

**CSE3311 SOFTWARE DESIGN – ASSIGNMENT 5
PATTERNS
VER. 1.0**

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Due: Wednesday, July 31, 2013

Where: Electronic

Weight: 10%

1. MAIN POINTS

Be sure to read and follow all the guidelines from the links on reports and academic honesty from the WWW home page for the course. The specification is the union of this document plus the program text you are given.

1.1. **Learning objectives.**

- Reading and writing assertions
- Reading and understanding contracts
- Verifying the correctness of algorithms

1.2. **To hand in.** Hand in, in class, a report containing the following items as a package in the given order.

- (1) Cover page printed from the course web pages
- (2) Your report consisting of your solutions to the tasks in Section 2. For reports done in pairs, include an appendix describing the contributions of the two team members. (electronic document)
- (3) Electronic submission: **There is only electronic submission for this report.**

2. TASKS

2.1. **Design Critique.** You are a software engineer at a company owned by Montgomery Burns, the most evil man in Parry Sound. One day, Mr. Burns, who thinks he knows something about software design, comes to you with a proposed design for a web-based hockey pool manager depicted on the figure 1. This system is intended to maintain professional hockey team statistics and provide a central database so that everyone in the pool mostly lazy employees can access the players statistics. Mr. Burns proposed design is as follows. Mention **five** things that you think are wrong or flawed with this design, and explain why you think they are flawed.

NOTE:

You dont need to know anything about hockey in order to understand this design and its flaws. The flaws are due to poor OO design practice.

A label missing from a client-supplier relationship is not considered a flaw.

There are at least five flaws. Only the first five you write down will be considered.

Mr. Burns will fire you for criticizing his design.

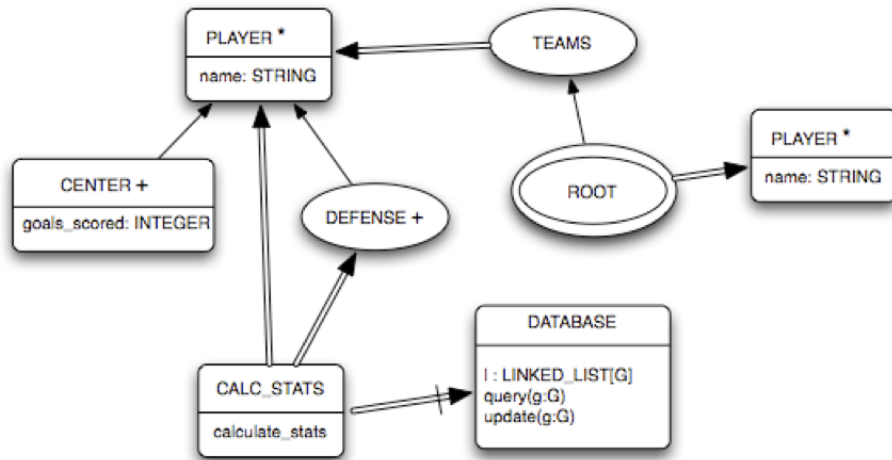


FIGURE 1. Mr. Burns design

2.2. BON: Classes and Relationships. In this question you are expected to use your knowledge on design patterns to suggest a solution for a given scenario. For each of the following scenarios, state which design pattern(s), of the ones described in the course, can best solve the problem. Describe how you would use the patterns (which pattern participants are responsible for doing what) to solve the problem. Briefly identify and discuss related issues. Only high-level descriptions are required. You do not need to provide pattern details.

2.2.1. *Cities.* A set of cities is maintained as an interconnected graph structure. A web based application needs to maintain multiple views of the distances between cities. Assume that the GRAPH class provides operations for obtaining the distance between any two cities. New roads are always constructed between cities and as a result the distances change. One view provides a table of distances between cities in kilometres, and another view maintains the same information in miles.

2.2.2. *Cities II.* In the problem of Part A, an application needs to collect various kinds of information about the cities such as the least and most crowded cities, the city with the largest mall, etc. Assume each object representing a city is equipped with necessary operations to obtain the population, size of the largest mall, etc.

2.2.3. *Government.* The Canadian Government needs to set certain attributes for the Canadian provinces based on characteristics of each province and federal policies. For instance, health care and education budgets allocated to the provinces use formulas that take into account regional differences. There are many other operations whose components depend on provincial data. New operations are introduced every year and some operations may be removed.

2.2.4. *Pizza.* A pizza factory produces pizzas with various toppings. There are 20 different toppings and a customer may order any combination of toppings. Assume that each of pizza bread and each topping will be represented by a different class.

3. GRADING SCHEME

The grade for the report is partitioned into the following parts.

- (1) Overall presentation – 10%
- (2) Design Critique – 20%
- (3) BON: Classes and Relationships (total 70%)
 - Cities – 10%
 - Cities II – 10%
 - Government – 30%
 - Pizza – 20%