# Lecture 4
# Java SE – Programming

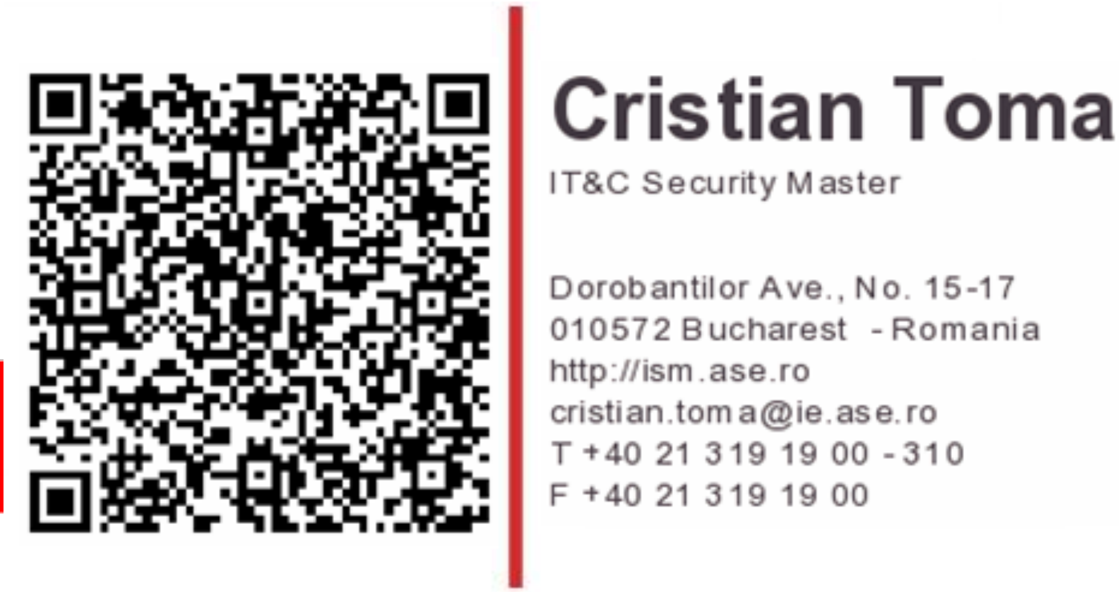
presentation

**Java Programming – Software App Development**

**Assoc. Prof. Cristian Toma Ph.D.**

D.I.C.E/D.E.I.C – Department of Economic Informatics & Cybernetics
www.dice.ase.ro

## **Cristian Toma** – Business Card



**Cristian Toma**

IT&C Security Master

Dorobantilor Ave., No. 15-17
010572 Bucharest - Romania
http://ism.ase.ro
cristian.toma@ie.ase.ro
T +40 21 319 19 00 - 310
F +40 21 319 19 00

## **Agenda** for Lecture 4 – Summary of JSE

1. Java Generics
2. JCF - Java Collection Framework
3. Exchange Ideas

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Java Generics, Error @ runtime versus @compile-time

## Java Generics

# 1 Summary of Java Generics

What are advantages of Generics in programming?
Moves the errors from “run-time in compile-time”

Is there any macro-expansion as in C / C + + within Generic programming?
NO

Where is the most intensive usage of Generic programming?
Starting with Java 8 | 9 and especially in JCF – Java Collection Framework

ATTENTION!!! For advanced Java Generics concepts please read:
“Sub-typing”, “Wild-Cards”, “Type-Erasure” in the web resources

**http://docs.oracle.com/javase/tutorial/java/generics/**
**http://docs.oracle.com/javase/tutorial/extra/generics/index.html**
**http://java.sun.com**

Java Generics Simple Samples – Generics1.java & Generics4.java

## 1 Summary of Java Generics

Recommendations for parameters naming are:

* **E - Element** – intensively uses in JCF - Java Collections Framework
* **K - Key**
* **N - Number**
* **T - Type**
* **V - Value**
* **S,U,V** etc. - 2nd, 3rd, 4th types

Please in Ubuntu 16 virtual machine check-out lecture 1 and 2 from **/home/stud/javase** directory

## Section Conclusion

Fact: **Generics in Java**

In few **samples** it is simple to remember: Java generics allows the programmer to use general classes in error prone approach and to provide mechanism for moving the error from runtime to compile time.

