TEESSIDE UNIVERSITY
SCHOOL OF COMPUTING

ICA SPECIFICATION

This form should be attached to the front of the ICA specification and include all details.

Module Title: Advanced Java Programming	**Module Leader:** Mark Truran:
	Module Code: COM2026-N-BJ1-2012
Assignment Title: Object oriented design patterns	**Deadline Date:** 7th January 2013
	Deadline Time: 11:59 PM (2359)
	Submission Method: ONLINE ■

OASIS Submission Notes:

- All work (including CDs etc) needs to be secured in a plastic envelope or a folder and clearly marked with the student name, number and module title.
- An Assignment Front Sheet should be fully completed before the work is submitted
- When an extension has been granted, a fully completed and signed Extension form must be submitted together with your work.

ONLINE Submission Notes:

- Please follow carefully the instructions given on the Assignment Specification
- When an extension has been granted, a fully completed and signed Extension form must be submitted as soon as it had been signed.

FULL DETAILS OF THE ASSIGNMENT ARE ATTACHED
INCLUDING MARKING & GRADING CRITERIA

Learning Outcomes

This assignment relates to learning outcomes (2) and (5) of the *Advanced Java Programming* module. These learning outcomes state that by the end of this module you should be able to:

2. Design and build a solution to a programming problem that uses design patterns
5. Reflect on the advantages and limitations of OO design principles/patterns

Introduction

In this ICA you will create a *presentation* that explains a particular OO design pattern. You will also develop a *NetBeans project* to accompany your presentation. You will be assigned *one* behavioural design pattern from the list below.

- Mediator pattern (MED)
- Command pattern (COM)
- Memento pattern (MOM)

You will also be assigned a hypothetical *context.* You must base your explanation of the pattern in this hypothetical context. You will be assigned *one* context from the list below.

- *Mars Base Alpha* – The first step in the colonization of Mars. Prefabricated habitat modules, laboratories and greenhouses, built and occupied by elite team of scientists and engineers. Planet exploration via drones and pressurized rovers. (MBA)
- *Black Squadron* – A shadowy government agency that specialises in surveillance, espionage and covert ops. Field operatives are experts in executive protection, counter intelligence and escape/evade techniques. Intelligence analysts sift through web sites, emails and SMS/MMS traffic to identify threats to national security (BLACK).
- *SkyNot* – An aggressive start-up company based in the American badlands, currently developing a line of robotic workers for off shore mining, construction work and military applications. Prototypes include a realistic humanoid model, an 8-legged mobile support platform for heavy weapons, and an invertebrate 'worm' that finds weak spots in fortified bunkers (SKY).

A list of pattern/context assignments is attached as an appendix to this document. Please check it now. Your pattern/context assignment will dictate the content of your presentation and project. For example, if you have been assigned 'MED-MBA', you will need to submit a presentation/project that explains the *Mediator* pattern using the hypothetical context of *Mars Base Alpha*.

You are free to pick any *reasonable* aspect of your assigned context. Please be imaginative! For example, if you were assigned 'MED-MBA', you could base your explanation of the mediator pattern on the base security/access system, or a 'smart' space suit, or a meteor detection/deflection module, or an RV guidance system etc.

Pick an aspect of your assigned context that is interesting! Imagine that you have to teach some of your peers about the design pattern. Try to capture their imagination!

Deliverable 1: The Presentation (50%)

This deliverable is worth 50% of the overall marks for the ICA.

Your slide show must contain the following elements:

1. A title slide.
2. A contents slide.
3. A section describing an imaginative and interesting problem scenario based in your assigned context (i.e. a hypothetical software engineering dilemma that 'needs' a design pattern).
4. A section providing a coherent explanation of your assigned design pattern, including annotated code snippets and a UML diagram. You should refer directly to the Gang of Four book in this section.
5. A section describing how your assigned design pattern can be applied to the hypothetical engineering problem outlined in (3), including samples of annotated code and an applied UML diagram.
6. A section which discusses the advantages/disadvantages of this pattern and design patterns in general. |n this section you should also discuss the relationship between this pattern and other design patterns / OO design principles e.g. SOLID, GRASP
7. A summary slide which provides an overview of the pattern. This must include a bullet point that reads '*Use this pattern when*....'.

