Objectives

- In this session, you will learn to:
  - Implement type-safety
  - Use the Set interface
  - Use the List interface
  - Use the Map interface

Implementing Type-safety

- To create an object of a generic class, you need to invoke the constructor of a generic class with the required type of parameters.
- Java provides the flexibility to leave the type parameters empty as long as the compiler can guess or judge the type of the argument from the context.
- Java provides wildcards that allow you to achieve inheritance in a type parameter.

Using a Generic Type Inference

- While using a generic type, you must provide the type argument for every type parameter declared for the generic type.
- The type argument list is a comma-separated list that is delimited by angular brackets and follows the type name.
- Consider the code given in the embedded document, of a generic type with two type arguments:

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- Java provides a new feature called type inference.
- Type inference enables you to invoke the constructor of a generic class with an empty set of type parameters, <>.
- The empty set of type parameters can be used as long as the compiler can infer the type arguments from the context.

Using a Generic Type Inference (Contd.)

- You can use the following code snippet to use the empty set of type parameters while creating the objects of the `Pair` class:

```
Pair<String, Integer> obj1 = new Pair<>("Test", 1);
Pair<Integer, String> obj2 = new Pair<>(2, "Demo");
```

Using Wildcards

- In generics, a subclass cannot be passed as a subtype of a superclass, as shown in the following code snippet:

```
WildCardDemo<Number> obj = new WildCardDemo<Integer>();
```

- Generics only allow the following type of declaration:

```
WildCardDemo<Integer> obj = new
WildCardDemo<Integer>();
```

Or,

```
WildCardDemo<Number> obj = new WildCardDemo<Number>();
```

- Some of the most commonly used wildcard arguments are:
  - `? extends`
  - `? super`
  - `?`

Using Wildcards (Contd.)

- You can use the following code, given in the embedded document, to compare only the numeric objects:

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Just a minute

- Which one of the following wildcards is used to specify the type that is inherited from the specified class?
  - `<?>`
  - `<? extends >`
  - `<extends ?>`
  - `<? extends ?>`

Just a minute (Contd.)

- Solution:
  - `<? extends >`

Activity 3.1: Working with Generics

- Problem Statement:
  - Futuristic Inc. is a leading software development organization based in the US. After analysing the communication system of the organization, the management has decided to develop a messaging application for the internal communication. For this, the management has asked Sam, the Senior Software Developer, to develop the application. The management wants the application code to be simple. Sam decides to implement the following functionalities to develop the application:
    - The application should display a menu. Using the menu, the user should be able to select either of the two options, SMS or email.
    - On the selection of the SMS option, the user should be asked to enter the cell phone number and message.
    - On the selection of the email option, the user should be asked to enter the email id and message.
    - After entering the required details, the sent message should be processed.

Activity 3.1: Working with Generics (Contd.)

- Problem Statement (Contd.):
  - In the initial phase, Sam needs to design the application to implement a handling mechanism that provides the SMS and email services. In addition, to initially test this functionality, he needs to process the sent message by appending the date and displaying the same. Help Sam to achieve the preceding requirements.

Activity 3.1: Working with Generics (Contd.)

- Solution: To perform the activity, refer the steps given in the embedded document.

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