Shiny Friday #2
Future Value App

Stat 133 with Gaston Sanchez

Future Value

(in its simplest form)

Investing Scenario

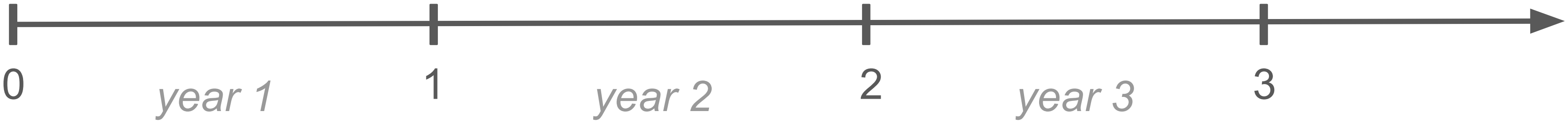
Amount (principal) = $1,000

Annual rate of return = 5%

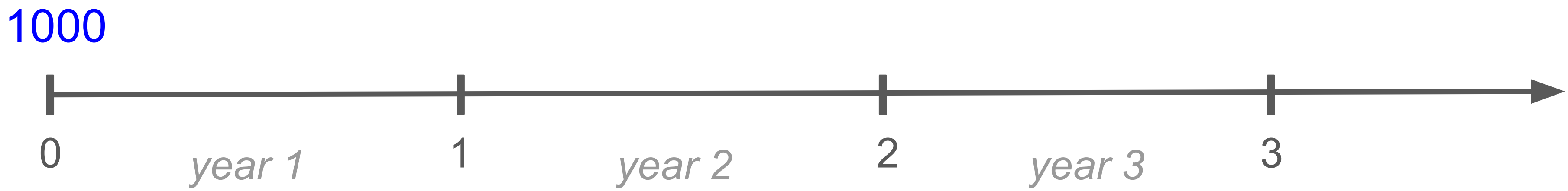
Years = **5**

Future Value in 5 years = ?

