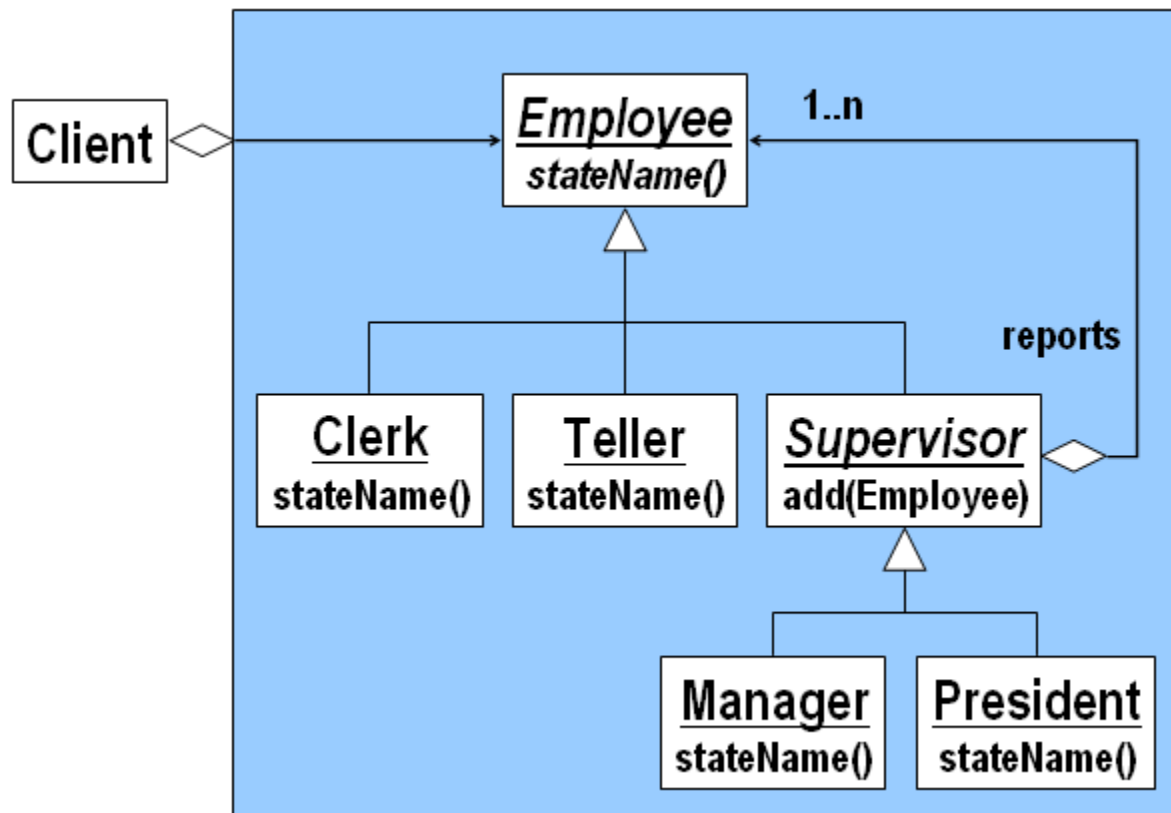# SOFE3650: Software Design and Architecture
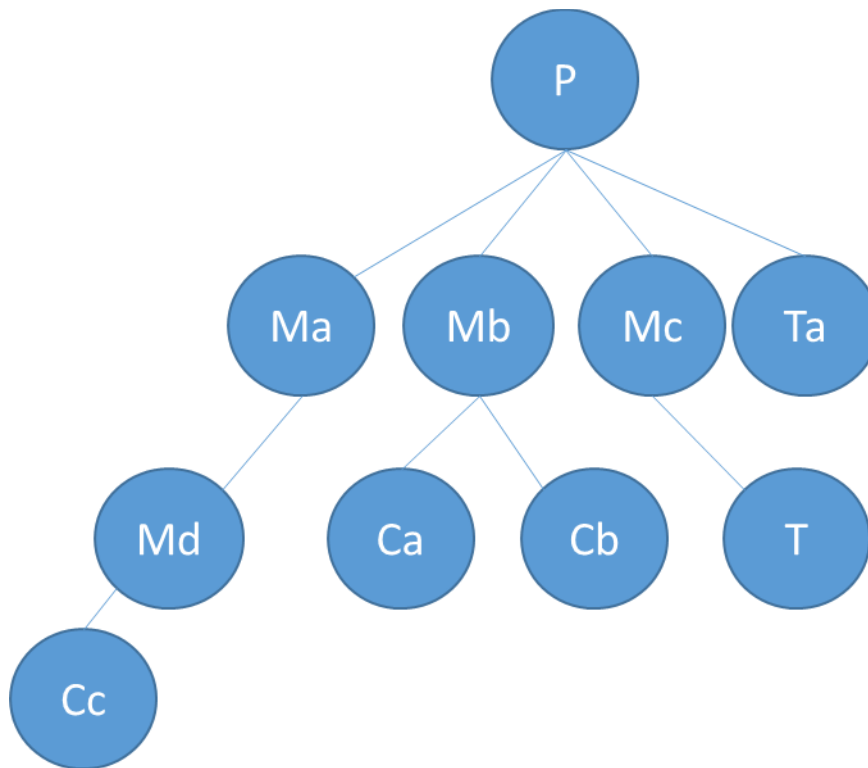## Assignment 2
Due: December 4, 2016 @ 11:00pm

