INSTITUTE OF TECHNOLOGY

BLANCHARDSTOWN

Year	Year 3
Semester	Autumn Repeat
Date of Examination	**Wed. 19th August 2009**
Time of Examination	**10.00 am**

Prog Code	BN013	**Prog Title**	Bachelor of Science in Computing in Information Technology	**Module Code**	COMP H3012
Prog Code	BN104	**Prog Title**	Bachelor of Science (Honours) in Computing	**Module Code**	COMP H3012
Prog Code	BN302	**Prog Title**	Bachelor of Science in Computing in Information Technology	**Module Code**	COMP H3012

Module Title	Object Orientation with Design Patterns

Internal Examiner(s): *Mr. Luke Raeside*
External Examiner(s): *Mr. John Dunnion, Dr. Richard Studdert*

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) This paper consists of 5 questions.
3) Candidates should attempt any 4 questions.
4) 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 the **THREE** categories of design patterns as described by the "Gang Of Four". Describe briefly the characteristics of **EACH** of the categories listed.

[16 marks]

c) Describe briefly the intent of the MVC design pattern.

[4 Marks]

[Total 25 marks]

Question 2

a) Distinguish clearly between **class inheritance** and **interface inheritance.**

[5 Marks]

b) Describe briefly the intent of the **Abstract Factory** pattern

[5 Marks]

c) Draw a UML class diagram of an **Abstract Factory** pattern. Clearly label **EACH** of the participants in the pattern.

[10 Marks]

d) List the role of each of the following participants of the **Builder** pattern:

i. **Director**
ii. **Builder**
iii. **Concrete Builder**
iv. **Product**

[5 Marks]

[Total 25 marks]

Question 3

a) Define the intent of the **Adaptor** pattern.

[3 Marks]

b) Create a Java class called *NetworkConnectionManager* 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 *getNetworkConnectionManager()* that returns a reference to the only possible instance of the class.

[15 Marks]

c) Explain using code examples how Java applies the **Adapter Pattern** to the mouse listener interfaces.

[7 Marks]

[Total 25 marks]

Question 4

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

i. **Command**
ii. **Observer**

[8 Marks]

b) Draw a UML class diagram for the **Composite** pattern. Outline the role of **EACH** of the participants shown in the diagram.

[10 Marks]

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

[7 Marks]

[Total 25 marks]

Question 5

a) List **ONE** difference between the **Abstract Factory** pattern and the **Builder** pattern.

[2 Marks]

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

i. **Flyweight**
ii. **Proxy**

[8 marks]

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

[8 Marks]

d) Briefly describe using an example the consequences of applying the **Façade Pattern** to a software design problem.

[7 Marks]

[Total 25 marks]