R avancé

partie 3 : Environnements

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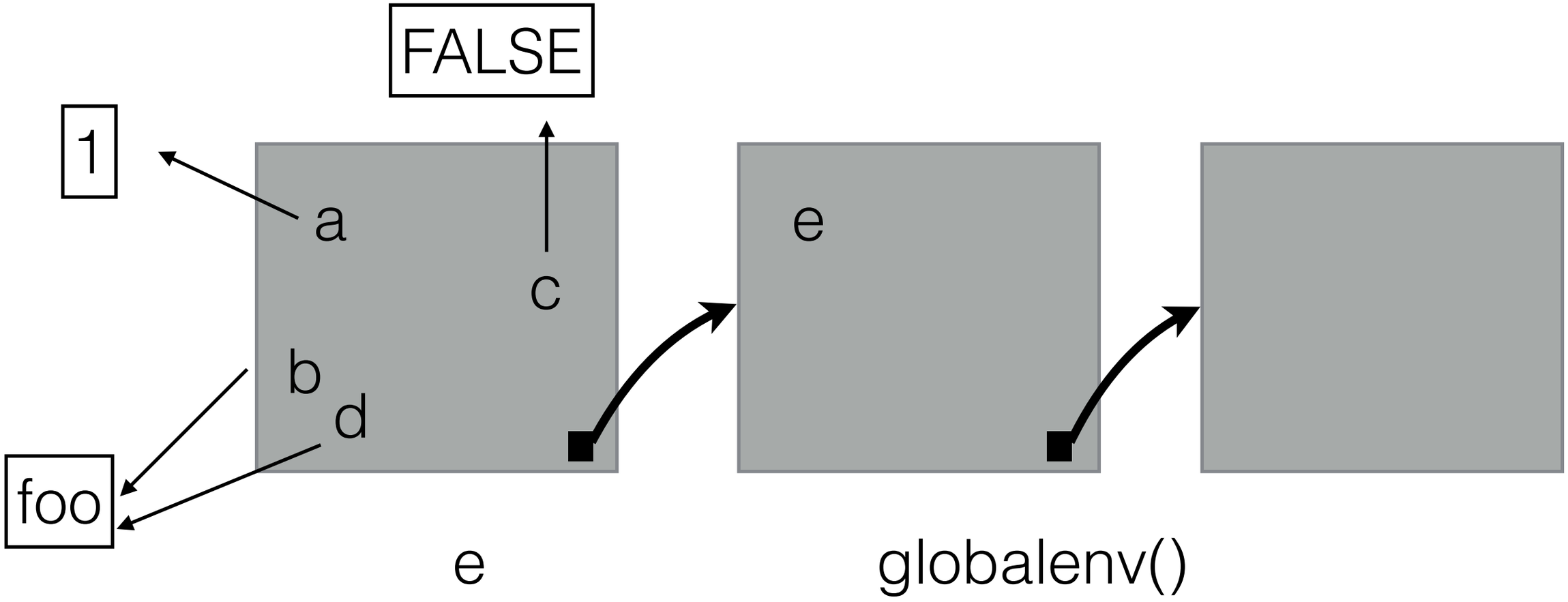
Quiz

- Quelles sont les 3 différences entre une liste et un environnement ?
- Quel est l'environnement parent du `globalenv()`

```
e <- new.env()
e$a <- 1
e$b <- "foo"
e$c <- FALSE
e$d <- e$b
```

