ADT - Type defined in terms of its data items and associated operations, **NOT its implementation.**

a. Identify the instance variables for each of the class

Dispenser: To make the sale, at least one item must be in the dispenser and the customer must know the cost of the product. Therefore, the instance variables of a dispenser are:

- Product cost - `cost`
- Number of items in the dispenser - `numberOfItems`

Cash Register: The cash register accepts money and returns change. Therefore, the cash register has only one instance variable, which we call `cashOnHand`.

Candy Machine: The class CandyMachine has four dispensers and a cash register. You can name the four dispensers by the items they store. Therefore, the candy machine has five instance variables:

- four dispensers – `candy`, `chip`, `gum`, and `cookie`
- a cash register – `cRegister`

b. Identify the methods/operations for each of the class (i.e. Dispenser, Cash Register, Candy Machine)

The relevant verbs are *show* (selection), *make* (selection), *show* (cost), *accept* (money), *return* (change), and *make* (sale).

- The verbs *show* (selection) and *make* (selection) relate to the candy machine.
- The verbs *show* (cost) and *make* (sale) relate to the dispenser.
- Similarly, the verbs accept (money) and *return* (change) relate to the cash register.

Dispenser: The verb *show* (cost) applies to either printing or retrieving the value of the data member cost. The verb *make* (sale) applies to reducing the number of items in the dispenser by 1. Of course, the dispenser has to be nonempty. You must also provide an operation to set the cost and the number of items in the dispenser. Thus, the operations for a dispenser object are:

- `getCount`: Retrieve the number of items in the dispenser.
- `getProductCost`: Retrieve the cost of the item.
- `makeSale`: Reduce the number of items in the dispenser by 1.
- `setCost`: Set the cost of the product.
- `setNumberOfItems`: Set the number of items in the dispenser.

Cash Register: The verb *accept* (money) applies to updating the money in the cash register by adding the money deposited by the customer. Similarly, the verb *return* (change) applies to reducing the money in the cash register by returning the overpaid amount (by the customer) to

the customer. You also need to (initially) set the money in the cash register and retrieve the money from the cash register. Thus, the possible operations on a cash register are:

- `acceptAmount`: Update the amount in the cash register.
- `returnChange`: Return the change.
- `getCashOnHand`: Retrieve the amount in the cash register.
- `setCashOnHand`: Set the amount in the cash register.

Candy Machine: The verbs *show* (selection) and *make* (selection) apply to the candy machine. Thus, the two possible operations are:

- `showSelection`: Show the number of products sold by the candy machine.
- `makeSelection`: Allow the customer to select the product.