

if

The screenshot shows the RStudio interface with a script file named 'Untitled1.R'. The script contains the following R code:

```
57  
58 x=c("我愛你","我是胡陽靜潔","妳好靜潔","我愛京滬")  
59 grep("我", x)  
60 grep1("我", x)  
61  
62  
63 x=c("北京大學","北京海軍","上海師範","上海復旦","山西大學")  
64 grep1("北京", x)  
65 grep1("上海", x)  
66  
67  
68  
69 x<-rnorm(1,3,1);x  
70 if(x>3){y<-10  
71 } else {y<-0}  
72 y  
73 y<-if(x>3){10}else{0};y  
74  
75  
76  
77
```

The console shows the execution results:

```
R 4.3.1 ~ /  
> x=c("我愛你","我是胡陽靜潔","妳好靜潔","我愛京滬")  
[1] "2hang"  
[1] "11"  
[1] "1ao"  
>  
> x=c("我愛你","我是胡陽靜潔","妳好靜潔","我愛京滬")  
> grep("我", x)  
[1] 1 2 4  
> grep1("我", x)  
[1] TRUE TRUE FALSE TRUE  
>  
> x=c("北京大學","北京海軍","上海師範","上海復旦","山西大學")  
> grep1("北京", x)  
[1] TRUE TRUE FALSE FALSE  
> grep1("上海", x)  
[1] FALSE FALSE TRUE TRUE FALSE  
> x<-rnorm(1,3,1);x  
[1] 3.115122  
> if(x>3){y<-10  
+ } else {y<-0}  
> y  
[1] 10  
> y<-if(x>3){10}else{0};y  
[1] 10  
> |
```

The Environment pane shows the following variables:

| Variable | Value |
|----------|--------------------------------|
| gap | num [1:5] 3 2 7 3 6 |
| i | 4L |
| str | chr [1:7] "a" "ab" "b" "bl..." |
| txt | chr [1:4] "arm" "foot" "le..." |
| x | 3.11512240456122 |
| y | 10 |

ifelse

The screenshot shows the RStudio interface with a script file named 'Untitled1.R'. The script contains the following R code:

```
58 x=c("我愛你","我是胡陽靜潔","妳好靜潔","我愛京滬")  
59 grep("我", x)  
60 grep1("我", x)  
61  
62  
63 x=c("北京大學","北京海軍","上海師範","上海復旦","山西大學")  
64 grep1("北京", x)  
65 grep1("上海", x)  
66  
67  
68  
69 x<-rnorm(1,3,1);x  
70 if(x>3){y<-10  
71 } else {y<-0}  
72 y  
73 y<-if(x>3){10}else{0};y  
74  
75 ifelse(rbinom(1,1,0.5),"李","花")  
76  
77  
78
```

The console shows the execution results:

```
R 4.3.1 ~ /  
> x=c("我愛你","我是胡陽靜潔","妳好靜潔","我愛京滬")  
[1] "2hang"  
[1] "11"  
[1] "1ao"  
>  
> x=c("我愛你","我是胡陽靜潔","妳好靜潔","我愛京滬")  
> grep("我", x)  
[1] 1 2 4  
> grep1("我", x)  
[1] TRUE TRUE FALSE TRUE  
>  
> x=c("北京大學","北京海軍","上海師範","上海復旦","山西大學")  
> grep1("北京", x)  
[1] TRUE TRUE FALSE FALSE  
> grep1("上海", x)  
[1] FALSE FALSE TRUE TRUE FALSE  
> x<-rnorm(1,3,1);x  
[1] 3.115122  
> if(x>3){y<-10  
+ } else {y<-0}  
> y  
[1] 10  
> y<-if(x>3){10}else{0};y  
[1] 10  
> ifelse(rbinom(1,1,0.5),"李","花")  
[1] "李"  
> ifelse(rbinom(1,1,0.5),"李","花")  
[1] "花"  
> |
```

The Environment pane shows the following variables:

| Variable | Value |
|----------|--------------------------------|
| gap | num [1:5] 3 2 7 3 6 |
| i | 4L |
| str | chr [1:7] "a" "ab" "b" "bl..." |
| txt | chr [1:4] "arm" "foot" "le..." |
| x | 3.11512240456122 |
| y | 10 |

switch

The screenshot shows the RStudio IDE with a script editor, console, and environment pane. The script editor contains R code that demonstrates the use of the `switch` function. The console shows the output of the code, and the environment pane shows the variables created during the execution.

```
62 x=c("北京大學","北京清華","上海師範","上海復旦","山西大學")
63
64 grep1("北京", x)
65 grep1("上海", x)
66
67
68
69 x<-rnorm(1,3,1);x
70 - if(x>3){y<-10
71 - } else {y<-0}
72 y
73 y<-if(x>3){10}else{0};y
74
75 ifelse(rbinom(1,1,0.5),"字","花")
76
77 switch(2,"不","要")
78 switch("median",median=median(c(-1:9,50)),mean=mean(c(-1:9,50)))
79 switch("aaa",median=median(c(-1:9,50)), mean=mean(c(-1:9,50)), print("nothing"))
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
```