Question 1 [10 mark]

Consider the Composite Design Pattern Class Diagram in Slide 30 Chapter 15 which represents the hierarchical structuring of a bank (see below):

Develop the implementation for each of the classes and assume the following tree structure in the bank:

Each node is labeled with its name. Node that start with P = President, M = Manager, T = Teller, and C = Clerk. You can make the Client class be responsible for creating the tree.

Your implementation will allow a Client class to print all the names of the objects by calling the stateName() function on the President object. Your implementation should also print the depth level of each object.

Question 2 [15 marks]

Consider the following classes:

Appetizer	MainDish	Dessert	Drink
+serve()	+serve()	+serve()	+serve()

Assume a restaurant that only offers the following two types of meals: (a) a full meal and (b) an economic meal. The full meal consists of the following food items and is served in the following order:

1. Appetizer
2. Drink
3. Main dish
4. Dessert

Meanwhile the economic meal consists of the following food items and is served in the following order:

1. Drink
2. Main dish

a) Identify the most appropriate design pattern that can be used to allow a customer to only order using one of the two types of meals provided and that the meal components must be served in the given order.

b) Draw the class diagram using the design pattern you chose.

c) Provide the Java code for the design pattern.

Hint: The four classes are created once. For example, serving an appetizer twice requires the appetizer object to execute the serve() function twice. You also do not need to create a singleton object.

Question 3 [15 marks]

Consider the following four classes:

Hot dog	Pizza	Burger	Check
int price = 4	int price = 8	int price = 5	int price = 0
addToBill (int bill)	addToBill (Bill b)	addToBill (Bill b)	addToBill (Bill b)

An order would consist in a list of these food items being created. Each food object has a price. The order is ended by a Check object that has a price of ZERO. At some point a Client class would want to get the bill by executing the addToBill( ) function which compute the total price of the order.

a) Identify the most appropriate design pattern that can be used to allow a customer to only order using one of the two types of meals provided and that the meal components must be served in the given order.

b) Draw the class diagram using the design pattern you chose. Also explain in writing how the class structure you have will operate to satisfy the restaurant's conditions.

c) Assuming the client ordered 2 hot dogs, 1 pizza and 2 burgers. Provide the Java code for the design pattern and that would correctly calculate the total price of the order. (*You can make the client create the list of food items including the tail Check object*).