

The logo of Högskolan i Skövde is a circular emblem. It features a central shield with a stylized tree, a book, and a sun. The shield is surrounded by a laurel wreath. Below the wreath, the year '1977' is inscribed.

Tuples, collections and pattern matching

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Tuples

`(1, 2)`

`("hello", "world")`

`("hello", 2)`



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Tuples

```
val t1 = (1, 2)
```

```
val t2 = ("hello", "world")
```

```
t1._1      // = 1
```

```
t2._2      // = "world"
```



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Tuples

```
val (one, two, three) = (1, 2, 3)
```

```
one      // = 1
```

```
two      // = 2
```

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Vectors

```
val a: Vector[Int] = Vector(1, 2, 3)
a.head           // = 1
a.tail           // = Vector(2, 3)
a(2)             // = 3
```

The logo of the University of Skövde is centered in the background. It features a shield with a crown on top, flanked by two lions. The shield is surrounded by a laurel wreath. Below the shield is the year '1977'.

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Array

```
val a: Array[Int] = Array(1, 2, 3)
```

```
a.head      // = 1
```

```
a.tail      // = Array(2, 3)
```

```
a(2)        // = 3
```

```
a(2) = 5
```

```
a(2)        // = 5
```

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Lists

```
val a: List[Int] = List(1, 2, 3)
a.head           // = 1
a.tail           // = List(2, 3)
```

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Lists

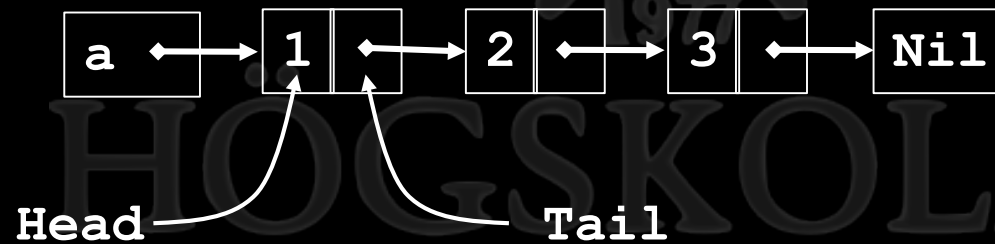
```
val a: List[Int] = 1 :: 2 :: 3 :: Nil  
a.head           // = 1  
a.tail           // = List(2, 3)
```



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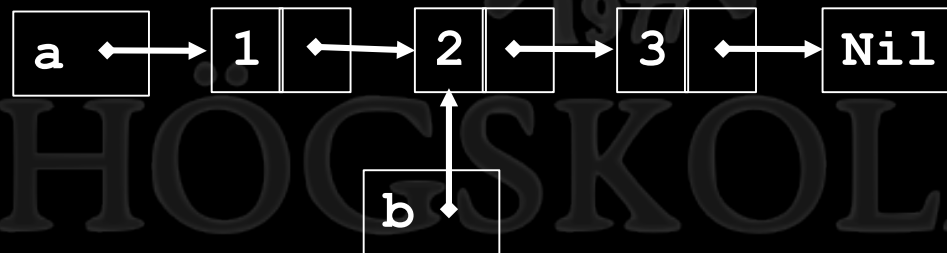
Lists

```
val a: List[Int] = 1 :: 2 :: 3 :: Nil
```



Lists

```
val a: List[Int] = 1 :: 2 :: 3 :: Nil  
val b = a.tail
```

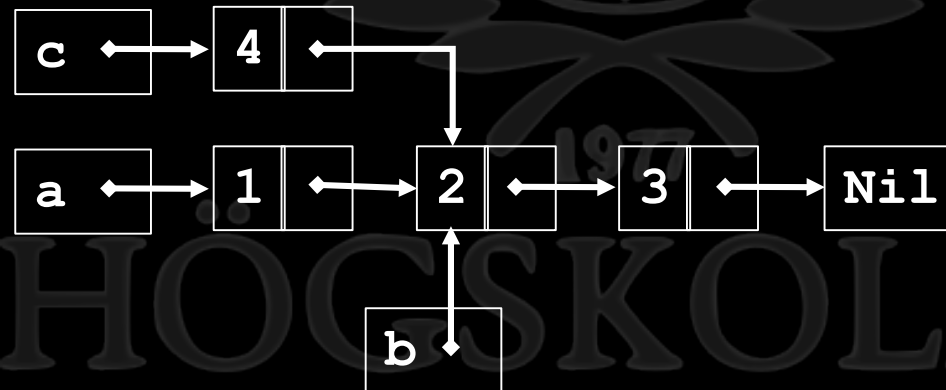


Lists

```
val a: List[Int] = 1 :: 2 :: 3 :: Nil
```

```
val b = a.tail
```

```
val c = 4 :: b
```



Recursion with lists

```
def sum(l: List[Int]): Int = {  
    if (l.isEmpty) 0  
    else l.head + sum(l.tail)  
}
```



