

# Introduction to Classes Exercises

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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		<b>TRUE</b> if the dog is asleep. <b>FALSE</b> 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
<code>totalNumberOfItems</code>	<code>int</code>	X	X	The number of items in the shopping cart.
<code>totalAmountOwed</code>	<code>double</code>	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 addItem(int numberOfItems, double
pricePerItem)
public void empty()
```

## Notes

- `getAveragePricePerItem()` returns the result of `totalAmountOwed / totalNumberOfItems`.
- `addItem(int numberOfItems, double pricePerItem)` updates `totalNumberOfItems` and increases `totalAmountOwed` by  $(\text{pricePerItem} * \text{numberOfItems})$
- `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.