Introduction to Classes Exercises

The following are descriptions of everyday items that you need to implement as classes. The set of attributes and methods are outlined for each item.

Easier Exercises

Company

Data Members

Attribute	Data Type	Get	Set	Description
name	string	X	X	The company name.
numberOfEmployees	int	X	X	The number of employees at the company.
revenue	double	X	X	The annual revenue of the company.
expenses	double	X	X	The annual expenses of the company.

Methods

```
public String getCompanySize()
public double getProfit()
```

Notes

- getCompanySize() returns "small" if 50 or less employees, "medium" if between 51 and 250 employees, "large" if greater than 250 employees.
- getProfit() returns the result of revenue - expenses.

Constructor

The Company class uses the default constructor.

Person

Data Members

Attribute	Data Type	Get	Set	Description
firstName	String	X	X	The first name of the person.
lastName	String	X	X	The last name of the person.
age	int	X	X	The age of the person.

Methods

```
public String getFullName()
public boolean isAdult()
```

Notes

- getFullName() returns the lastName + ", " + firstName.
- isAdult() returns true if the person is 18 or older.

Constructors

The Person class uses the default constructor.

Product

Data Members

Attribute	Data Type	Get	Set	Description
name	String	X	X	The name of the product.
price	double	X	X	The price of the product.
weightInOunces	double	X	X	The weight (in ounces) of the product.

Methods

Notes

- There are no additional methods beyond the basic getters and setters.

Constructors

The Product uses the default constructor.

Medium Exercises

Dog

Data Members

Attribute	Data Type	Get	Set	Description
sleeping	boolean	X		TRUE if the dog is asleep. FALSE if not.

Notes

- All new dogs are awake by default.

Methods

```
public String makeSound()
public void sleep()
public void wakeUp()
```

Notes

- makeSound() returns "Zzzzz..." if the dog is asleep. Returns "Woof!" if the dog is awake.
- sleep() sets sleeping to true.
- wakeUp() sets sleeping to false.

Constructor

The Dog class uses the default constructor.

ShoppingCart

Data Members

Attribute	Data Type	Get	Set	Description
totalNumberOfItems	int	X	X	The number of items in the shopping cart.
totalAmountOwed	double	X	X	The total amount owed.

Notes

- All shopping carts have total 0 items and 0.0 amount owed by default.

Methods

```
public double getAveragePricePerItem()
public void addItems(int numberOfItems, double
pricePerItem)
public void empty()
```

Notes

- getAveragePricePerItem() returns the result of totalAmountOwed / totalNumberOfItems.
- addItems(int numberOfItems, double pricePerItem) updates totalNumberOfItems and increases totalAmountOwed by (pricePerItem * numberOfItems)
- empty() resets totalNumberOfItems to 0 and totalAmountOwed to 0.0.

Constructor

The ShoppingCart class uses the default constructor.

Difficult Exercises

Calculator

Data Members

Attribute	Data Type	Get	Set	Description
currentValue	int	X		The current calculated value.

Notes

- All calculators have 0 as currentValue by default.

Methods

```
public int add(int addend)
public int multiply(int multiplier)
public int subtract(int subtrahend)
public int power(int exponent)
public void reset()
```

Notes

- add(int addend) returns the new currentValue after performing the addition.
- multiply(int multiplier) returns the new currentValue after performing the multiplication.
- subtract(int subtrahend) returns the new currentValue after performing the subtraction.
- power(int exponent) returns the new currentValue after raising the currentValue by the exponent.
- void reset() resets the currentValue to 0.

Constructor

The Calculator class uses the default constructor.