COMP3334 Computer Systems Security

Group Project (20%)

Form a group of 3 – 5 students. Nominate a group leader. Enol in one of the groups in Blackboard by 28th February 2022 or you will be automatically assigned a group.

Background

The advancement of computer technologies brings art activities into the new era. The outcomes of art activities include tonnes of multimedia information that can be represented and stored in computer systems efficiently. Protecting ownership of digital artwork is hard to achieve because computer files can easily be replicated.

In 2014, the first NFT (non-fungible token) is created by Kevin McCoy, an artistic, for a digital illustration, named Quantum. NFT, due to its security properties, gains rapid popularity in the art circles. Online marketplaces are established for the exchange of artworks. In 2021, according to DappRadar, NFT generated over US$23 billion in trading volume.

Albeit its market value, NFT, is regarded as one of the solutions for protecting and exchanging ownership of digital artwork. Together with various other computing technologies, it provides a security service for the art industry.

In this project, suppose you are going to build up a digital art platform for representing, storing and exchanging digital artwork, you are required to (1) provide a thorough analysis of the security requirements, and (2) implement a concrete system.

What you have to do

Part 1: Security Analysis (30 marks)

Perform a thorough security analysis of the system. Elaborate clearly the security requirements and what security mechanisms should be adopted in the implementation (**Part 2**). Justify critically your solution.

Write a report. It should contain the following sections:

- Abstract
- Security requirement analysis with justifications
- A literature review of similar systems in the market
- System design specification
- Bibliography

Part 2: System Implementation (50 marks)

Implement the system based on **Part 1**. You may choose your preferred programming language(s) (e.g., JavaScript, Python, Go and PHP) to build your system. The system can be a desktop software, mobile app, website or a combination of them. You may adopt standard libraries for network connectivity and security mechanisms. Note that it is not compulsory to use NFT/Blockchain as the means for building up your system and you are allowed to use any appropriate security mechanisms in your implementation, to fulfil the security requirements you define in **Part 1**.

In the same report in **Part 1**, include the followings:

- System installation guide
- At least TWO use cases, demonstrating the flow of your system. Provide screenshots when necessary.

Part 3: Presentation and Demonstration (20 marks)

You are going to give a 10-minute demonstration on your project. The presentation should include the design of your system and a demonstration of your program. The presentation schedule will be announced once the group formation is confirmed.

For the report, only major sections are listed above. You may include other (sub-)sections so that your report is presented in a systematic manner.

Your report must NOT exceed 30 pages, excluding the cover page, the table of contents and appendices of supplementary documents (e.g., diagrams, figures, and screenshots), with single line spacing and font size 12. Use .doc/.docx/.pdf format for the report only. Use the APA or IEEE standard to format all citations.

Assessment Criteria

This project is assessed based on the following rubrics:

	Excellent	Good	Satisfactory	Weak	Fail
Security Requirement Analysis (30 marks)	Identify all relevant security issues and provide justifications. (24-30 marks)	Identify most of the relevant security issues and provide justifications. (17-23 marks)	Identify some of the relevant security issues and provide justifications. (8-16 marks)	Identify a few of the relevant security issues and provide justifications. (1-7 marks)	Unable to identify any relevant security issues and unable to provide justifications. (0 mark)
System Implementation (40 marks)	Develop an application that satisfies all the system requirements with security features. (31-40 marks)	Develop an application that satisfies most of the system requirements with security features. (21-30 marks)	Develop an application that satisfies some of the system requirements with security features. (11-20 marks)	Develop an application that satisfies a few of the system requirements with security features. (1-10 marks)	Unable to develop an application that satisfies the system requirements with security features. (0 mark)
Usability (10 marks)	The system provides an excellent user experience. (9-10 marks)	The system provides a good user experience. (6-8 marks)	The system provides a fair user experience. (3-5 marks)	The system provides an unsatisfactory user experience. (1-2 marks)	The user interface provides no clue to the system functions. (0 mark)
Presentation and Demonstration (20 marks)	The presentation has an attention-grasping introduction and clear demonstration, excellent time management and visual aids. (16-20 marks)	The presentation has an introduction of the design and clear demonstration, good time management and visual aids. (11-15 marks)	The presentation has an introduction of the design and demonstration, fair time management and visual aids. (6-10 marks)	The presentation has poor introduction of the design and demonstration, uses time poorly. The group has trouble bringing visual aids smoothly into the presentation. (1-5 marks)	The presentation does not have an introduction of the design and demonstration, no time management and no visual aids. (0 mark)

Submission

The submission deadline of the *system and report* is **23:59:00 17th April 2022 (Sun)**. No late submission is allowed.

Only the group leader has to submit the followings:

Part 1 – Use .doc/.docx/.pdf format for the document. Name the file using the following convention:

Group<group_no>.<document_format_ext>

E.g., Group99.docx

Part 2 Put all of your source codes into a single folder (which can contain a number of folders/subfolders). The files/folders must be organized in a structure that can be easily deployed, based on the installation guide in Part 1.

Zip the folder using the following naming convention:

Group<group_no>.zip

E.g., Group99.zip

Submit the zip file to Blackboard. If the zip file is too large, put it to your PolyU OneDrive storage. Save the link in a text file and submit the text file.

Any wrong file naming and submission will receive 0 mark for the whole project. You have the obligation to check the correctness of your submission. Note that plagiarism is serious offense. Both copiee and copier will receive 0 mark. Serious cases would be submitted to the Departmental Learning and Teaching Committee (DLTC) for further disciplinary actions.

This is a group project. Each group member must fill in the peer evaluation form. Each student has to rank the contribution of his/her group members, including himself/herself. Submit it individually to ywliu@polyu.edu.hk. The aim of peer evaluation is to serve as a free-rider deterrent. In case of apparent inconsistency of ratings among group members, a special interview session may be arranged for the group. Students who fail to submit this form are subject to mark deduction.

Peer Evaluation Form

Name:

Student No:

Group Members (Name)	**Effectiveness***				
	Not at all	**Poorly**	**Adequately**	**Well**	**Extremely Well**
<Me>					

* Put ✓ in appropriate boxes