INSTITUTE OF TECHNOLOGY
BLANCHARDSTOWN

Year	Year 4
Semester	Semester 1 REPEAT
Date of Examination	Monday 18 August 2014
Time of Examination	1:00pm – 3:00pm

Prog Code	**BN402**	**Prog Title**	Bachelor of Science (Honours) in Computing	**Module Code**	COMP H4023
Prog Code	**BN104**	**Prog Title**	Bachelor of Science (Honours) in Computing	**Module Code**	COMP H4023

Module Title	Enterprise and Cloud Computing

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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 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

Question 1.

a) Web based applications are subject to a variety of security threats. Discuss one security vulnerability that can threaten the integrity of a system's most valuable asset, it's data. Your answer should explain both the threat itself illustrated with an example, and how to prevent the threat.

10 marks

b) Outline how both access control and authentication is supported by a Glassfish container. Your answer should cover:

i) Setting up, and securing, user authentication data.

3 marks

ii) Setting session bean access constraints at class and method level. Refer to both declarative and programmatic security.

4 marks

iii) A comparison of options for authenticating clients.

8 marks

Question 2.

a) Give an overview of any <u>two</u> of the three layers of the cloud computing stack. Discuss the relevance of both layers when considering options for application development based on Java EE's three tier architecture.

10 marks

b) For a service to be considered a cloud based service, it must satisfy a number of characteristics. Explain <u>three</u> such characteristics.

6 marks

c) Discuss <u>three</u> technical challenges facing cloud forensics.

9 marks

Question 3.

a) Explain message beans under the following headings:

i. The role of a message bean in a Java EE application. **2 marks**

Asynchronous,

ii. How message beans differ from session beans. **4 marks**

Session bean can call session bean directly,

iii. Message beans can avail of the same EJB container services as session beans. Apart from access to an entity manager, discuss two other services available to a message bean. **6 marks**

JNDI , dependency injection, entity manager, timer service

b) Read the extract of code below, which is from an **abstract façade** that session beans in a Java EE application extend. Answer the related questions following the code:

```
public abstract class AbstractFacade<T> {
    private Class<T> entityClass;

    public AbstractFacade(Class<T> entityClass) {
        this.entityClass = entityClass;     }

    protected abstract EntityManager getEntityManager();

    public void create(T entity) {
      getEntityManager().persist(entity);
      }
    public void edit(T entity) {
      getEntityManager().merge(entity);
      }
    public void remove(T entity) {
       getEntityManager().remove(getEntityManager().merge(entity));
       }
    public T find(Object id) {
      return getEntityManager().find(entityClass, id);
      }
```

i) Explain the role of the entity manager in the code above. **5 marks**

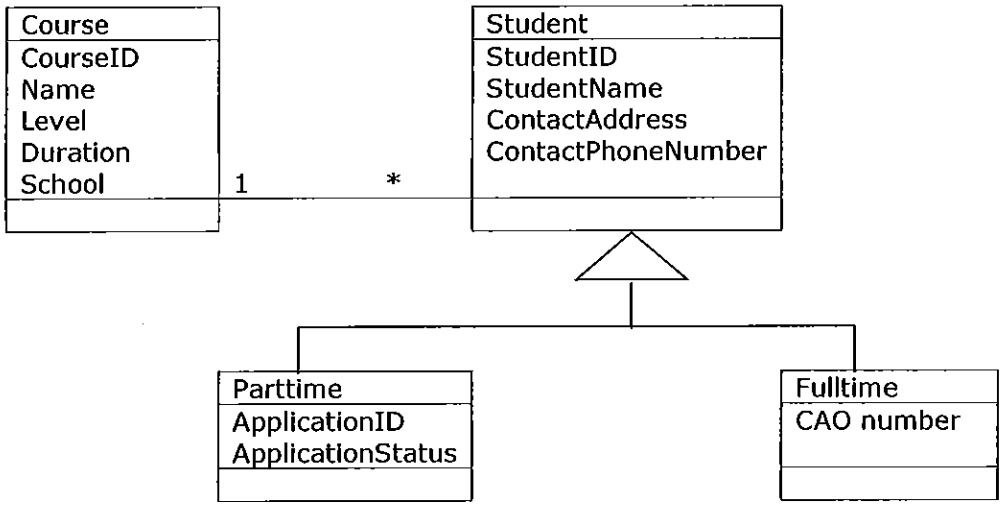
Manages the mapping from class to database, concurency, locking, security, adding, updating deleting, inheritence, adding primary keys

ii) There are four methods used above from the entity manager class: persist(), merge(), remove() and find(). Explain how each method effects the life cycle of an entity. **8 marks**

persist linjs to a new row in database table.
merge connecting it to existing row in database table,
connection break between entity class and database table
take a connected instance and connect it to a existing row

