# Java OOP Exam

# Bakery

## Overview

As we all love baked delicacies, today you were chosen to build a simple bakery software system. This system must have support for **baked foods**, **tables** and **drinks** in the bakery. The project will consist of **model classes** and a **controller class**, which manages the **interaction** between the **baked foods**, **drinks** and **tables**.

## Setup

* Upload **only the** bakerypackage in every problem **except** **Unit Tests**
* **Do not modify the classes, interfaces or their packages**
* Use **strong cohesion** and **loose coupling**
* **Use inheritance and the provided interfaces wherever possible**
  + This includes **constructors**, **method parameters** and **return types**
* **Do not** violate your **interface** **implementations** by adding **more public methods** in the concrete class than the interface has defined
* Make sure you have **no public fields** anywhere

## Task 1: Structure (50 points)

You are given **8** interfaces, and you must implement their functionality in the **correct classes**.

It is not required to implement your structure with Engine, ConsoleReader, ConsoleWriter and enc. It's good practice but it's not required.

There are **3** types of entities and 3 repositories in the application: **Table, BakedFood, Drink and a Repository for each of them**:

### BakedFood

BaseFood is a **base class** for any **type of BakedFood** and it **should not be able to be instantiated**.

#### Data

* **name** - String
  + If the name **is null or whitespace,** throw an **IllegalArgumentException** with message **"Name cannot be null or white space!"**
* **portion** - double
  + If the portion **is less or equal to 0,** throw an **IllegalArgumentException** with message **"**Portion cannot be less or equal to zero!**"**
* **price** - double
  + If the portion **is less or equal to 0,** throw an **IllegalArgumentException** with message **"**Price cannot be less or equal to zero!**"**

#### Behavior

##### String toString()

Returns a String with information about **each food**. The returned String must be in the following format:

"{currentBakedFoodName}: {currentPortion - formatted to the second digit}g - {currentPrice - formatted to the second digit}"

#### Constructor

A **BaseFood** should take the following values upon initialization:

String name, double portion, double price

#### Child Classes

There are several concrete types of **BakedFood**:

##### Bread

The **Bread has** constant value for InitialBreadPortion - 200

##### Cake

The **Cake has** constant value for InitialBreadPortion - 245

### Drink

BaseDrink is a **base class** for any **type of Drink** and it **should not be able to be instantiated**.

#### Data

* **name** - String
  + If the name **is null or whitespace,** throw an **IllegalArgumentException** with message **"Name cannot be null or white space!"**
* **portion** - int
  + If the portion **is less or equal to 0,** throw an **IllegalArgumentException** with message **"**Portion cannot be less or equal to zero!**"**
* **price** - double
  + If the portion **is less or equal to 0,** throw an **IllegalArgumentException** with message **"**Price cannot be less or equal to zero!**"**
* **brand** - **String** 
  + If the name **is null or whitespace,** throw an **IllegalArgumentException** with message **"Brand cannot be null or white space!"**

#### Behavior

##### String toString()

Returns a String with information about **each drink**. The returned String must be in the following format:

**"{current drink name} {current brand name} - {current portion}ml - {current price - formatted to the second digit}lv"**

#### Constructor

A BaseDrinkshould take the following values upon initialization:

String name, int portion, double price, String brand

#### Child Classes

There are several concrete types of **Drink**:

##### Tea

The **Tea has constant value** for teaPrice – 2.50

##### Water

The **Water** has **constant value** forwaterPrice - 1.50

### Table

**BaseTable** is a base **class** for different types of tables and **should not be able to be instantiated**

#### Data

* **foodOrders - Collection<BakedFood>** accessible only by the base class
* **drinkOrders – Collection<Drink>** accessible only by the base class
* **tableNumber** – int the table number
* **capacity** - int the table capacity.
  + It can’t be **less than zero**. In these cases, throw an **IllegalArgumentException** withmessage "Capacity has to be greater than 0"
* **numberOfPeople** - int the count of people who want a table.
  + cannot be **less** or **equal** **to 0**. In these cases, throw an **IllegalArgumentException** **with message** "Cannot place zero or less people!"
* **pricePerPerson** – **double** the price per person for the table
* **isReserved - boolean** returns **true** if the **table** is **reserved**, otherwise **false.**
* **price – double** calculates the price for all people

#### Behavior

##### void reserve(int numberOfPeople)

Reserves the table with the count of people given.

