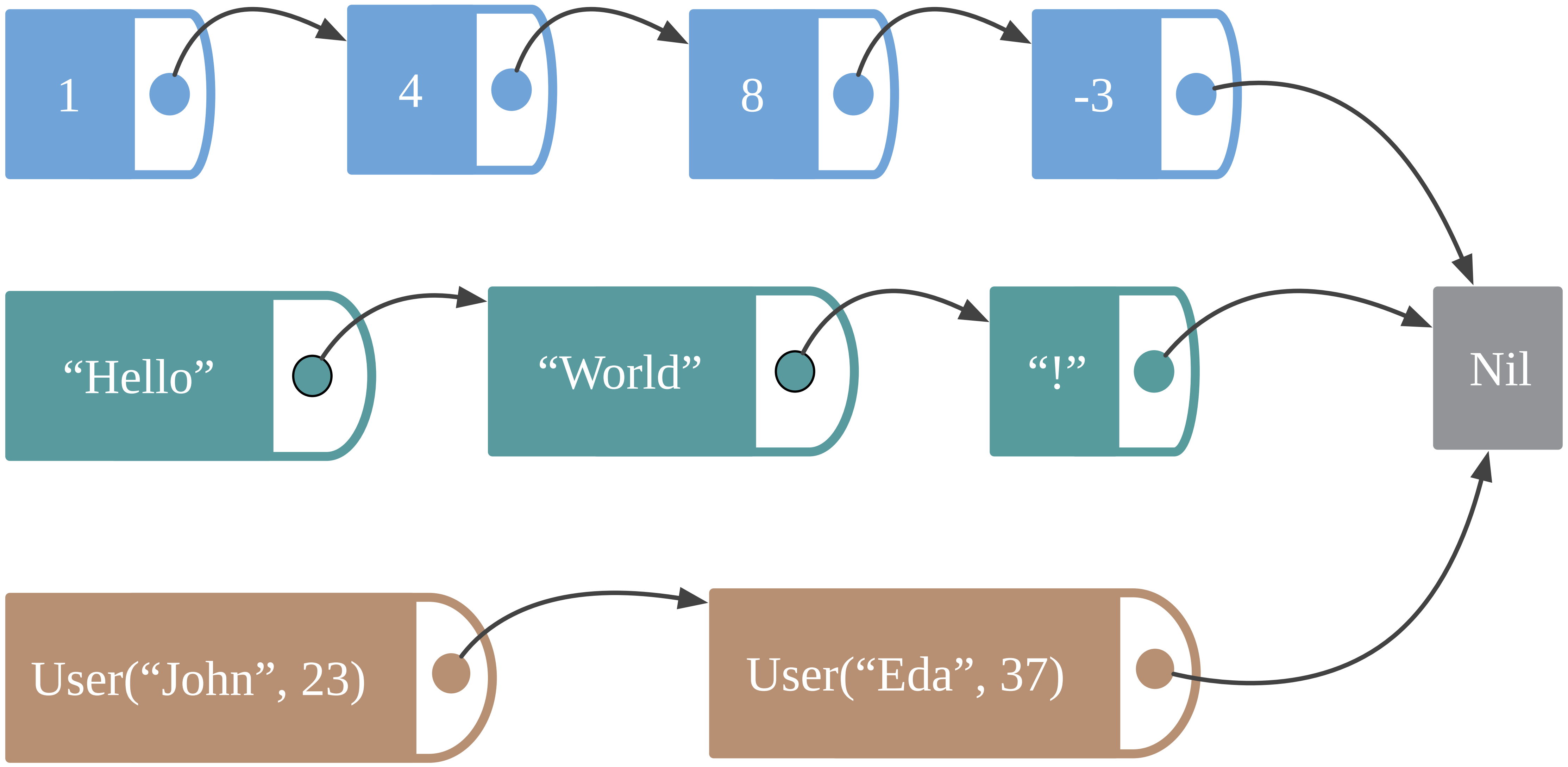
Parametric functions - Part 1

List is a generic data structure

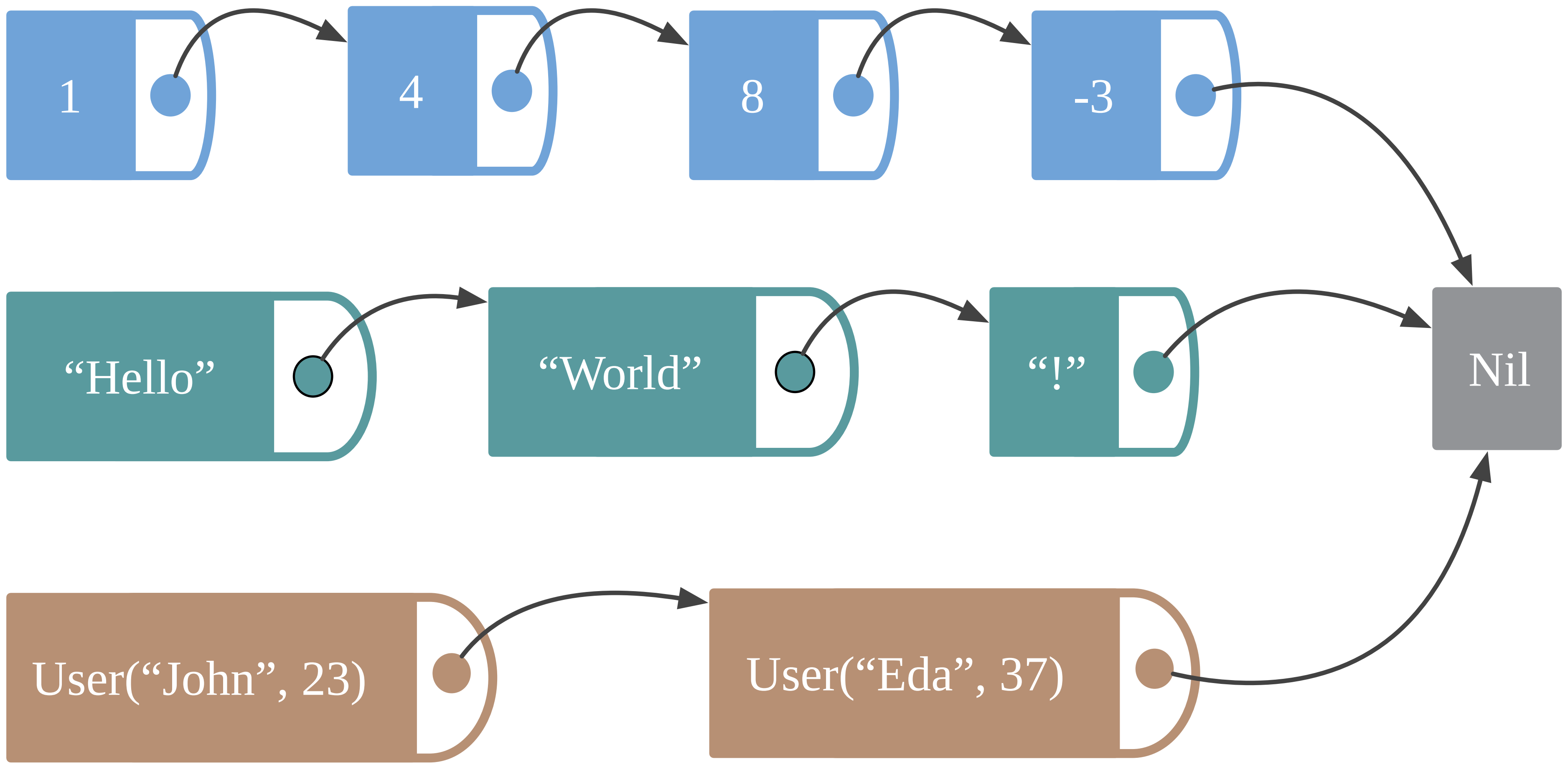


How to avoid duplication?

```
def size(list: List[Int]    ): Int

def size(list: List[String]): Int

def size(list: List[User]  ): Int
```



How to avoid duplication?

```
def map(list: List[Int]   , update: Int    => Int   ): List[Int]

def map(list: List[String], update: String => String): List[String]

def map(list: List[User]  , update: User   => User): List[User]
```

```
def map(list: List[User], update: User => Int   ): List[Int]
def map(list: List[User], update: User => String): List[String]
```

Parametric function

```
def map[A](list: List[A], update: A => A): List[A]
```

```
map(List(1,2,3,4), (x: Int) => x + 1)
// res0: List[Int] = List(2, 3, 4, 5)

map(List("Hello", "World"), (x: String) => x.reverse)
// res1: List[String] = List("olleH", "dlroW")
```

Parametric function

```scala
def map[A](list: List[A], update: A => A): List[A]
```

```scala
val users = List(User("John", 23), User("Alice", 37), User("Bob", 18))
```

```scala
map(users, (user: User) => user.age)
// error: type mismatch;
//  found   : repl.Session.App.User => Int
//  required: Any => Any
// map(users, (user: User) => user.age)
//            ^^^^^^^^^^^^^^^^^^^^^^^^
```

Parametric function

```
def map[A](list: List[A], update: A => A): List[A]
```

```
val users = List(User("John", 23), User("Alice", 37), User("Bob", 18))
```

```
map[User](users, (user: User) => user.age)
// error: type mismatch;
//  found   : Int
//  required: repl.Session.App.User
// map[User](users, (user: User) => user.age)
//                                  ^^^^^^^^
```

Parametric function

```scala
def map[From, To](list: List[From], update: From => To): List[To]
```

Parametric function

```
def map[From, To](list: List[From], update: From => To): List[To]
```

```
val users = List(User("John", 23), User("Alice", 37), User("Bob", 18))
```

```
map(List(1,2,3,4), (x: Int) => x + 1)
// res5: List[Int] = List(2, 3, 4, 5)

map(users, (user: User) => user.age)
// res6: List[Int] = List(23, 37, 18)
```

Applies to all parametric types

```scala
trait JsonDecoder[A]{
  def decode(value: Json): A
}

case class Predicate[A](value: A => Boolean)

trait ConnectionIO[A]
```