INSTITUTE OF TECHNOLOGY BLANCHARDSTOWN

Academic term	2014-15
Year of study	Year 4
Semester	SEMESTER ONE – REPEAT PAPER
Date of examination	
Time of examination	

Programme code	**Programme title**	**Module code**
BN402	Bachelor of Science (Honours) in Computing	COMP H4023
BN104	Bachelor of Science (Honours) in Computing	COMP H4023

Module title	Enterprise and Cloud Computing

Internal Examiner(s)	**Geraldine Gray**
External Examiner(s)	**Mr. 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 table 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

Question 1:

a) Discuss the services offered by each of the three layers of the cloud computing stack. Your discussion should advise on when it is, or is not, appropriate to avail of the services at each layer.

(17 marks)

b) Report on the benefits of cloud computing to the Irish economy, both in terms of cloud providers, and companies that can avail of their services.

(8 marks)

Total: 25 marks

Question 2:

a) "By the end of March 2012, more than 9 million apps and websites had been integrated with Facebook" [newsroom.fb.com].
In light of this trend, discuss the security implications of including user generated content on an application's web tier. Your answer should explain how Cross Side Scripting (XSS) works, vulnerabilities exposed by XSS, and how to prevent an XSS attack.

(10 marks)

b) Discuss the support for user authentication offered by a Java Enterprise Edition (JEE) container such as Glassfish. Your answer should discuss three alternative options, and relative strenghts and weaknesses of each.

(10 marks)

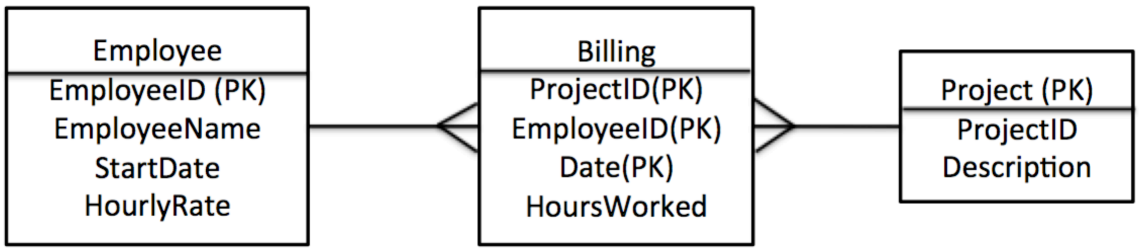
c) Explain how concurrency control is implemented when updates are made to data that is distributed across multiple nodes on a network. Assume data is stored in a relational database.

(5 marks)

Total: 25 marks

Question 3:

a) Define Entity classes to cater for the data requirements given in the Entity Relationship Diagram (ERD) below. You do not need to include set and get methods, or static queries in your answer. All relationships are bidirectional.



(18 marks)

b) Write JPQL queries for each of the following. Base your answers on the ERD from part a) above:

i) A list of employees whose hourly rate is over €50.00.

(1 mark)

ii) A list of project descriptions for projects running on January 5th 2015.

(3 marks)

iii) The total billing costs for employee ID "E2435". Note: Billing costs can be calculated by multiplying HourlyRate with HoursWorked.

(3 marks)

Total: 25 marks

Question 4:

a) You have been asked to implement the following application using Java Enterprise Edition (JEE). Identify the entity classes, session beans and message beans needed to implement the functionality described below. Illustrate, with the aid of a diagram, the interactions between application components.
Note: The application does not need to manage course materials such as lecture notes and assessment work.

Managing online courses

Initially, users must register with the site, providing a valid email address, payment details, selected course and password. Once the chosen password is sufficiently secure, the user's details are stored. Shortly afterwards the user receives an email to confirm they are registered on the course. A link on this email will bring the user to a login page. Once logged in, the user can view course material and assessment work. Assessments can be uploaded, following which the lecturer will receive an email notifying them of work to be corrected. Grades are then entered for each assesment submitted. Students can log in at any time to view grades achieved to date.

(15 marks)

b) Discuss the life cycle events of a session bean. Your answer should include the difference between stateful and stateless session bean life cycle events.

(10 marks)

Total: 25 marks

Question 5:

a) The following is an extract of code from a JSF page and its corresponding managed bean. Assume a session façade and entity class are available to support access to a student database table. Answer the questions on the next page based on this code.

```
<h:form id="studentForm">
 <h:panelGrid columns="3">

   <h:outputLabel value="First Name" for="firstName"/>
   <h:inputText id="firstName" label="First Name"
value="#{registrationBean.student.firstName}"/>
   <h:message for="firstName" />

   <h:outputLabel value="Age" for="age" />
   <h:inputText id="age" label="Age" size="2"
value="#{registrationBean.student.age}">
       <f:validateLongRange minimum="18" maximum="99"/>
   </h:inputText>
   <h:message for="age" />

   <h:panelGroup/>
   <h:commandButton id="register" value="Register"
action="#{registrationBean.addStudent}"/>
  </h:panelGrid>
</h:form>
```

```
@Named(value = " registrationBean")
@SessionScoped
public class registrationBean implements Serializable{

   private Student student;
   @EJB
   private session.StudentFacade ejbFacade;

    public String addStudent {
      ejbFacade.create(student);
      return "confirmRegistration";
    }
. . . . }
```

Question 5 continued:

i. Explain the following parameter in the JSF page: **value="#{registrationBean.student.firstName}"/>**.

(3 marks)

ii. What type of validation is used by the JSF page? Explain your answer.

(3 marks)

iii. Is the page navigation as implemented above static or dynamic? Explain you answer.

(4 marks)

iv. From your knowledge of session beans, explain the sequence of events you expect to occur from the following method call in registrationBean above: **ejbFacade.create(student);**

(5 marks)

b) Give details of any four scopes of a managed bean supporting a JSF user interface. Explain the difference between each scope, and when it would be used.

(10 marks)

Total: 25 marks