Console output:

```
> grep1("北京", x)
[1] TRUE TRUE FALSE FALSE
> grep1("上海", x)
[1] FALSE FALSE TRUE TRUE FALSE
> x<-rnorm(1,3,1);x
[1] 3.115122
> if(x>3){y<-10
+ } else {y<-0}
[1] 10
> y<-if(x>3){10}else{0};y
[1] 10
> ifelse(rbinom(1,1,0.5),"字","花")
[1] "字"
> ifelse(rbinom(1,1,0.5),"字","花")
[1] "花"
> switch(2,"不","要")
[1] "要"
> switch(2,"不","要")
[1] "要"
> switch("median",median=median(c(-1:9,50)),mean=mean(c(-1:9,50)))
[1] 4.5
> switch("aaa",median=median(c(-1:9,50)), mean=mean(c(-1:9,50)), print("nothing"))
[1] "nothing"
>
```

Environment pane:

| Variable | Value |
|----------|--------------------------------|
| gap | num [1:5] 3 2 7 3 6 |
| i | 4L |
| str | chr [1:7] "a" "ab" "b" "bl..." |
| txt | chr [1:4] "arm" "foot" "le..." |
| x | 3.11512240456122 |
| y | 10 |

for

The screenshot shows the RStudio IDE with a script editor, console, and environment pane. The script editor contains R code that demonstrates the use of the `for` loop. The console shows the output of the code, and the environment pane shows the variables created during the execution.

```
73 y<-if(x>3){10}else{0};y
74
75 ifelse(rbinom(1,1,0.5),"字","花")
76
77 switch(2,"不","要")
78 switch("median",median=median(c(-1:9,50)),mean=mean(c(-1:9,50)))
79 switch("aaa",median=median(c(-1:9,50)), mean=mean(c(-1:9,50)), print("nothing"))
80
81 for(i in 1:2) {print(i)}
82 x<-c("a","b")
83 for(i in 1:2) {print(x[i])}
84 for(i in seq_along(x)) {print(x[i])} #seq_along相比seq更有效率，輸入向量，輸出等長的數列
85 for(letter in x) print(letter)
86
87
88
89
90
91
92
93
94
```

Console output:

```
[1] "花"
> switch(2,"不","要")
[1] "要"
> switch(2,"不","要")
[1] "要"
> switch("median",median=median(c(-1:9,50)),mean=mean(c(-1:9,50)))
[1] 4.5
> switch("aaa",median=median(c(-1:9,50)), mean=mean(c(-1:9,50)), print("nothing"))
[1] "nothing"
> for(i in 1:2) {print(i)}
[1] 1
[1] 2
> x<-c("a","b")
> for(i in 1:2) {print(x[i])}
[1] "a"
[1] "b"
> for(i in seq_along(x)){
+ print(x[i])} #seq_along相比seq更有效率，輸入向量，輸出等長的數列
[1] "a"
[1] "b"
>
> for(letter in x) print(letter)
[1] "a"
[1] "b"
>
```

Environment pane:

| Variable | Value |
|----------|--------------------------------|
| gap | num [1:5] 3 2 7 3 6 |
| i | 2L |
| letter | "b" |
| str | chr [1:7] "a" "ab" "b" "bl..." |
| txt | chr [1:4] "arm" "foot" "le..." |
| x | chr [1:2] "a" "b" |
| y | 10 |

巢狀 for

The screenshot shows the RStudio interface with the following code in the editor:

```
73 y<-if(x>3){10}else{0};y
74
75 ifelse(rbinom(1,1,0.5),"字","花")
76
77 switch(2,"不","要")
78 switch("median",median=median(c(-1:9,50)),mean=mean(c(-1:9,50)))
79 switch("aaa",median=median(c(-1:9,50)), mean=mean(c(-1:9,50)), print("nothing"))
80
81 for(i in 1:2) {print(i)}
82 x<-c("a","b")
83 for(i in 1:2) {print(x[i])}
84 for(i in seq_along(x)){ } #seq_along相比seq更有效率，輸入向量，輸出等長的數列
85 for(letter in x) print(letter)
86
87
88 x<-matrix(1:6,2,3)
89 for(i in seq_len(nrow(x))) {
90   for(j in seq_len(ncol(x))) {
91     print(x[i,j])
92   }
93 }
94
```