Prepare your presentation using *Powerpoint* (PPT/PPTX) or *Open Office* (ODP). Convert your presentation to PDF format before submission. Your presentation must contain at least 20 slides. Spelling, grammar, intelligibility and visual appearance are important factors in the overall mark.

Deliverable 2: The Project (50%)

This deliverable is worth 50% of the overall marks for the ICA.

You must produce a *NetBeans* project that demonstrates your assigned pattern *clearly* and *efficiently.* Some of the code snippets you use in your presentation will be drawn from this project.

Your code must satisfy all of the *CheckStyle* rules described in 'scm_checks.xml'. Your *javadoc* must be meaningful and complete at the field, method, constructor, class and package level. Variables must be scoped correctly and declared with appropriate access modifiers.

Style, encapsulation and documentation are important factors in the overall mark. Do *not* neglect them. If you are in any doubt about the quality of code that is required, please review and emulate the SOLUTION files hosted on http://eat.tees.ac.uk

You should exercise/test your solution using either (a) a class with a main method or (b) a set of unit tests. A set of unit tests will attract significantly more marks.

You may incorporate other design patterns into your project for extra credit, but please ensure that the assigned design pattern remains clear and intelligible.

Notes

- This is individual work. Do not work with other students. Do not discuss your work with other students. Do not lend your work to other students. Do not post your work on forums or bulletin boards. Your code will be checked using a plagiarism detection tool. The penalties for plagiarism are severe.
- You must use the *NetBeans* IDE to produce your project. If you use a different IDE or a different code editor you will lose 50% of your marks.
- Study the assignments at the back of this assessment carefully. If you hand in work that targets the wrong pattern/context you will lose 50% of your marks.
- Failure to export your presentation to PDF will involve the loss of marks.
- Your work will be tested in IT.08 (Linux lab). Before you submit your work, please make sure that your project will compile and run in that lab. Marks will be deducted if we have to fix your project before we start testing.

How do I submit?

Before the deadline, submit your work online following the instructions listed here:

Advanced Java Programming > Assessment > Component 1 > Submission

APPENDIX 1 – PATTERN/CONTEXT ASSSIGNMENTS

NAME	PATTERN	CONTEXT
ANASTASOV KIRIL	MED	MBA
APPLETON MARK WILLIAM	MED	MBA
CAYGILL MATTHEW	MED	MBA
DAVIDSON MICHAEL THOMAS	MED	MBA
DAVIES MARC	MED	BLACK
DENISJONOKS EDUARDS	MED	BLACK
GOODALL NATHAN	MED	BLACK
GREEN BENJAMIN THOMAS	MED	SKY
HANSON BRAGG OLIVER	MED	SKY
HEYWOOD DANIELLE	MED	SKY
INGLEBY THOMAS CHARLES	COM	MBA
JEFFERSON STEPHEN	COM	MBA
KIRTLEY JENNIFER	COM	MBA
MELLOR ADAM DAVID AIDEN	COM	BLACK
PERRY OLIVER COLIN	COM	BLACK
PIAZZA ALEXANDER	COM	BLACK
PICKERING GEORGE ROBERT	COM	BLACK
RAHMAN SOHAIL	COM	SKY
RAMEL LEWIS JAMES MICHAEL	COM	SKY
ROBSON JOHN	COM	SKY
SAMPLE NATHEN	MOM	MBA
SMITH JACOB ANDREW	MOM	MBA
TEMPLE SEAN PETER	MOM	MBA
THOMPSON ROBERT	MOM	BLACK
TORANO EUAN	MOM	BLACK
WARMINGTON ALEX	MOM	BLACK
WATERSON DOMINIC	MOM	SKY
WILLIAMSON MARK JOHN	MOM	SKY
WILLS CHRISTOPHER	MOM	SKY
WRIGHT OWEN JAMES	MOM	SKY