted in groups of 4 to 5 students.

- Reports should have the following **general structure** (although titles of the sections can be different, or they can be split in multiple sections if necessary):
 - 1. Introduction:** this section briefly motivates the choice of the issue/application to be analysed and the methods used, as well as telling the reader what to expect in the report (e.g., a comparison between enterprise distributed ledger systems).
 - 2. Main sections:** the main sections can be structured in different ways depending on the topic and the nature of the report. They may contain for example a detailed literature review, and/or description of a protocol for new or existing application(s) of blockchain technologies and/or comparisons between different systems, implementation, or business models and/or implementation of simple prototypes of distributed ledger applications.
 - 3. Conclusions and discussion:** A wrap up of the project that clearly explains what you learn and what you see as possible improvements or challenges to be overcome.
 - 4. References.**
- **Level of detail.** The report should contain enough detail for a reader familiar with the material taught in your programme to understand what you have done.
- **Code.** If your report includes prototyping of a blockchain application, the code should be included in the report as a figure or in the main text. Code should be appropriately commented in the figure caption or within the text (e.g., explain what a specific part of a code is for, specify the meaning of the variables used). **Including a piece of code (or pseudocode) is optional.**

- **Figures and Tables.** All figures and tables need to be numbered and have a self-contained caption, including – if the data shown are not your own – the source. All figures and tables need to be referred to and discussed at the appropriate place in the main text. **The report should contain at least one figure or table** that presents a scheme, snapshot of code or a diagram summarising the content of the report.
- **References.** The reference list should be formatted consistently and contain all the information that a reader would need to retrieve the items referred to. All references need to be cited in the main text. **The report should contain at least 8 references.**

Marking scheme

Marks are assigned based on those four main criteria:

[1] **Scientific quality:** how well the material in the project scope has been covered, e.g., are methods being used correctly, have results been discussed critically. **[35 points]**

[2] **Breadth:** the amount of background material, over and above lecture module content, that the group has incorporated into the project (e.g., the overall quality and relevance of the bibliography used in the report). **[25 points]**

[3] **Originality:** the extent to which the report shows original insights, perspectives, and approaches that go beyond the standard content of lectures. **[15 points]**

[4] **Presentation** and logical **structure** of the report, including English style, readability, and coherence of the report as a whole. **[25 points]**