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Pattern matching: constant patterns

```
val num: Int = ...  
val str = num match {  
  case 0 => "zero"  
  case 1 => "one"  
  case 2 => "two"  
  case _ => "something else"  
}
```

Wildcard



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Pattern matching: constant patterns

```
val eng: String = ...  
val swe = eng match {  
  case "Hello" => "Hej"  
  case "Good bye" => "Hej då"  
  case "Not too much, not too little" => "Lagom"  
  case _ => "Not in dictionary"  
}
```

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Pattern matching: constant patterns

```
def describe(x: Any): String = x match {  
  case true => "true"  
  case Nil => "empty list"  
  case 5 => "five"  
  case '5' => "five"  
  case _ => "Something else"  
}
```

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Pattern matching: typed patterns

```
def describe(x: Any): String = x match {  
  case a: Int => a + " is an integer"  
  case a: Double => a + " is a double"  
  case a: Boolean => a + "is a boolean"  
  case a: String => a + " is a string"  
  case _ => "unknown type"  
}
```

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Pattern matching: guards

```
def describe(x: Any): String = x match {  
  case n: Int if n == 0 => "zero"  
  case n: Int if n < 0 => "negative"  
  case n: Int if n > 0 => "positive"  
  case _ => "not an int"  
}
```

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Pattern matching: tuple patterns

```
val t: (Int, Int, Int) = ...  
val sum = t match {  
  case (a, b, c) => a + b + c  
}
```



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Pattern matching: tuple patterns

```
val t: (Int, Int, Int) = ...  
val sum = t match {  
  case (a, b, _) => a + b  
}
```

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Pattern matching: tuple patterns

```
def describe(t: (Boolean, Boolean)): String = t match {  
  case (true, true) => "Both true"  
  case (true, false) => "First true"  
  case (false, true) => "Second true"  
  case (false, false) => "None true"  
}
```

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Pattern matching: sequence patterns

```
val ns: List[Int] = ...  
val sum = ns match {  
  case List() => 0  
  case List(a) => a  
  case List(a, b) => a + b  
  case List(a, b, c) => a + b + c  
}
```

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Pattern matching: sequence patterns

```
val ns: List[Int] = ...  
val sum = ns match {  
  case Nil => 0  
  case a :: Nil => a  
  case a :: b :: Nil => a + b  
  case a :: b :: c :: Nil => a + b + c  
}
```

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Recursion with lists

```
def sum(l: List[Int]): Int = {  
  if (l.isEmpty) 0  
  else l.head + sum(l.tail)  
}
```

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Recursion with lists: with pattern match

```
def sum(l: List[Int]): Int = l match {  
  case Nil => 0  
  case h :: t => h + sum(t)  
}
```

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Recursion with lists: with pattern match

```
val sum: (List[Int] => Int) = {  
  case Nil => 0  
  case h :: t => h + sum(t)  
}
```

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Built-in functions

```
val a = List(1, 2, 3, 4)
a.filter(x => x % 2 == 0) // = List(2, 4)
a.map(x => x + x) // = List(2, 4, 6, 4)
a.reduce((a, b) => a + b) // = 10
a.fold(10)((a, b) => a + b) // = 20
a.zip(List(5, 6, 7, 8)) // = List((1, 5), (2, 6), (3, 7), (4, 8))
```

scala-lang.org/api/current/scala/List.html

Built-in functions: reduce

```
List(1, 2, 3, 4).reduce((a, b) => a + b)
```

```
((1 + 2) + 3) + 4)
```

[1, 2, 3, 4]

3 = +

6 = +

10 = +

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Built-in functions: fold

```
List(1, 2, 3, 4).fold(10)((a, b) => a + b)
```

```
((((0 + 1) + 2) + 3) + 4)
```

```
(10) [1, 2, 3, 4]
```

11 = +

13 = +

16 = +

20 = +

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Built-in functions: foldLeft

```
List(1, 2, 3, 4).foldLeft("-->")((a, b) => a + b)
```

```
((("-->" + 1) + 2) + 3) + 4)
```

```
// = "-->1234"
```

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Built-in functions: foldRight

```
List(1, 2, 3, 4).foldRight("-->")((a, b) => a + b)
```

```
(1 + (2 + (3 + (4 + "-->"))))
```

```
// = "1234-->"
```

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Built-in functions: zip

```
val a = List(1, 2, 3, 4)
```

```
val b = List(5, 6, 7, 8)
```

```
a.zip(b) // = List((1, 5), (2, 6), (3, 7), (4, 8))
```

1 2 3 4
5 6 7 8

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Built-in functions: zipWithIndex

```
val a = List(5, 6, 7, 8)
```

```
a.zipWithIndex // = List((5, 0), (6, 1), (7, 2), (8, 3))
```

0 1 2 3
5 6 7 8

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