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14.00 - 16.00pm

CMPU 4023 Enterprise Application Develop

Basement 3, Kevin Street

Programme Code: DT211C, DT228, DT282
Module Code: CMPU 4023
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TECHNOLOGICAL UNIVERSITY DUBLIN

KEVIN STREET CAMPUS

BSc. (Honours) Degree in Computer Science (Infrastructure)

BSc. (Honours) Degree in Computer Science

BSc. (Honours) Degree in Computer Science (International)

Year 4

SEMESTER 2 EXAMINATIONS 2018/19

Enterprise Application Development

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Instructions

Answer question 1 and any two of the other three

1 (a) In the context of enterprise application architecture, distinguish between a monolithic design and a service-oriented design (SOA). Mention two advantages of the SOA approach to enterprise application construction.

(8 Marks)

(b) Explain what an object-relational mapper (ORM) does. Give your opinion as to why you would not recommend using an ORM for an enterprise service implementation.

(8 Marks)

(c) Remote APIs can be implemented using a number of different paradigms. Briefly describe the following approaches and mention one advantage of each approach.

- Message Passing
- Remote Procedure Calls

(8 Marks)

(d) What is an SQL-injection attack? What vulnerability is an attacker able to exploit in such an attack? Mention one way that this vulnerability can be prevented.

(8 Marks)

(e) In the context of API security, explain the difference between authentication and authorisation. Explain how these concepts are related to enterprise identity management.

(8 Marks)

2 (a) Representational State Transfer (REST) has been described as a stateless client-server API design pattern. Describe the principles behind REST and how it works

(10 Marks)

(b) Consider a hypothetical service API for an ecommerce shopping cart having the following

exposed resources:

Products	Items that can be bought including name, price, description, etc
Cart	Zero or more order items in the basket pending checkout
Orders	Cart items checked out for purchase
Customers	Service users

Provide the RESTful API interfaces that can perform the following actions. Illustrate each answer by providing an example REST query and response bodies, including the HTTP verbs, URIs, query parameters and response status codes

- List all electrical products for sale at €250
- Add a product to the cart, specifying a quantity
- Create a new customer order from the cart contents
- Cancel a specific order
- List all orders for a given customer for the past 12 months

(20 Marks)

3 (a) Discuss the role of an RDBMS system in the implementation of an *Authentication Authority Service*. In your opinion, when does it make sense to carry out the associated cryptographic operations within the service database rather than within the service middleware? Support your answer with examples.

(10 Marks)

(b) Describe, in detail, the following API authentication schemes. In your answer, state any security-related assumptions you are making about the environment in which each scheme will operate.

- JSON Web Tokens
- Hash-based Message Authentication

(20 Marks)

4 (a) One of the desirable characteristics of an API is that it should be learnable by its consumer - typically an application developer charged with implementing an API client in code. What, in your opinion, should good documentation describe about an API?

(15 Marks)

(b) The consumers of service APIs in the enterprise may be implementing business-critical functions, the failure of which could impact adversely on business continuity. Describe the problem of service failure propagation in a service-oriented-architecture (SOA) deployment and how API stability through forward and backward version compatibility can help to mitigate against this risk.

(15 Marks)