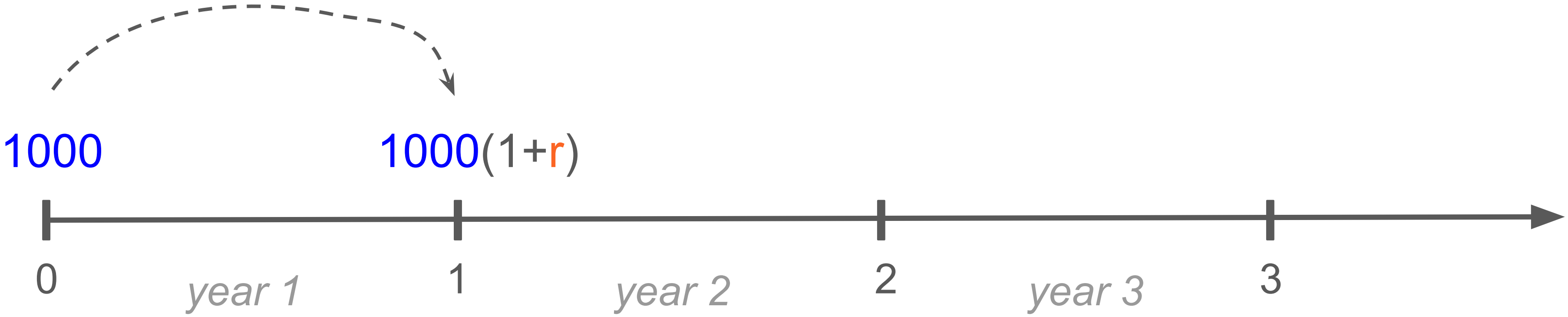
timeline



timeline



timeline



1000

$1000(1+r)$

0

year 1

1

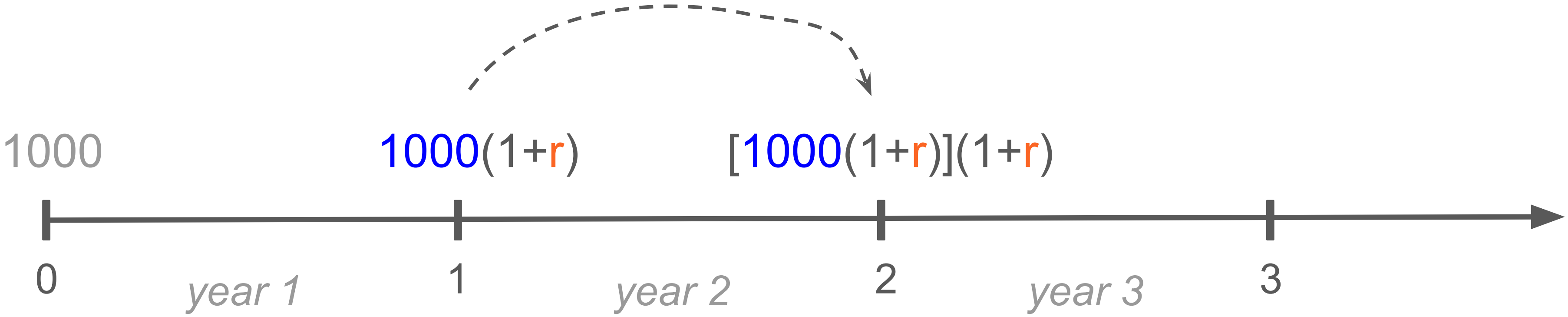
year 2

2

year 3

3

timeline



1000

$1000(1+r)$

$[1000(1+r)](1+r)$

0

year 1

1

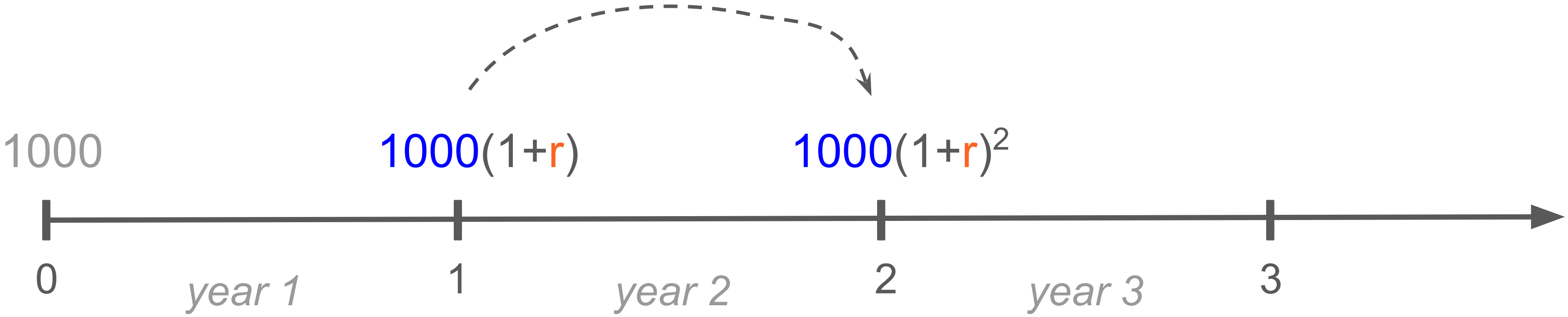
year 2

2

year 3

3

timeline



1000

$1000(1+r)$

$1000(1+r)^2$

0

year 1

1

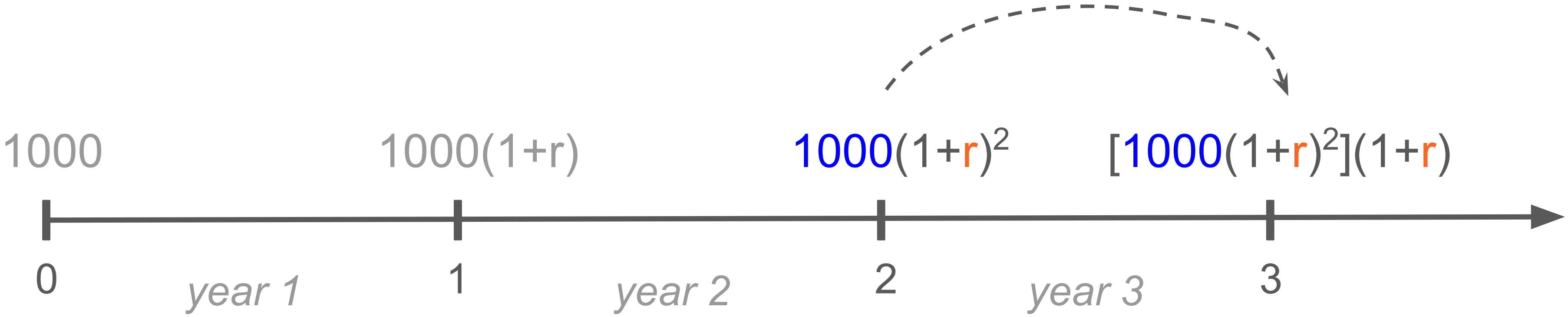
year 2

2

year 3

3

timeline



1000

$1000(1+r)$

$1000(1+r)^2$

$[1000(1+r)^2](1+r)$

0

year 1

1

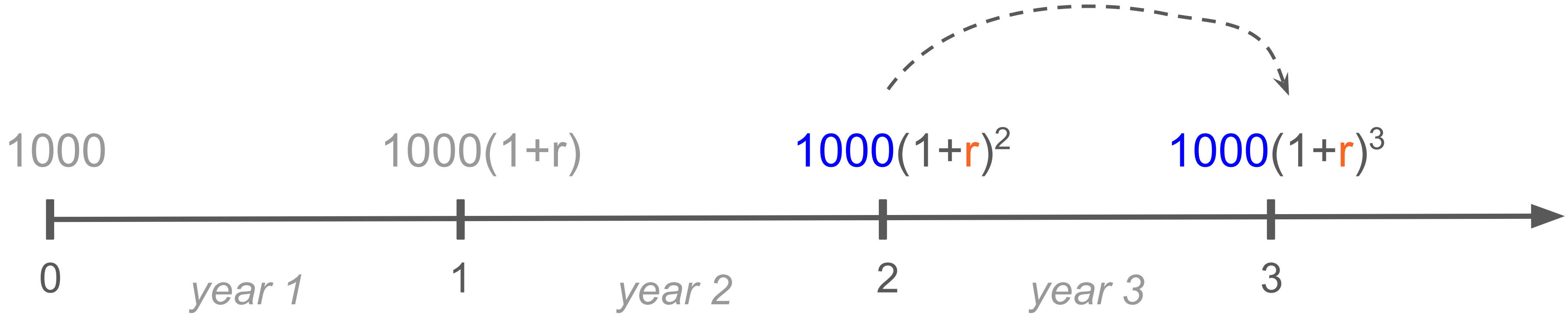
year 2

2

year 3

3

timeline



1000

$1000(1+r)$

$1000(1+r)^2$

$1000(1+r)^3$

0

year 1

1

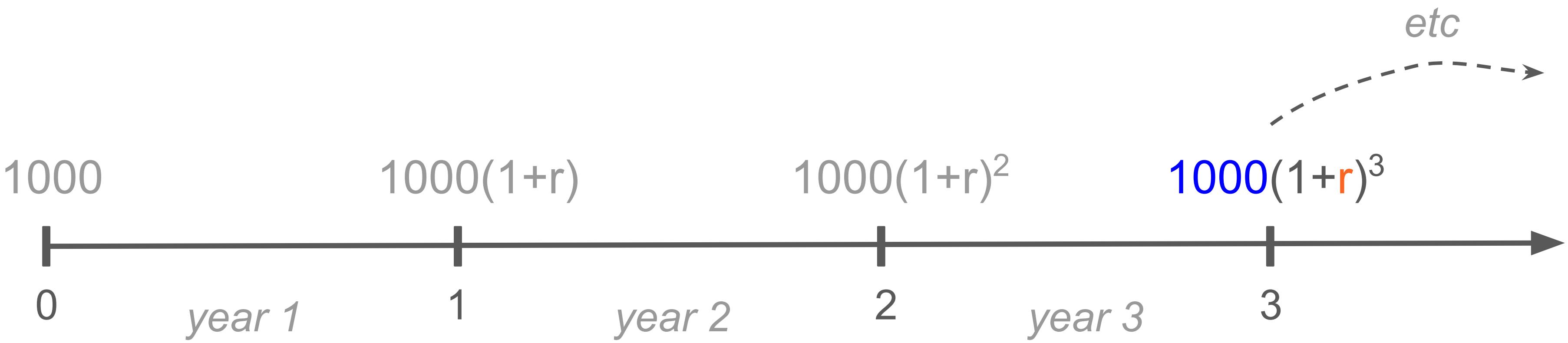
year 2

2

year 3

3

timeline

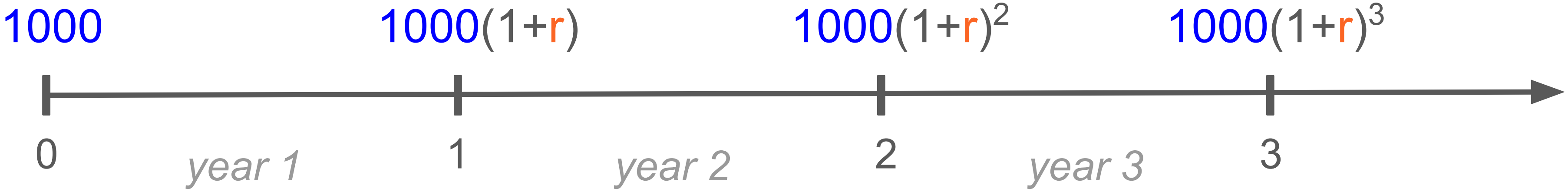


etc

1000 $1000(1+r)$ $1000(1+r)^2$ $1000(1+r)^3$

0 *year 1* 1 *year 2* 2 *year 3* 3

timeline



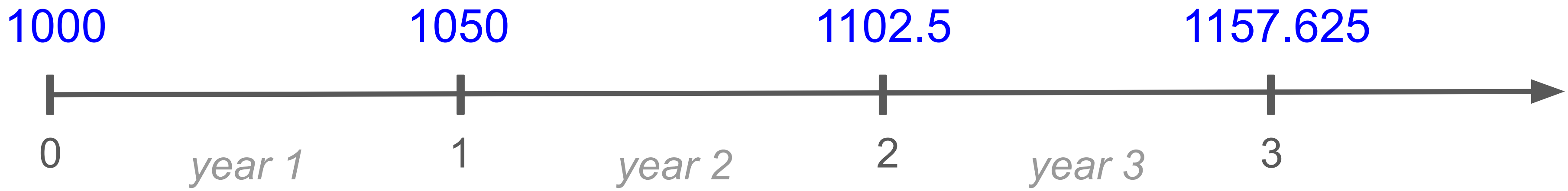
1000 $1000(1+r)$ $1000(1+r)^2$ $1000(1+r)^3$

0   *year 1*   1   *year 2*   2   *year 3*   3