##### void orderFood(BakedFood food)

Orders the provided food (think of a way to collect all the food which is ordered).

##### void orderDrink(Drink drink)

Orders the provided drink (think of a way to collect all the drinks which are ordered).

##### double getBill()

Returns the bill for all of the ordered drinks and food.

##### void clear()

Removes all the ordered drinks and food and finally frees the table sets the count of people and price to 0.

##### String getFreeTableInfo()

Return a String with the following format:

"Table: {table number}"

"Type: {table type}"

"Capacity: {table capacity}"

"Price per Person: {price per person for the current table}"

#### Constructor

A BaseTableshould take the following values upon initialization:

int tableNumber, int capacity, double pricePerPerson

#### Child Classes

There are several concrete types of **Table**:

##### InsideTable

The **InsideTable has constant value** for pricePerPerson – 2.50

##### OutsideTable

The **OutsideTable** has **constant value** forpricePerPerson - 3.50

### Repository

The repository holds information about the entity.

#### Data

* models - A **collection of T (entity)**

#### Behavior

**void add(T model)**

Adds an entity in the collection.

**Collection<T> getAll()**

Returns all entities (unmodifiable)

#### Child Repositories

##### TableRepository

**T getByNumber(int tableNumber)**

Returns an entity with that name.

##### FoodRepository

**T getByName(String name)**

Returns an entity with that name.

##### DrinkRepository

**T getByName(String name)**

#### Child Classes

Create **FoodRepositoryImpl**, **DrinkRepositoryImpl** and **TableRepositoryImpl** repositories.

## Task 2: Business Logic (150 points)

### The Controller Class

The business logic of the program should be concentrated around several **commands**. You are given interfaces, which you must implement in the correct classes.

**Note: The** Controller **class SHOULD NOT handle exceptions! The tests are designed to expect exceptions, not messages!**

The first interface is Controller. You must implement a ControllerImplclass, which implements the interface and implements all its methods. The given methods should have the following logic:

### Commands

There are several commands, which control the business logic of the application. They are stated below.

#### AddFood Command

##### Parameters

* type – String
* name – String
* price – double

##### Functionality

Creates a food with the correct type. If the food is created successful, returns:

"Added {baked food name} ({baked food type}) to the menu"

**If a baked food with the given name already exists in the food repository, throw** an IllegalArgumentException **with message** "{type} {name} is already in the menu"

#### AddDrink Command

##### Parameters

* type – String
* name – String
* portion – int
* brand - String

##### Functionality

Creates a drink with the correct type. If the drink is created successful, returns:

#### "Added {drinkName} ({drinkBrand}) to the drink menu"

**If a drink with the given name already exists in the drink repository, throw** an IllegalArgumentException **with message** "{type} {name} is already in the menu"

#### AddTable Command

##### Parameters

* type - String
* tableNumber – int
* capacity - int

##### Functionality

Creates a table with the correct type and returns:

"Added table number {tableNumber} in the bakery"

**If a drink with the given name already exists in the drink repository, throw an **IllegalArgumentException** with message **"****Table {tableNumber} is already added to the restaurant"

#### ReserveTable Command

##### Parameters

* numberOfPeople – int

##### Functionality

Finds a table which is not reserved, and its capacity is enough for the number of people provided. If there is no such table returns:

"No available table for {numberOfPeople} people"

In the other case reserves the table and returns:

"Table {tableNumber} has been reserved for {numberOfPeople} people"

#### OrderFood Command

##### Parameters

* tableNumber - int
* foodName - String

##### Functionality

Finds the table with that number and the food with that name in the menu. If there is no such table returns:

"Could not find table with {tableNumber}"

If there is no such food returns:

"No {bakedFoodName} in the menu"

In other case orders the food for that table and returns:

"Table {tableNumber} ordered {bakedFoodName}"

#### OrderDrink Command

##### Parameters

* tableNumber - int
* drinkName – String
* drinkBrand – String

##### Functionality

Finds the table with that number and finds the drink with that name and brand. If there is no such table, it returns:

"Could not find table {tableNumber}"

If there isn’t such drink, it returns:

"There is no {drinkName} {drinkBrand} available"

In other case, it orders the drink for that table and returns:

**"Table {tableNumber} ordered {drinkName} {drinkBrand}"**

#### LeaveTable Command

##### Parameters

* tableNumber - int

##### Functionality

Finds the table with the same table number. Gets the bill for that table and clears it. Finally returns:

"Table: {tableNumber}"

"Bill: {table bill:f2}"

#### GetFreeTablesInfo Command

##### Functionality

Finds all not reserved tables and for each table returns the table info.

