INSTITUTE OF TECHNOLOGY BLANCHARDSTOWN

Year	Year 4
Semester	Winter
Date of Examination	
Time of Examination	

Programme Title	**Bachelor of Science (Honours) in Computing**
Programme Code	BN402, BN104
Module Title	Enterprise Computing
Banner Module Code	COMP H4023

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External Examiner(s): **Dr. Michael Barrett**
Dr. Tom Lunney

Instructions to candidates:

1) **To ensure that you take the correct examination, please check that the module and programme which you are following is listed in the tables above.**
2) The paper consists of five questions. Candidates should complete ANY FOUR of the five questions.
3) The paper is worth 100 marks. Each question is worth 25 marks.

DO NOT TURN OVER THIS PAGE UNTIL YOU ARE TOLD TO DO SO

The following questions are a revision aid for the Enterprise Computing exam. It is not an exhaustive list of all possible questions that might appear on the exam, but gives an indication of the layout of the paper, and the types of questions to expect. There will typically be two or three parts to each question.

Reciting lecture note material is NOT sufficient as an answer to questions. **Answers should be in your own words, and when asked for an example, use your own example rather than one from the notes.**
Marking schemes are generally based on 1 mark per point made, provide the point is well put and in your own words.

Question 1: Cloud Computing

a) Explain what is meant by the following statement: "Cloud computing is the delivery of computing as a service rather than a product"

b) What are the typical characteristics of a cloud computing offering?

c) What does the term hybrid cloud refer to?

d) Give an overview of the three layers of the cloud computing stack.

e) If developing a JEE application, which layers of the cloud computing stack may be appropriate to relevant to the project development tead.

f) Explain in detail one of the three layers of the cloud computing stack (SaaS, PaaS, IaaS) and when it is, is not, appropriate to use services of that layer. You could be asked to do this in a context of a business scenario (see past exam questions)

g) Give an example of a cloud service you are familiar with, and classify it as SaaS, PaaS or IaaS.

h) Discuss potential benefits of cloud computing for the Irish economy.

i) Explain the terms warranty and liability in the context of a Service Level Agreement with a cloud provider.

j) What four things should be covered in a warranty clause of a SLA?

k) In your opinion, is cloud computing a green technology? Give reasons for you answer.

Question 2. Distributed architectures and security

a) Explain how to ensure reliability and failover when running an application server like Glassfish.

b) "Enterprise Wide Applications typical run over distributed databases" Explain why this is so, and the issues that arise when running transactions over a distributed database

c) Explain the term 'serialisable schedule'

d) Explain what 2-phase locking is, and when it would be necessary to use 2PL.

e) Why is COMMIT not sufficient to ensure the atomicity of global transactions run over a number of databases? Give details of a solution to the problem.

f) How can redundancy be guaranteeing when implementing a database on MySQL.

g) Explain the steps involved in adding JEE security to a web application.

h) Detail the options available in JEE security for user authentication, comparing each with respect to ease of implementation and level of security offered. (L6, 44-53)

i) Give examples of two common security threats which exploit vulnerabilities in a web interface.

j) Given the code below (login script run on a database, or user entry echoed back to the browser) explain what type of attack this code in vulnerable to. How can the code be improved to secure against such an attack.

Question 3: EJB's (session, entity and message beans)

a) Compare and contrast session beans, entity classes and message beans. In your answer, reference the role of each; where in the application architecture they typically reside, and what type of functionality is implemented in each. Give examples to illustrate your answer.

b) What is the difference between a stateful, stateless and singleton session bean? Gives examples of when each might be used.

c) Describe the life cycle of a stateful (or stateless) session bean.

d) Explain the term instance pooling with respect to managing session beans.

e) Convert the following POJO into a stateful/stateless session bean with the following interfaces: local; remote; web service; RESTful .

f) Explain how to reference a session bean's remote interface form a client application.

g) Explain the term dependency injection

h) From the business scenario given, identify what entity beans would be needed; would you need to use a message bean; how many session beans would you recommend and what would be the role of each.

Question 4. Persistence

a) What are the main components of the Java Persistence API?

b) Describe the role of a persistence manager and the services it provides.

c) Explain the life cycle states of an entity bean. Map the following database table(s) to an entity bean:

   i. Defining primary keys

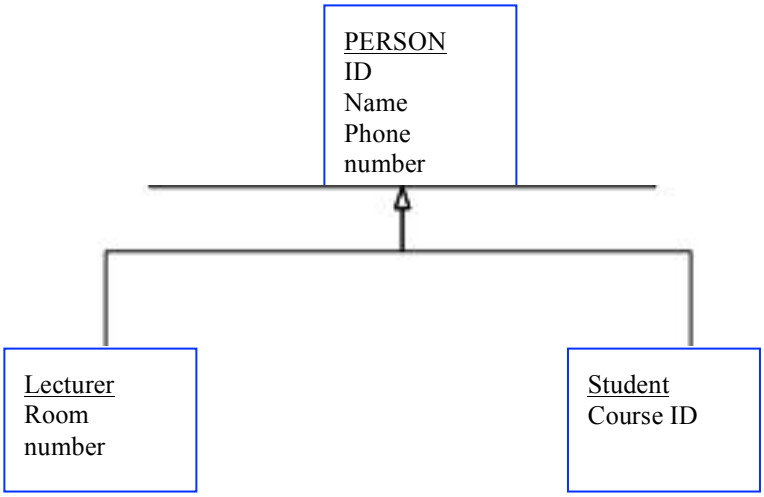
   ii. Mapping an entity to two or more tables

   iii. Defining foreign keys

   iv. Defining compound attributes (embeddables)

d) Explain the options when implementing inheritance in a relational database table

e) Given the following class diagram with inheritance, convert it to a set of relational database tables using a Single table strategy (or a join table strategy, or a table per class strategy). What are the strengths and weaknesses of this strategy?



f) Explain how optimistic locking is implemented, and in what circumstances it would be advisable to use optimistic locking

g) Explain how pessimistic locking is implemented, and in what circumstances it would be advisable to use pessimistic locking

h) Given a customer table and an order table, write the following queries in JPQL:

   i. All customers who live in the US

   ii. All customers who placed an order in December 2009

   iii. All orders placed by customers living in Dublin

i) What is a named query, where is it implemented, and how does it differ from a dynamic query?

Question 5: JSF

a) Explain the life cycle events of a JSF page.

b) Explain the scope annotation in a sample code (e.g. @SessionScoped). What alternatives could have been considered?

c) Explain code that illustrates the link between a JSF page and a JSF managed bean.

d) Explain code from a custom built validator.

e) Discuss the alternatives supported by JSF to validate user input

f) Explain all components in the JSF architecture

g) Explain the options for both static and dynamic navigation in JSF