INSTITUTE OF TECHNOLOGY BLANCHARDSTOWN

Institute of Technology Blanchardstown
Institiúid Teicneolaíochta Baile Bhlainséir

Year	**Year 3**
Semester	**REPEAT PAPER**
Date of Examination	Tuesday 27th August 2013
Time of Examination	10.00am – 12.00pm

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) Define the term **Design Pattern** in the context of software development.

[3 marks]

b) List **TWO** consequences of declaring a Java **method** as **abstract**.

[4 marks]

c) Describe briefly the fundamental characteristics of:

i. **Creational Patterns**
ii. **Behavioural Patterns**

[8 marks]

d) Draw a **UML** class diagram to illustrate **polymorphism**. Include **ONE polymorphic method** in your diagram.

[6 marks]

e) List **TWO** design patterns defined by the "Gang of Four" that employ **polymorphism** within the pattern.

[4 marks]

[Total 25 marks]

Question 2

a) The "Gang of Four" defined the following principle of reusable object-oriented design: "Programme to an interface, not an implementation". Briefly describe **TWO** advantages of applying this principle in object oriented program design.

[6 marks]

b) Define the **intent** of the **Builder** pattern. List **ONE** consequence of applying this pattern.

[4 marks]

c) Draw a **UML** class diagram of the **Builder** pattern. Clearly label each of the **participants** in the pattern.

[9 marks]

d) Describe clearly the role of **EACH** of the following **participants** of the **Abstract Factory** pattern:

i. **Abstract Factory**
ii. **Concrete Factory**

[6 marks]

[Total 25 marks]

Question 3

a) Explain the **intent** of the **Singleton** pattern.

[3 marks]

b) Draw a **detailed UML diagram** for the **Singleton** pattern.

[7 marks]

c) Describe in brief **TWO** consequences of implementing the **Singleton** pattern.

[6 marks]

d) Use intuitive examples to describe the difference in **intent** between the **Adapter** pattern and the **Façade** pattern. Include some appropriate **UML** diagrams in your answer.

[9 marks]

[Total 25 marks]

Question 4

a) Describe briefly the **intent** of **EACH** of the following patterns:

i. **Iterator**
ii. **Observer**
iii. **Chain of Responsibility**

[9 marks]

b) Draw a **UML** class diagram for the **Chain Of Responsibility** pattern. Outline the role of **ONE** of the participants shown in the diagram.

[8 marks]

c) Differentiate clearly between the **Abstract Factory** pattern and the **Factory Method** pattern. Include the following terms in your answer:

i. **Creational Pattern**
ii. **Intent**
iii. **Objects**

[8 marks]

[Total 25 marks]

Question 5

a) Describe **ONE** characteristic of a **Structural Design Patterns** as described by the "Gang of Four".

[3 marks]

b) Distinguish clearly between a **class structural pattern** and an **object structural pattern.**

[3 marks]

c) Explain briefly the **intent** of **EACH** of the following design patterns:

i. **Composite**
ii. **Decorator**

[6 marks]

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

[7 marks]

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

[6 marks]

[Total 25 marks]