



INTRODUCTION TO R

Create and Name Lists

Vector - Matrix - List

- Vector: 1D, same type
- Matrix: 2D, same type
- List
 - Different R objects
 - No coercion
 - Loss of some functionality

Create list

list()

```
> c("Rsome times", 190, 5)
[1] "Rsome times"    "190"    "5"

> list("Rsome times", 190, 5)
[[1]]
[1] "Rsome times"

[[2]]
[1] 190

[[3]]
[1] 5

> song <- list("Rsome times", 190, 5)
> is.list(song)
[1] TRUE
```

Name list

```
> song <- list("Rsome times", 190, 5)

> names(song) <- c("title", "duration", "track")

> song
$title
[1] "Rsome times"

$duration
[1] 190

$track
[1] 5
```

Name list

```
> song <- list(title = "Rsome times",  
               duration = 190,  
               track = 5)
```

```
> str(song)  
List of 3  
 $ title      : chr "Rsome times"  
 $ duration: num 190  
 $ track      : num 5
```

List in List

```
> similar_song <- list(title = "R you on time?",  
                        duration = 230)  
  
> song <- list(title = "Rsome times",  
               duration = 190, track = 5,  
               similar = similar_song)  
  
> str(song)  
List of 4  
 $ title      : chr "Rsome times"  
 $ duration: num 190  
 $ track      : num 5  
 $ similar :List of 2  
  ..$ title    : chr "R you on time?"  
  ..$ duration: num 230
```



INTRODUCTION TO R

Subset and Extend Lists

The song list

```
> similar_song <- list(title = "R you on time?",
                        duration = 230)
> song <- list(title = "Rsome times",
               duration = 190, track = 5,
               similar = similar_song)

> song
List of 4
 $ title      : chr "Rsome times"
 $ duration: num 190
 $ track      : num 5
 $ similar :List of 2
  ..$ title      : chr "R you on time?"
  ..$ duration: num 230
```

Output of calling `str(song)`

[versus [[

```
> song[1]  
List of 1  
 $ title: chr "Rsome times"
```

```
> song[[1]]  
[1] "Rsome times"
```

```
> song[c(1, 3)]  
List of 2  
 $ title: chr "Rsome times"  
 $ track: num 5
```

```
> song  
List of 4  
 $ title    : chr "Rsome times"  
 $ duration: num 190  
 $ track    : num 5  
 $ similar  :List of 2  
  ..$ title    : chr "R you on time?"  
  ..$ duration: num 230
```

[versus [[

```
> song[[c(1, 3)]]  
Error in song[[c(1, 3)]] :  
  subscript out of bounds
```

```
> song[[1]][[3]]  
Error in song[[1]][[3]] :  
  subscript out of bounds
```

```
> song[[4]][[1]]  
[1] "R you on time?"
```

```
> song[[c(4, 1)]]  
[1] "R you on time?"
```

```
> song  
List of 4  
 $ title      : chr "Rsome times"  
 $ duration: num 190  
 $ track      : num 5  
 $ similar :List of 2  
  ..$ title      : chr "R you on time?"  
  ..$ duration: num 230
```

Subset by names

```
> song[["duration"]]
[1] 190

> song["duration"]
List of 1
 $ duration: num 190

> song[c("duration", "similar")]
List of 2
 $ duration: num 190
 $ similar :List of 2
  ..$ title   : chr "R you on time?"
  ..$ duration: num 230
```

```
> song
List of 4
 $ title   : chr "Rsome times"
 $ duration: num 190
 $ track   : num 5
 $ similar :List of 2
  ..$ title   : chr "R you on time?"
  ..$ duration: num 230
```

Subset by logicals

```
> song[c(FALSE, TRUE, TRUE, FALSE)]  
List of 2  
 $ duration: num 190  
 $ track   : num 5
```

```
> song[[c(FALSE, TRUE, TRUE, FALSE)]]  
Error : attempt to select less than one element
```

```
> song[[F]][[T]][[T]][[F]]  
Error : attempt to select less than one element
```

```
> song  
List of 4  
 $ title    : chr "Rsome times"  
 $ duration: num 190  
 $ track    : num 5  
 $ similar :List of 2  
 ..$ title   : chr "R you on time?"  
 ..$ duration: num 230
```

\$ and extending

```
> song$duration
[1] 190

> friends <- c("Kurt", "Florence",
               "Patti", "Dave")

> song$sent <- friends
> song
List of 5
 $ title      : chr "Rsome times"
 $ duration:  num 190
 $ track      :  num 5
 $ similar :List of 2
  ..$ title      : chr "R you on time?"
  ..$ duration:  num 230
 $ sent       : chr [1:4] "Kurt" "Florence" "Patti" "Dave"
```

```
> song
List of 4
 $ title      : chr "Rsome times"
 $ duration:  num 190
 $ track      :  num 5
 $ similar :List of 2
  ..$ title      : chr "R you on time?"
  ..$ duration:  num 230
```

Extending lists

```
> song[["sent"]] <- friends

> song$similar$reason <- "too long"

> song
List of 5
 $ title      : chr "Rsome times"
 $ duration:  : num 190
 $ track      : num 5
 $ similar    :List of 3
  ..$ title    : chr "R you on time?"
  ..$ duration:  : num 230
  ..$ reason   : chr "too long"
 $ sent       : chr [1:4] "Kurt" "Florence" "Patti" "Dave"
```

Wrap-up

- `[[` or `[` ?
 - `[[` to select list element
 - `[` results in sublist
- `[[` and `$` to subset and extend lists