

Day 2: Functional Interface in Java 8 (Predicate, Supplier, Consumer, Function)

Some of the new functional interfaces introduced in java 8 to perform functional style of programming. these interfaces belongs to `java.util.function` package.

1. **Predicate<T>**
2. **Consumer<T>**
3. **Supplier<T>**
4. **Function<T,R>**

1. **java.util.function.Predicate<T>:**

This interface contains only one abstract method called:

```
public boolean test(T t);
```

This method `test()` checks whether supplied obj satisfying a condition or not.

Example:

```
import java.util.function.Predicate;
public class Main {

    public static void main(String[] args) {

        Predicate<Integer> p = i -> i > 0;

        System.out.println(p.test(10)); //true
        System.out.println(p.test(-10)); //false
    }
}
```

```
}  
}
```

In java 8 Collection interface defines a method called:

```
public boolean removeIf(Predicate filter)
```

Based on the condition of Predicate, this method will remove/filter the elements from the Collection classes

Example: Removing the Students from the List whose marks is less than 700

```
import java.util.List;  
import java.util.ArrayList;  
public class Main{  
  
    public static void main(String[] args)    {  
  
        List<Student> students=new ArrayList<>();  
  
        students.add(new Student(10, "name1", 650));  
        students.add(new Student(12, "name2", 750));  
        students.add(new Student(13, "name3", 550));  
        students.add(new Student(14, "name4", 820));  
        students.add(new Student(15, "name5", 720));  
        students.add(new Student(16, "name6", 620));  
  
        System.out.println(students);  
  
        students.removeIf( student -> student.getMarks() < 700 );  
  
        System.out.println(students);  
    }  
}
```

2. java.util.function.Consumer<T>:

It represents a function which takes in one argument and produces a result. However these kind of functions don't return any value.

```
public void accept(T t);
```

Example:

```
import java.util.function.Consumer;
public class Main {

    public static void main(String[] args) {

        Consumer<Student> c = s -> {

            System.out.println("Roll is "+s.getRoll());
            System.out.println("Name is "+s.getName());
            System.out.println("Marks is "+s.getMarks());
        };

        c.accept(new Student(10, "Amit", 850));
    }
}
```

Note :- from java 8 each collection classes contains a method called

```
default void forEach(Consumer c);
```

This forEach method defined as **default** method inside the **java.lang.Iterable** interface.

Example: iterating elements of a List using forEach method.

```
import java.util.ArrayList;
import java.util.List;
public class Main{
    public static void main(String[] args) {
        List<String> list = new ArrayList<>();
        list.add("Football");
        list.add("Cricket");
        list.add("Chess");
        list.add("Hockey");

        list.forEach(s -> System.out.println(s));

        //or using Method reference
        //list.forEach(System.out::println);
    }
}
```

3.java.util.function.Supplier<T>:

It represents a function which does not take in any argument but produces a value of type T.

method:

```
public T get();
```

Example:

```
import java.util.function.Supplier;
public class Main {

    public static void main(String[] args) {

        Supplier<String> s = () -> "This is from Lambda Expression";

        System.out.println(s.get());

        Supplier<Student> s2 = () -> new Student(10, "Ram", 850);

        System.out.println(s2.get().getName());

    }
}
```

4.java.util.function.Function<T,R>

This interface defines an abstract method which will takes T type of object as parameter and returns R type of object.

```
public R apply(T t);
```

Example:

```
import java.util.function.Function;

public class Main {

    public static void main(String[] args) {

        Function<Integer,String> f = i -> "This is a numner "+i;

        System.out.println(f.apply(10));

        Function<String,Integer> f2 = s -> Integer.parseInt(s);

    }
}
```

```

        System.out.println(f2.apply("200")+500);

        Function<String,Integer> f3 = Integer::parseInt;
        System.out.println(f3.apply("400")+200);
    }
}

```

Example2: Getting a Student object and returning greeting message with Student Name.

```

import java.util.function.Function;
public class Main {

    public static void main(String[] args) {

        Function<Student,String> f = s -> "Welcome "+s.getName().toUpperCase();

        String msg= f.apply(new Student(10,"Amit",850));

        System.out.println(msg);

    }
}

```