



# VAL VS DEF FUNCTIONS

# Val function (Lambda)

```
val replicate: (Int, String) => String =  
  (n: Int, text: String) => ...
```

```
replicate(3, "Hello ")  
// res1: String = "Hello Hello Hello "
```

# Def function (Method)

```
def replicate(n: Int, text: String): String =  
  ...
```

```
replicate(3, "Hello ")  
// res3: String = "Hello Hello Hello "
```

# Val function (Lambda or anonymous function)

```
(n: Int, text: String) => List.fill(n)(text).mkString
```

# Val functions are ordinary objects

```
(n: Int, text: String) => List.fill(n)(text).mkString
```

```
3
```

```
"Hello World!"
```

```
User("John Doe", 27)
```

# Val functions are ordinary objects

```
val replicate = (n: Int, text: String) => List.fill(n)(text).mkString
```

```
val counter = 3
```

```
val message = "Hello World!"
```

```
val john = User("John Doe", 27)
```

# Val functions are ordinary objects

```
val replicate = (n: Int, text: String) => List.fill(n)(text).mkString
```

```
val counter = 3
```

```
val message = "Hello World!"
```

```
val john = User("John Doe", 27)
```

```
val repeat = replicate
```

# Val functions are ordinary objects

```
val numbers = List(1,2,3)
// numbers: List[Int] = List(1, 2, 3)

val functions = List((x: Int) => x + 1, (x: Int) => x - 1, (x: Int) => x * 2)
// functions: List[Int => Int] = List(<function1>, <function1>, <function1>)
```

# Val functions are ordinary objects

```
val numbers = List(1,2,3)
// numbers: List[Int] = List(1, 2, 3)

val functions = List((x: Int) => x + 1, (x: Int) => x - 1, (x: Int) => x * 2)
// functions: List[Int => Int] = List(<function1>, <function1>, <function1>)
```

```
functions(0)(10)
// res12: Int = 11

functions(2)(10)
// res13: Int = 20
```



# Val function desugared

```
val replicate: (Int, String) => String = (n: Int, text: String) => List.fill(n)(text).mkString
```

# Val function desugared

```
val replicate: (Int, String) => String      = (n: Int, text: String) => List.fill(n)(text).mkString
```

```
val replicate: Function2[Int, String, String] = (n: Int, text: String) => List.fill(n)(text).mkString
```

# Val function desugared

```
val replicate: (Int, String) => String = (n: Int, text: String) => List.fill(n)(text).mkString
```

```
val replicate: Function2[Int, String, String] = (n: Int, text: String) => List.fill(n)(text).mkString
```

```
val bigFunction: (Int, Int, Int, Int, Int,  
                  Int, Int, Int, Int, Int,  
                  Int, Int, Int, Int, Int,  
                  Int, Int, Int, Int, Int,  
                  Int, Int, Int  
                  ) => String = _ => ???
```

```
// error: function values may not have more  
//         than 22 parameters, but 23 given
```

# Val function desugared

```
val replicate: (Int, String) => String = (n: Int, text: String) => List.fill(n)(text).mkString
```

```
val replicate: Function2[Int, String, String] = new Function2[Int, String, String] {  
  def apply(n: Int, text: String): String =  
    List.fill(n)(text).mkString  
}
```

# SAM (Single Abstract Method)

```
trait Printer {  
  def print(message: String): Unit  
}
```

## SAM syntax

```
val console: Printer =  
  (message: String) => println(message)
```

## Standard syntax

```
val console: Printer = new Printer {  
  def print(message: String): Unit =  
    println(message)  
}
```

# SAM (Single Abstract Method)

```
trait Printer {  
  def print(message: String): Unit  
}
```

## Standard syntax

```
val console: Printer = new Printer {  
  def print(message: String): Unit =  
    println(message)  
}
```