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JCF – Java Collection Framework, List<E>, Map<K,V>

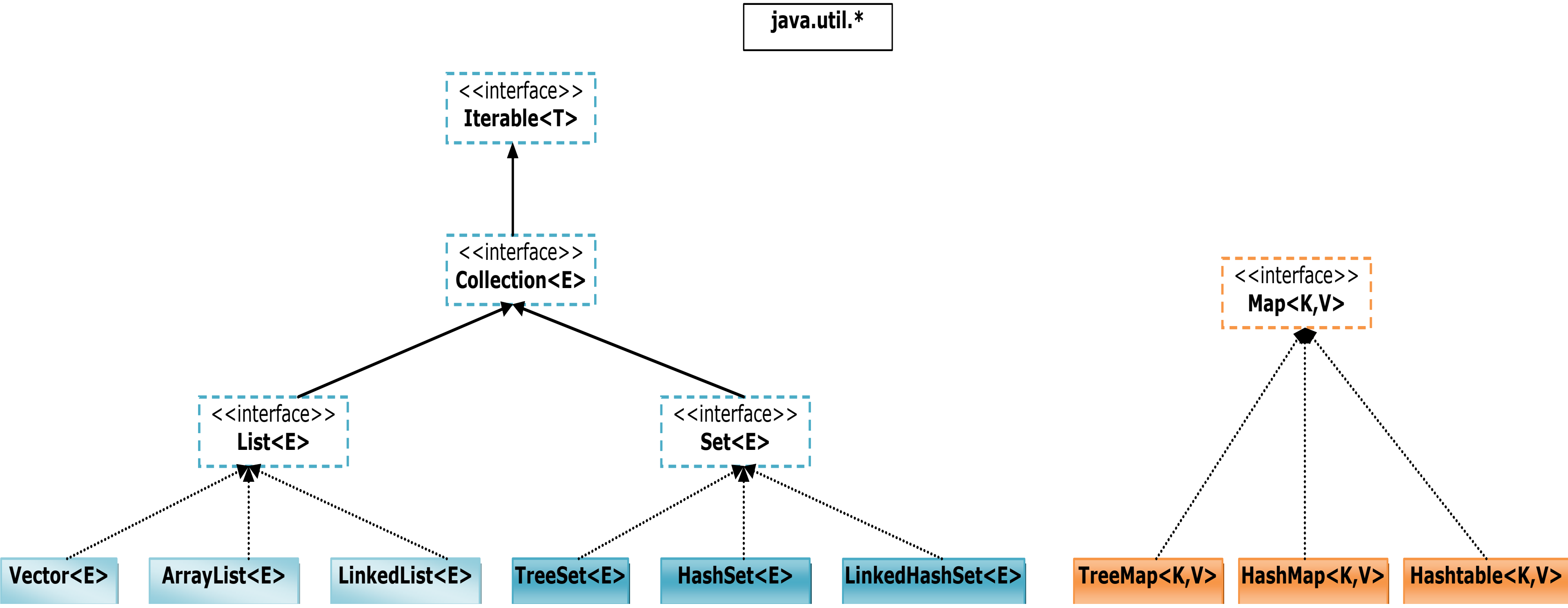
## **JCF –** Java Collection Framework

## 2. Summary of JCF

***JCF – Java Collection Framework Features:***

- **JCF** is an hierarchy of classes, abstract classes, interfaces and algorithms, that implements the standard data structures used in programming – vector, list – stack/queue, binary-tree, hash-table
- **JCF** contains interfaces, implementations & algorithms
- **JCF** involves to code with ***interface as type*** style
- The classes hierarchy is based on:
  - ***Collection*** – defines a value for each item in the data structure
  - ***Map*** – defines a pair of items, key-value, for each element/node in the data structure

## 2. Summary of JCF



## 2. Summary of JCF

1. In order to go through a data structure from JCF, it is possible to use **foreach** or **iterators** (or partially tu use **Enumeration** for classes **Vector** and **Hashtable**)
   a. for(Object o :  collection) System.out.println(o);
   b. for(Iterator<?> it = collection.iterator(); it.hasNext();) System.out.println(it.next())

2. The order of the items/elements into collections/data structures (including for use of sorting algorithms) is given by the implementation of the method "***compareTo(…)***" from the interface **Comparable<T>** or by the implementation of the method ***"compare(...)"*** from the interface **Comparator<T>**.

3. For optimization and best practice programming, it is recommended for the classes that instantiate objectes which are used in hash-data structures, to implement the inherited methods "***hashCode()***" and "***equals(…)***" from class **Object**.

JCF Summary

**for easy sharing**

## Section Conclusions

JCF – Java Collection Framework is a set of classes, interfaces and algorithms for standard data-structure processing

JCF – presents almost like in C++ STL: containers, iterators, and algorithms

JCF – needs for order of the items in the data-structures to process objects from classes that provide methods for comparing.

In JCF the best practice is to override methods from class Object for equality and hashing value, in order to work with hash data structure

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Share knowledge, Empowering Minds

## Communicate & Exchange Ideas

Questions & Answers!

# Thanks!

DAD – Distributed Application Development
End of Lecture 4 – summary of Java SE