CYBR 515: Homework Assignment #1 (100 points, team-based)

Comprehensive Software Security Analysis

Background:

You are part of a business team at a new tech startup, SecureShop Inc., aiming to develop a secure, user-friendly online shopping platform called "SecureCart". Your platform will handle user registration, product browsing, shopping cart management, and secure checkout processes. Your task is to ensure that SecureCart meets high security standards while being functional and user-friendly.

Instructions:

Read the scenario carefully and complete the following tasks. Your responses should be well-researched, detailed, and demonstrate creative thinking. Make sure to address each part of the question comprehensively. Integrate security frameworks, such as the OWASP Top Ten, into your answers, focusing on at least two specific vulnerabilities or security considerations. Each group is to submit one document on eCampus. Provide the question number before each of your answers.

Questions:

1. Functional and Non-Functional Requirements (20%)
   Define five functional requirements and five non-functional requirements for SecureCart. Your requirements should address both business needs and security considerations. Include at least one peer-reviewed paper that supports your approach to defining these requirements.

2. Use Case Development (20%)
   Create a detailed use case for the "User Registration" feature of SecureCart. Include the actors involved, preconditions, postconditions, main success scenario, and any alternate scenarios. Integrate security considerations by referencing OWASP Top Ten vulnerabilities, focusing on two relevant vulnerabilities (e.g., Injection, Broken Authentication).

3. Misuse Case Development (20%)

   Develop a misuse case for a potential security threat in the "Secure Checkout" process. Describe the threat, the actor involved, the steps of the misuse case, and the impact if the threat is realized. Suggest mitigation strategies to prevent this misuse case, referencing at least one peer-reviewed paper and OWASP Top Ten vulnerabilities.

4. Subject-Object-Activity Matrix (20%)

   Create a subject-object-activity matrix for the "Shopping Cart Management" feature. Identify at least three subjects, three objects, and describe the activities/actions each subject can perform on each object. Include security considerations and how they align with the OWASP Top Ten framework.

5. Requirements Traceability Matrix (20%)

   Develop a requirements traceability matrix (RTM) for SecureCart, mapping at least five security requirements to their corresponding controls and test/verification efforts. Ensure that your RTM shows how each requirement is traced from its source to implementation and testing. Reference OWASP Top Ten vulnerabilities and at least one peer-reviewed paper to support your RTM.

Grading rubric:

Question	Points	Criteria
Functional and Non-Functional Requirements	20	Completeness, relevance, clarity, integration of security considerations, and peer-reviewed support
Use Case Development	20	Identification of actors, detailed steps, handling of alternate scenarios, and integration of OWASP Top Ten vulnerabilities
Misuse Case Development	20	Clarity, detail, realism, relevance, practicality of mitigation strategies, and peer-reviewed support
Subject-Object-Activity Matrix	20	Correct identification of subjects/objects, accurate, detailed activities/actions, and integration of security considerations
Requirements Traceability Matrix	20	Completeness, accuracy, logical mapping, clear documentation, readability, and peer-reviewed support
Total	100	