## SAM syntax

```
val console: Printer =  
  (message: String) => println(message)
```

# Val function desugared

## SAM syntax

```
val replicate: (Int, String) => String =  
  (n: Int, text: String) =>  
    List.fill(n)(text).mkString
```

## Standard syntax

```
val replicate: (Int, String) => String =  
  new Function2[Int, String, String] {  
    def apply(n: Int, text: String): String =  
      List.fill(n)(text).mkString  
  }
```

# Val function desugared

## SAM syntax

```
val replicate: (Int, String) => String =  
  (n: Int, text: String) =>  
    List.fill(n)(text).mkString
```

```
replicate(3, "Hello ")  
// res24: String = "Hello Hello Hello "  
  
replicate.apply(3, "Hello ")  
// res25: String = "Hello Hello Hello "
```

## Standard syntax

```
val replicate: (Int, String) => String =  
  new Function2[Int, String, String] {  
    def apply(n: Int, text: String): String =  
      List.fill(n)(text).mkString  
  }
```



# Apply syntax

```
trait Printer {  
  def apply(message: String): Unit  
}  
  
val console: Printer = new Printer {  
  def apply(message: String) = println(message)  
}
```

```
console("Hello World!")  
// Hello World!
```

# Def function (Method)

```
import java.time.LocalDate  
  
def createDate(year: Int, month: Int, dayOfMonth: Int): LocalDate =  
    ...
```



```
createDate(2020, 1, 5)  
// res28: LocalDate = 2020-01-05
```

# Arguments

```
import java.time.LocalDate  
  
def createDate(year: Int, month: Int, dayOfMonth: Int): LocalDate =  
  ...
```

```
val createDateVal: (Int, Int, Int) => LocalDate =  
  (year, month, dayOfMonth) => ...
```

# IDE

```
createDate|
(m) createDate(year: Int, month: Int, dayOfMonth: Int)      LocalDate
(v) createDateVal                                            (Int, Int, Int) => LocalDate
^↓ and ^↑ will move caret down and up in the editor Next Tip  
```

# Scaladoc

```
def createDate(year: Int, month: Int, dayOfMonth: Int): LocalDate

val createDateVal: (Int, Int, Int) => LocalDate
```

# Named arguments

```
import java.time.LocalDate  
  
def createDate(year: Int, month: Int, dayOfMonth: Int): LocalDate =  
  ...
```

```
createDate(2020, 1, 5)  
// res30: LocalDate = 2020-01-05
```

```
createDate(dayOfMonth = 5, month = 1, year = 2020)  
// res31: LocalDate = 2020-01-05
```

# Def functions are not data

```
def createDate(year: Int, month: Int, dayOfMonth: Int): LocalDate =  
  ...
```

```
List(createDate)  
// error: missing argument list for method createDate in class App16  
// Unapplied methods are only converted to functions when a function type is expected.  
// You can make this conversion explicit by writing `createDate _` or `createDate(_,_,_)` instead  
// List(createDate)  
//      ^^^^^^^^^^^
```

# Def functions are not data

```
def createDate(year: Int, month: Int, dayOfMonth: Int): LocalDate =  
  ...
```

```
List(createDate _)  
// res33: List[(Int, Int, Int) => LocalDate] = List(<function3>)
```

# Def functions are not data

```
def createDate(year: Int, month: Int, dayOfMonth: Int): LocalDate =  
  ...
```

```
List(createDate _)  
// res33: List[(Int, Int, Int) => LocalDate] = List(<function3>)
```

```
val createDateVal = createDate _  
// createDateVal: (Int, Int, Int) => LocalDate = <function3>
```



# Def functions are not data

```
def createDate(year: Int, month: Int, dayOfMonth: Int): LocalDate =  
  ...
```

```
List(createDate): List[(Int, Int, Int) => LocalDate]
```

```
val createDateVal: (Int, Int, Int) => LocalDate = createDate
```

# Summary

- Val functions are ordinary objects
- Use def functions for API
- Easy to convert def to val