The console output shows the execution of these nested loops:

```
R 4.3.1 ~ /
> x<-c("a","b")
> for(i in 1:2) {print(x[i])}
[1] "a"
[1] "b"
> for(i in seq_along(x)){
+ print(x[i])} #seq_along相比seq更有效率，輸入向量，輸出等長的數列
[1] "a"
[1] "b"
>
> for(letter in x) print(letter)
[1] "a"
[1] "b"
>
> x<-matrix(1:6,2,3)
> for(i in seq_len(nrow(x))) {
+   for(j in seq_len(ncol(x))) {
+     print(x[i,j])
+   }
+ }
[1] 1
[1] 3
[1] 5
[1] 2
[1] 4
[1] 6
> |
```

while

The screenshot shows the RStudio interface with the following code in the editor:

```
89 for(i in seq_len(nrow(x))) {
90   for(j in seq_len(ncol(x))) {
91     print(x[i,j])
92   }
93 }
94 count<-0
95 while(count<6){
96   print(count)
97   count<-count+1
98 }
99 z<-5
100 while(z>=3&&z<=10) {
101   print(z)
102   coin<-rbinom(1,1,0.5) #投一枚均勻硬幣
103   if(coin==1) {
104     z<-z+1
105   } else {
106     z<-z-1
107   } #小型的隨機遊走
108 }
109
```

The console output shows the execution of these loops:

```
R 4.3.1 ~ /
[1] 5
[1] 6
[1] 5
[1] 6
[1] 7
[1] 6
[1] 5
[1] 4
[1] 5
[1] 6
[1] 7
[1] 8
[1] 7
[1] 6
[1] 7
[1] 8
[1] 7
[1] 8
[1] 9
[1] 10
> |
```

repeat

The screenshot shows the RStudio interface with a script editor, console, and environment pane. The script editor contains R code for a simulation. A `repeat` loop is highlighted in blue, starting at line 111 and ending at line 117. The console shows the output of the code, which includes a series of numbers. The environment pane on the right shows the current state of the workspace, including variables like `x`, `coin`, `gap`, `i`, `j`, `letter`, `str`, `txt`, `y`, and `z`.

```
99 z<-5
100 while(z>=36&&z<=10) {
101   print(z)
102   coin<-rbinom(1,1,0.5) #投一枚均匀的硬币
103   if(coin==1) {
104     z<-z+1
105   } else {
106     z<-z-1
107   } #小型的随机游走
108 }
109
110 x0<-1;tol<-1e-8
111 repeat{
112   x1<-computeEstimate() #自己写的一个函数
113   if(abs(x1-x0)>tol) {
114     break
115   } else {
116     x0<-x1
117   }
118 }
119
120 [1] 5
121 [1] 6
122 [1] 5
123 [1] 6
124 [1] 7
125 [1] 6
126 [1] 5
127 [1] 4
128 [1] 5
129 [1] 6
130 [1] 7
131 [1] 6
132 [1] 7
133 [1] 8
134 [1] 7
135 [1] 6
136 [1] 7
137 [1] 8
138 [1] 7
139 [1] 8
140 [1] 9
141 [1] 10
142 > |
```

next

The screenshot shows the RStudio interface with a script editor, console, and environment pane. The script editor contains R code for a simulation. A `for` loop is highlighted in blue, starting at line 120 and ending at line 126. The console shows the output of the code, which includes a series of numbers. The environment pane on the right shows the current state of the workspace, including variables like `x`, `coin`, `gap`, `i`, `j`, `letter`, `str`, `txt`, `y`, and `z`.

```
106 z<-z-1
107 } #小型的随机游走
108 }
109
110 x0<-1;tol<-1e-8
111 repeat{
112   x1<-computeEstimate() #自己写的一个函数
113   if(abs(x1-x0)>tol) {
114     break
115   } else {
116     x0<-x1
117   }
118 }
119
120 for(i in 1:100){
121   if(i<=20){
122     next #跳過頭20次迴圈
123   }
124   #其他需要執行的語句
125 }
126
127 [1] 5
128 [1] 6
129 [1] 5
130 [1] 6
131 [1] 7
132 [1] 6
133 [1] 5
134 [1] 4
135 [1] 5
136 [1] 6
137 [1] 7
138 [1] 6
139 [1] 7
140 [1] 8
141 [1] 7
142 [1] 6
143 [1] 7
144 [1] 8
145 [1] 7
146 [1] 8
147 [1] 9
148 [1] 10
149 > |
```