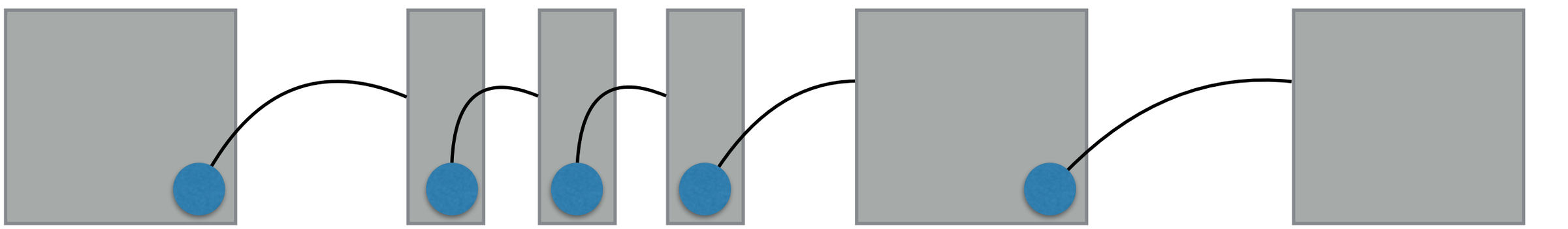


Les environnements particuliers

- `globalenv()`
- `baseenv()`
- `emptyenv()`
- `environment()`

Le chemin de recherche (search path)

```
> search()
 [1] ".GlobalEnv"        "package:stats"     "package:graphics"
 [4] "package:grDevices" "package:utils"     "package:datasets"
 [7] "package:testthat"  "package:magrittr"  "package:devtools"
[10] "package:methods"   "Autoloads"         "package:base"
```



```
> ls( "package:stats" ) %>% head(20)
 [1] "acf"                    "acf2AR"                 "add.scope"
 [4] "add1"                   "addmargins"             "aggregate"
 [7] "aggregate.data.frame"   "aggregate.ts"           "AIC"
[10] "alias"                  "anova"                  "ansari.test"
[13] "aov"                    "approx"                 "approxfun"
[16] "ar"                     "ar.burg"                "ar.mle"
[19] "ar.ols"                 "ar.yw"

> stats <- as.environment("package:stats")
> parent.env(stats)
<environment: package:graphics>
attr(,"name")
[1] "package:graphics"
attr(,"path")
[1] "/Library/Frameworks/R.framework/Versions/3.2/Resources/library/graphics"
>
> search()
 [1] ".GlobalEnv"         "package:stats"     "package:graphics"
 [4] "package:grDevices" "package:utils"     "package:datasets"
 [7] "package:testthat"  "package:magrittr"  "package:devtools"
[10] "package:methods"   "Autoloads"         "package:base"
```

```
e <- new.env()
e$a <- 2
ls(e)
get("a", e)
e$a <- NULL
ls(e)
rm( "a", envir = e )
ls(e)
exists("a", envir = e )
ls.str(e)
```

```
> exists( "rnorm", e )
[1] FALSE

> exists( "rnorm", e, inherits = TRUE )
[1] TRUE
```

```
> get("rnorm", e, inherits = TRUE )
function (n, mean = 0, sd = 1)
.Call(C_rnorm, n, mean, sd)
<bytecode: 0x7fe9ed01b720>
<environment: namespace:stats>
```

Recherche récursive de l'environnement où est un objet

```
where <- function( name, env=parent.frame()){
  if( identical(env, emptyenv()) ){
    stop("can't find ", name, call. = FALSE)
  } else if( exists(name, envir=env, inherits=FALSE) ){
    env
  } else {
    where( name, parent.env(env))
  }
}
```

Ecrire une version de get basée sur le format de where

Environnements et fonctions

```
> where("sd")
<environment: package:stats>
attr(,"name")
[1] "package:stats"
attr(,"path")
[1] "/Library/Frameworks/R.framework/Versions/3.2/Resources/library/stats"
> environment(sd)
<environment: namespace:stats>
> sd
function (x, na.rm = FALSE)
sqrt(var(if (is.vector(x)) x else as.double(x), na.rm = na.rm))
<bytecode: 0x7fe9f03f0838>
<environment: namespace:stats>

> x <- 1:10
> sd(x)
[1] 3.02765
> var <- function(x, na.rm=TRUE) 100
> var(x)
[1] 100
> sd(x)
[1] 3.02765
```

Environnements et sémantique de référence

```
modify <- function(x){
  x$a <- 2
  invisible(NULL)
}

x_l <- list(a=1)
modify(x_l)
x_l

x_e <- new.env()
x_e$a <- 1
modify(x_e)
x_e
```