UNIVERSITY of TECHNOLOGY, MAURITIUS

MSc Software Engineering

Cohort: MSE/07/PT

Examinations for 2007 - 2008 / Semester 1

MODULE: DESIGN PATTERNS

MODULE CODE: SDT5101

Duration: 2 Hours

Instructions to Candidates:

1. Answer **all** questions.
2. Questions may be answered in any order but your answers must show the question number clearly.
3. Always start a new question on a fresh page.
4. All questions **do not** carry equal marks.
5. Total marks 60.

This question paper contains 3 questions and 3 pages.

ANSWER ALL QUESTIONS

QUESTION 1: (30 MARKS)

Mauri Ltd has just acquired a new stock management system and the source codes (PhP5) also have been delivered. The coding style is fully object-oriented. The company has been using the system for two weeks and is not satisfied with it. For each user accessing the system, a new connection is made. The User Interface (UI) is not standard. Each update to the database is treated by a separate program. Search facilities have been included but different programs have been written to provide such facilities. You have been asked to refactor the system using Design Patterns.

(a) Identify five design patterns that can be used. Describe how each pattern can be used in the above context. Your answer should consist of a detailed description of the pattern including the structure (diagram) and a justification for its use. Note: Sample codes may be used to explain your answer. ***(5x5 marks)***

(b) "Familiarity sometimes keeps us from seeing the obvious." In what way can patterns help avoid this? ***(1 mark)***

(c) What are three reasons that cause requirements to change? ***(3 marks)***

(d) What could Christopher Alexander discover by looking at structures that solve similar problems? ***(1 mark)***

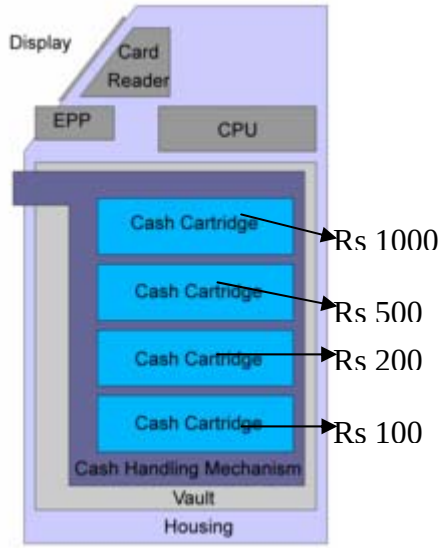
QUESTION 2: (20 MARKS)

(a) Explain with a diagram, what an observer pattern aims to solve and how it does this? ***(10 marks)***

(b) Explain with a diagram, what a Flyweight pattern aims to solve and how it does this? ***(10 marks)***

QUESTION 3: (10 MARKS)

(10 marks)



The above diagrams show the ATM machine and its internal mechanism. There are four cash cartridges, each one storing a bunch of notes as shown in the diagram. A customer wants to withdraw Rs 2800. The machine will give him/her two Rs1000 notes, one Rs 500 note, one Rs 200 note and one Rs 100 notes

Describe the design pattern that will be best suitable for the cash handling mechanism?

******END OF QUESTION PAPER******