

## ***Mandag 7. oktober 2024***

### **Exercise 1** (repetition fra 2. sem.)

In the file *ex1student.zip* is a Customer class with attributes phoneNo, mobileNo, firstname and lastname (and constructor and toString() method), and the beginning of an App class with a main() method.

Extend the main() method with the following: Print all phone numbers (the keys). Print all customers (the values). Print the set of entries. Print the map as pairs, as in (key, value). Print the map using its toString() method.

Do the same with a LinkedHashMap and a TreeMap (instead of the HashMap).

Why are the keySet() and entrySet() methods returning a Set, when the values() method is returning a collection?

### **Exercise 2**

Use the code in the file *ex2student.zip* as starting point for this exercise (unpack the directory and copy it to a module or project in IntelliJ).

Implement the MapI<K,V> interface in the class named SetHashMap<K,V> using separate chaining as collision strategy. (You can forget about rehashing in this exercise.).

Make an implementation where the type of the collections in the hash table is java.util.HashSet. The elements in the hash sets must have the type Entry<K,V>.

Test your SetHashMap class using the MapTest class and the Ex2App class (they are in the zip-file).

### **Exercise 3**

In this exercise you must implement the MapI interface from exercise 2 in a class named ListHashMap using separate chaining as collision strategy. (You can forget about rehashing in this exercise.)

Make an implementation where the type of the collections in the hash table is java.util.LinkedList. The elements in the linked list must have the type Entry<K,V>.

Test your ListHashMap.

### **Opgave 4**

Lav en Car klasse med felterne model (f.eks. "VW") og farve (f.eks. "Red") og constructor, og toString .

Lav en App klasse med en main() metode. Opret et HashSet (kaldet cars), og indsæt nogle Car objekter i denne (f.eks. cars.add(new Car("FORD", "Black"));).

Lav flere biler med samme model, nogle af dem skal også have samme color . Udskriv hash settet.

Hvad sker der, når man indsætter to bil objekter der har præcis de samme attributter i det samme HashSet ?

Test om en af de indsatte biler er i hash settet (f.eks. med `cars.contains(new Car("FORD", "Black"))`). Virker `contains()` metoden?

To biler skal opfattes som værende det samme objekt, hvis de har samme model. Lav de ændringer, der skal til, for at sådanne to biler opfattes som ens (lav `equals()` og `hashCode()` metoder). Det betyder, at der kun skal kunne være én bil med samme model i hash settet. Prøv det af ved at indsætte objekter med samme model. Virker `contains()` metoden?

Kommenter din `hashCode()` metode ud, men behold `equals()` metoden. Virker `contains()` metoden nu?