



INTERMEDIATE R FOR FINANCE

# Why use apply?

# Meet the apply family

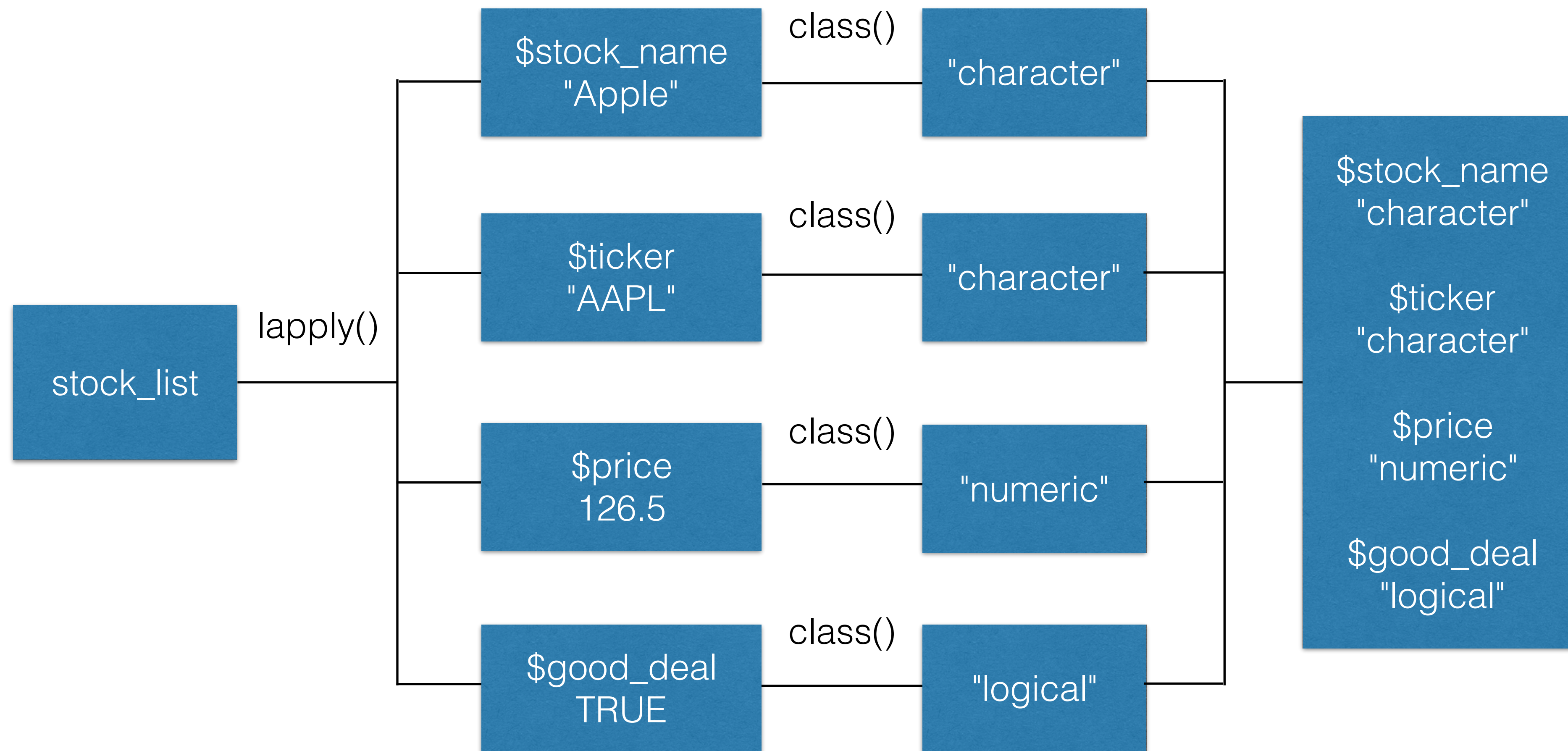
Function	Description
apply	Apply functions over array margins
<code>lapply</code>	Apply a function over a list or vector
eapply	Apply a function over values in an environment
mapply	Apply a function to multiple lists or vector arguments
rapply	Recursively apply a function to a list
tapply	Apply a function over a ragged array
<code>sapply</code>	Simplify the result from lapply
<code>vapply</code>	Strictly simplify the result from lapply

# lapply()

```
> stock_list <- list(stock_name = "Apple", ticker = "AAPL",  
                     price = 126.5, good_deal = TRUE)
```

```
> lapply(stock_list, FUN = class)  
$stock_name  
[1] "character"  
  
$ticker  
[1] "character"  
  
$price  
[1] "numeric"  
  
$good_deal  
[1] "logical"
```

# Break it down



# Sharpe ratio

$$sharpe = \frac{mean(r) - r_f}{sd(r)}$$

- Normalize returns by risk
- Compare returns among stocks
- Higher sharpe ratio = More return / unit risk



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**Let's practice!**





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**sapply() - simplify it!**

# sapply()

```
> stock_list <- list(stock_name = "Apple", ticker = "AAPL",  
                     price = 126.5, good_deal = TRUE)
```

```
> sapply(stock_list, FUN = class)  
stock_name      ticker      price    good_deal  
"character" "character" "numeric" "logical"
```



# Apply a custom summary function

```
> simple_summary <- function(x) {  
  c(mean = mean(x), sd = sd(x))  
}
```

```
> head(stock_return, 3)
```

	apple	ibm	micr
1	0.003744634	0.001251408	0.0008445946
2	-0.007188353	-0.001124859	0.0163713080
3	0.007698653	0.003190691	-0.0044835603

```
> sapply(stock_return, FUN = simple_summary)
```

	apple	ibm	micr
mean	0.002838389	0.001926806	0.002472939
sd	0.007157457	0.008130703	0.009943938



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**`vapply()` - specify  
your output!**

# vapply()

```
> args(vapply)
function (X, FUN, FUN.VALUE, ..., USE.NAMES = TRUE)
NULL
```

```
> vapply(stock_list, FUN = class, FUN.VALUE = character(1))
stock_name      ticker      price    good_deal
"character" "character" "numeric" "logical"
```

# Anonymous functions

```
> vapply(stock_return,  
          FUN = function(x) {c(mean = mean(x), sd = sd(x))},  
          FUN.VALUE = numeric(2))  
          apple      ibm      micr  
mean 0.002838389 0.001926806 0.002472939  
sd   0.007157457 0.008130703 0.009943938
```



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