$$FV = 1000(1+r)^n$$

Future value at the end of year n

timeline



$$FV = 1000(1+0.05)^5 = 1276.282$$

Future value at the end of year 5

Inputs & Outputs

Input(s) & Output(s)

Amount (principal) = $1,000

Annual rate of return = 5%

Years = 5

Future Value in 5 years = ?

Input(s) & Output(s)

Amount (principal) = $1,000

Annual rate of return = 5%

Years = 5

Inputs

Future Value in 5 years = ?

Output

Input(s), Computation(s) & Output(s)

Amount (principal) = $1,000

Annual rate of return = 5%

Years = 5

Inputs

$\boxed{FV = 1000(1+r)^n}$

Computation(s)

Future Value in 5 years = FV

Output

In R ...

Input(s), Computation & Output(s)

Inputs

```
amount = 1000
rate = 0.05
years = 5
```

Input(s), Computation & Output(s)

Inputs

```
amount = 1000
rate = 0.05
years = 5
```

Computation

```
fv = amount * (1 + rate)^years
```

Input(s), Computation & Output(s)

Inputs

```
amount = 1000
rate = 0.05
years = 5
```

Computation

```
fv = amount * (1 + rate)^years
```

Output

```
fv
```

FVs for every year

Input(s), Computation & Output(s)

Inputs

```
amount = 1000

rate = 0.05

time = 0:5   ← sequence of years!
```

Input(s), Computation & Output(s)

Inputs

```
amount = 1000
rate = 0.05
time = 0:5
```

← *sequence of years!*

Computation

```
fv = amount * (1 + rate)^time
```

Input(s), Computation & Output(s)

Inputs

```
amount = 1000
rate = 0.05
time = 0:5
```

← *sequence of years!*

Computation

```
fv = amount * (1 + rate)^time
```

Output: timeline

```
plot(time, fv, type = "l")
points(time, fv)
```

Shiny App Demo

Shiny App main components

ui

`Input( )` *functions; defining* `inputId` *and* `label`

`Output( )` *functions; defining* `outputId`

Shiny App main components

ui

`Input( )` *functions;* *defining* `inputId` *and* `label`

`Output( )` *functions;* *defining* `outputId`

server

To assemble input(s) into outputs

```
output$outputId <- renderFunction({
  # what to do with inputs
  # to obtain an output
})
```