

# Midterm

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*\*Note: Problems are out of order to remove large blank spaces. Problem ordering is 2, 1, 3*

## Problem 2

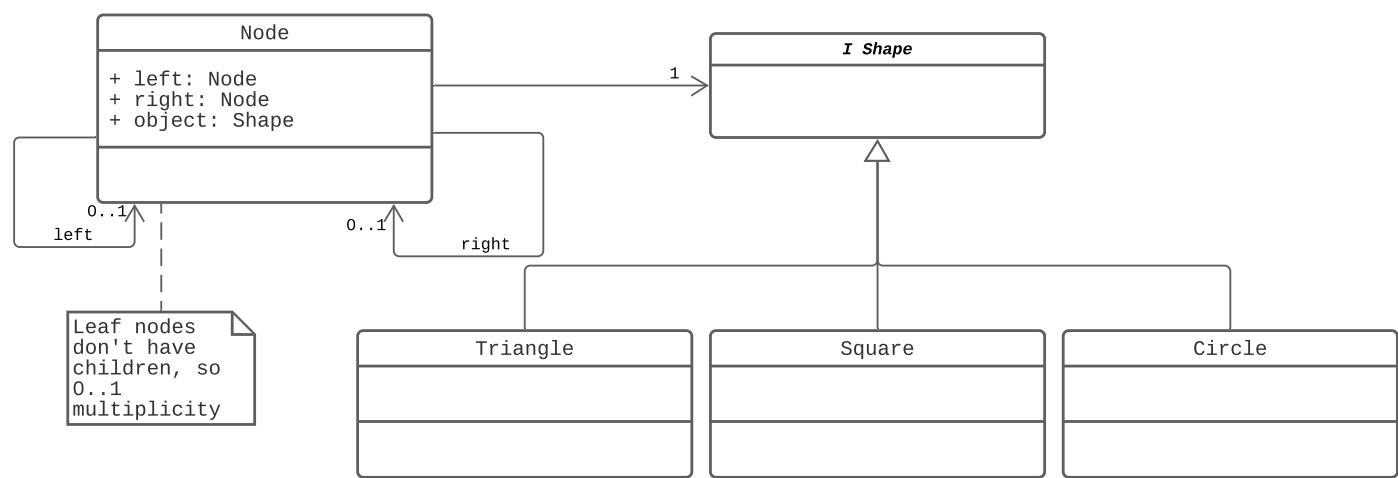
// In UML book 5.1.2.1 it gives example 5-3 of code for an Association Class  
// So this is copied from the book

```
public class Account {  
    private String name;  
    private Category[] categories;  
    private DiaryEntry[] entries;  
}
```

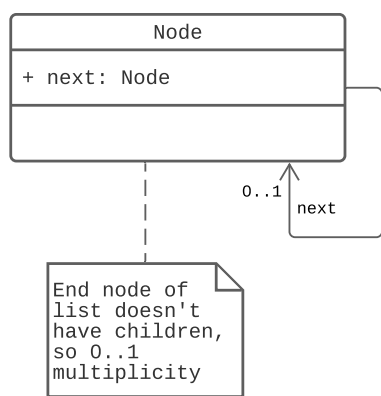
```
public class Category {  
    private String name;  
}
```

```
public class DiaryEntry {  
    private String name;  
    private Category[] categories;  
}
```

Question 1 i      Draw a UML class diagram for: A binary tree of Shapes, where a shape can either be a tirangle, a square or a circle



Question 1 ii      Draw a UML class diagram for: A uni-directional linked list



### Problem 3

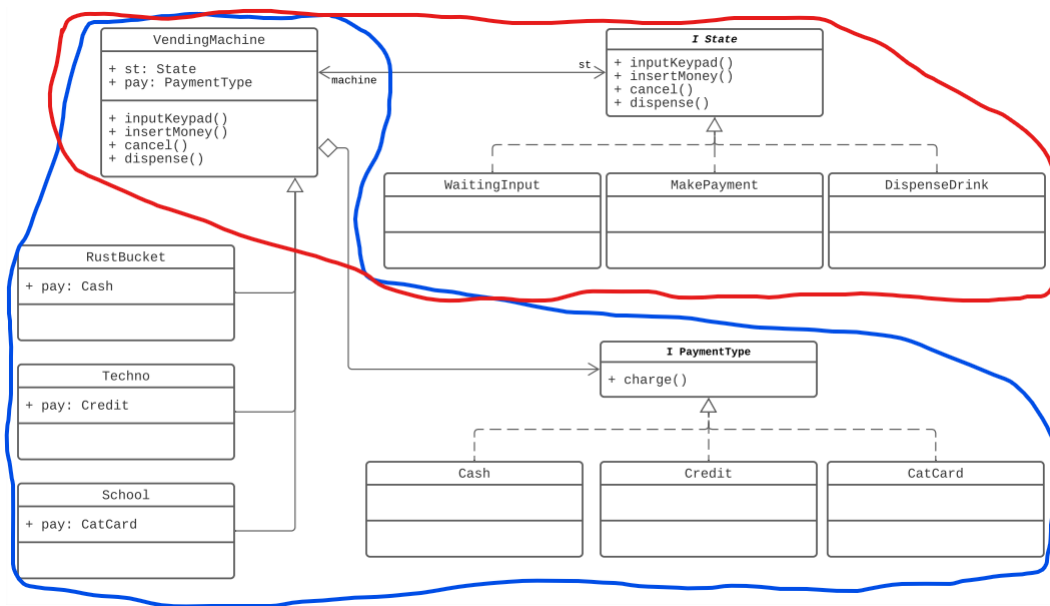


Figure 1: Coupled components are circled

In figure 1, the coupled components are circled. The components circled in red are the state pattern, and the components circled in blue are the strategy pattern. This depicts a vending machine. There are multiple states the vending machine could be in (similar to the gumball machine from class). Each vending machine can use a different payment type (strategy pattern) that could be swapped out. So if money is inserted in the **makePayment** state it will use the pay object (type **PaymentType**) to collect money in a variety of ways. This combines the strategy pattern (changeable **PaymentType**) and the State pattern (different **VendingMachine** states).

Question 3

Draw UML class diagram of a coupled pattern

