INSTITUTE OF TECHNOLOGY BLANCHARDSTOWN

Institute of Technology Blanchardstown
Institiúid Teicneolaíochta Baile Bhlainséir

Year	**Year 3**
Semester	**REPEAT PAPER**
Date of Examination	Monday 25 August 2014
Time of Examination	1:00pm – 3:00pm

Prog Code	BN302	**Prog Title**	Bachelor of Science in Computing in Information Technology	**Module Code**	COMP H3032
Prog Code	BN013	**Prog Title**	Bachelor of Science in Computing in Information Technology	**Module Code**	COMP H3032
Prog Code	BN104	**Prog Title**	Bachelor of Science (Honours) in Computing	**Module Code**	COMP H3032

Module Title	Object Orientation with Design Patterns

Internal Examiner(s): **Dr. Luke Raeside**

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) **Answer ANY FOUR questions**
3) **All questions carry equal marks.**

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

Question 1

a) Describe the role of **Design Patterns** within software development.

[5 marks]

b) List **THREE** categories of design patterns as described by the "Gang of Four". Describe briefly the characteristics of **EACH** of the categories listed.

[14 marks]

c) List **THREE** advantages of applying the **MVC** design pattern.

[6 marks]

[Total 25 marks]

Question 2

a) Explain clearly with the aid of an intuitive example the **intent** of the **Builder** design pattern.

[5 marks]

b) Create a Java class called *Sun* so that only one instance of this class can be created, i.e., apply the **Singleton Pattern** to this class. Provide a method within the class called *createSun()* that returns a reference to the **only possible instance** of the *Sun* class.

[12 marks]

c) Describe using an intuitive example the function of the **Façade** design pattern.

[5 marks]

d) Outline **ONE** consequence of implementing the **Façade** pattern.

[3 marks]

[Total 25 marks]

Question 3

a) Draw a **UML** class diagram to represent the relationships between **EACH** of the participants of the **Decorator** pattern.

[9 marks]

b) Draw an outline **UML** class diagram to illustrate the **Composite** pattern. Outline the role of **EACH** of the participants shown in the diagram.

[10 marks]

c) Discuss briefly **TWO** consequences of applying the **Command** pattern.

[6 marks]

[Total 25 marks]

Question 4

a) Explain clearly the design implications of using an **abstract class** over an **interface.**

[5 marks]

b) Describe the **Intent** of **EACH** of the following design patterns:

i. **Abstract Factory**
ii. **Adapter**

[8 marks]

c) Discuss briefly the **intent** and **design structure** of the **Command** pattern. Include **EACH** of the following participants in your discussion:

i. **Invoker**
ii. **Command**
iii. **Concrete Command**
iv. **Receiver**

[12 marks]

[Total 25 marks]

Question 5

a) Explain briefly the role of **EACH** of the following participants of the **Builder** design pattern:

i. **Director**
ii. **Product**
iii. **Bullder (Abstract class)**
iv. **Concrete Builder** **[12 marks]**

b) Describe briefly **ONE positive** and **ONE potentially negative** consequence of the **Flyweight** pattern.

[6 marks]

c) List **TWO** potential consequences of applying the **Chain of Responsibility** design pattern.

[4 marks]

d) Outline the **Intent** of the **Observer** design pattern.

[3 marks]

[Total 25 marks]