#### GetTotalIncome Command

Returns the total income for the restaurant for all completed bills.

"Total income: {income:f2}lv"

### Input / Output

You are provided with one interface, which will help with the correct execution process of your program. The interface is Engine and the class implementing this interface should read the input and when the program finishes, this class should print the output.

#### Input

Below, you can see the **format** in which **each command** will be given in the input:

* **AddFood {type} {name} {price}**
* **AddDrink {type} {name} {portion} {brand}**
* **AddTable {type} {tableNumber} {capacity}**
* **ReserveTable {numberOfPeople}**
* **OrderFood {tableNumber} {foodName}**
* **OrderDrink {tableNumber} {drinkName} {drinkBrand}**
* **LeaveTable {tableNumber}**
* **GetFreeTablesInfo**
* **GetTotalIncome**
* **END**

#### Output

Print the output from each command when issued. If an exception is thrown during any of the commands' execution, print the exception message.

#### Examples

|  |
| --- |
| **Input** |
| AddFood Bread White 2.90  AddDrink Water Spring 500 Divna  AddTable InsideTable 1 10  AddTable OutsideTable 2 20  ReserveTable 5  OrderFood 1 White  OrderDrink 1 Spring Divna  GetFreeTablesInfo  LeaveTable 1  GetTotalIncome  END |
| **Output** |
| Added White (Bread) to the menu  Added Spring (Divna) to the drink menu  Added table number 1 in the bakery  Added table number 2 in the bakery  Table 1 has been reserved for 5 people  Table 1 ordered White  Table 1 ordered Spring Divna  Table: 2  Type: OutsideTable  Capacity: 20  Price per Person: 3.50  Table: 1  Bill: 16.90  Total income: 16.90lv |

|  |
| --- |
| **Input** |
| AddFood Bread Healthy 2.90  AddFood Bread Focaccia 4.90  AddFood Cake Choco 5.90  AddFood Cake Cherry -9.0  AddDrink Water Spring -500 Divna  AddDrink Water Sparkling 500 Perier  AddDrink Tea GreenTea 250 Lipton  AddDrink Tea HerbalTea 200 Bio  AddTable InsideTable 1 10  AddTable InsideTable 2 12  AddTable InsideTable 3 11  AddTable OutsideTable 4 20  AddTable OutsideTable 5 -2  AddTable OutsideTable 6 10  ReserveTable 5  ReserveTable 1  ReserveTable 2  OrderFood 1 Healthy  OrderFood 1 OrangeCream  OrderFood 2 Choco  OrderFood 3 Choco  OrderFood 4 Choco  OrderDrink 1 Spring Divna  OrderDrink 2 GreenTea Lipton  OrderDrink 2 Perier HerbalTea  OrderDrink 3 Spring Monin  GetFreeTablesInfo  LeaveTable 1  LeaveTable 2  GetTotalIncome  END |
| **Output** |
| Added Healthy (Bread) to the menu  Added Focaccia (Bread) to the menu  Added Choco (Cake) to the menu  Price cannot be less or equal to zero!  Portion cannot be less or equal to zero  Added Sparkling (Perier) to the drink menu  Added GreenTea (Lipton) to the drink menu  Added HerbalTea (Bio) to the drink menu  Added table number 1 in the bakery  Added table number 2 in the bakery  Added table number 3 in the bakery  Added table number 4 in the bakery  Capacity has to be greater than 0  Added table number 6 in the bakery  Table 1 has been reserved for 5 people  Table 2 has been reserved for 1 people  Table 3 has been reserved for 2 people  Table 1 ordered Healthy  No OrangeCream in the menu  Table 2 ordered Choco  Table 3 ordered Choco  Could not find table 4  There is no Spring Divna available  Table 2 ordered GreenTea Lipton  There is no Perier HerbalTea available  There is no Spring Monin available  Table: 4  Type: OutsideTable  Capacity: 20  Price per Person: 3.50  Table: 6  Type: OutsideTable  Capacity: 10  Price per Person: 3.50  Table: 1  Bill: 15.40  Table: 2  Bill: 10.90  Total income: 26.30lv |

## Task 3: Unit Tests (100 points)

You will receive a skeleton with one class inside. The class will have some methods, fields and constructors. Cover the whole class with unit test to make sure that the class is working as intended.