Question 4.

a) Define Entity Beans to cater for the data requirements of a college as given in the class diagram below. Justify your choice of method for handling inheritance, taking into account that student attributes may change in the future.
You do not need to include set and get methods, or static queries in your answer.



Note:
The relationship is one to many and bidirectional.
Parttime and **Fulltime** inherit from **Student**.

19 marks

b) Give the JPQL queries for each of the following, based on the class diagram in part a) above:

i. A list of part time students with an application status of "**RG**".

2 marks

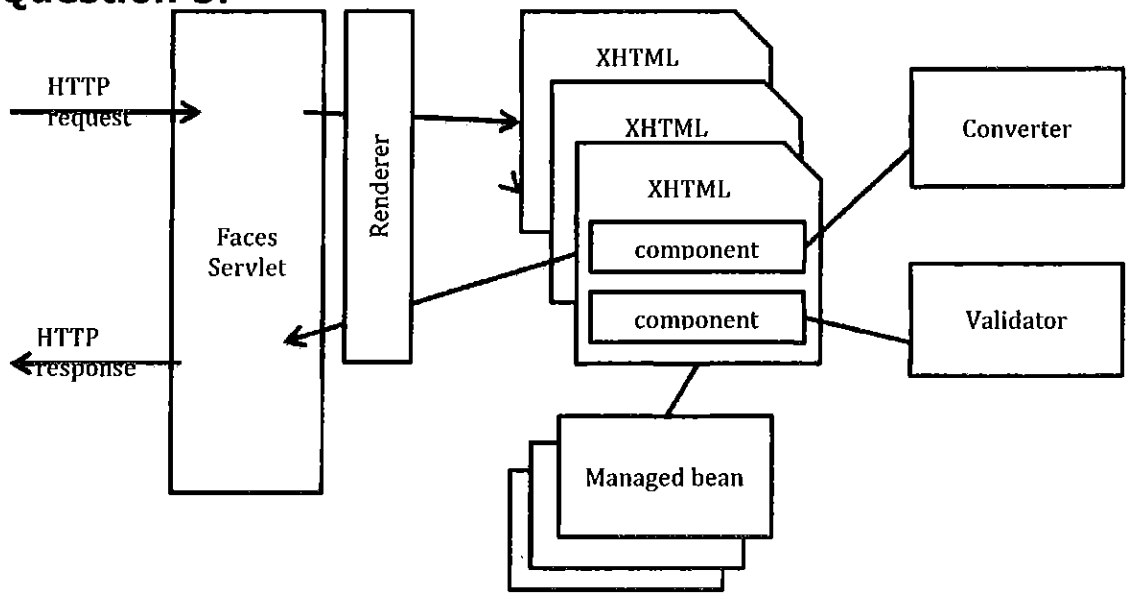
i. A list of full time students with "**Dublin**" in their address.

2 marks

ii. A list of fulltime students on courseID **BN002**.

2 marks

Question 5.



a) The goal of the Java Server Faces (JSF) framework is to make Web Development faster and easier. Discuss how this is achieved. In your answer, make reference the components of the JSF architecture illustrated above.

12 marks

b) Explain how to implement custom validation components in Java Server Faces. Illustrate your answer with an explanation of the code sample below. How is the validate meth
od referenced in a JSF page?

```
@FacesValidator("emailValidator")
public class EmailValidator implements Validator {
@Override
   public void validate(FacesContext facesContext,
         UIComponent uIComponent, Object value) throws
         ValidatorException {
      Pattern pattern = Pattern.compile("\\ddd\snn\sd+");
      Matcher matcher = pattern.matcher((CharSequence) value);
      HtmlInputText htmlInputText = (HtmlInputText) uIComponent;
      if (!matcher.matches()) {
          FacesMessage facesMessage = new FacesMessage(".....");
      }
   }
}
```

8 marks

c) Managed beans have a life span based on their scope. Outline the five scopes of a JSF managed bean.

5 marks