



INTERMEDIATE R

while loop

while loop

```
while(condition) {  
  expr  
}
```



```
> ctr <- 1  
  
> while(ctr <= 7) {
```

while loop

```
while(condition) {  
  expr  
}
```



```
> ctr <- 1  
  
> while(ctr <= 7) {  
  print(paste("ctr is set to", ctr))  
}
```

while loop

```
while(condition) {  
  expr  
}
```



```
> ctr <- 1  
  
> while(ctr <= 7) {  
  print(paste("ctr is set to", ctr))  
  ctr <- ctr + 1  
}
```

while loop

```
while(condition) {  
  expr  
}
```



```
> ctr <- 1  
      TRUE  
> while(ctr <= 7) {  
  print(paste("ctr is set to", ctr))  
  ctr <- ctr + 1      increment ctr  
}  
[1] "ctr is set to 1"
```

ctr: 1

while loop

```
while(condition) {  
  expr  
}
```



```
> ctr <- 1  
      TRUE  
> while(ctr <= 7) {  
  print(paste("ctr is set to", ctr))  
  ctr <- ctr + 1      increment ctr  
}  
[1] "ctr is set to 2"
```

ctr: 2

while loop

```
while(condition) {  
  expr  
}
```



```
> ctr <- 1  
      TRUE  
> while(ctr <= 7) {  
  print(paste("ctr is set to", ctr))  
  ctr <- ctr + 1      increment ctr  
}  
[1] "ctr is set to 7"
```

ctr: 7

while loop

```
while(condition) {  
  expr  
}
```



```
> ctr <- 1  
  
      FALSE  
> while(ctr <= 7) {  
  print(paste("ctr is set to", ctr))  
  ctr <- ctr + 1  
}
```

ctr: 8

No printout!

while loop

```
> ctr <- 1

> while(ctr <= 7) {
  print(paste("ctr is set to", ctr))
  ctr <- ctr + 1
}
[1] "ctr is set to 1"
[1] "ctr is set to 2"
...
[1] "ctr is set to 7"

> ctr
[1] 8
```

infinite while loop

[illegible]

break statement

```
> ctr <- 1
> while(ctr <= 7) { TRUE
  if(ctr %% 5 == 0) { Break if ctr is a 5-fold
    break
  }
  print(paste("ctr is set to", ctr))
  ctr <- ctr + 1
}
```

[1] "ctr is set to 1"
[1] "ctr is set to 2"
[1] "ctr is set to 3"
[1] "ctr is set to 4"

while loop stops if ctr is 5: no more printouts



INTERMEDIATE R

for loop

for loop

```
for(var in seq) {  
  expr  
}
```



```
> cities <- c("New York", "Paris",  
              "London", "Tokyo",  
              "Rio de Janeiro", "Cape Town")  
  
> cities  
[1] "New York"  "Paris"    ...  "Cape Town"
```

for loop

```
for(var in seq) {  
  expr  
}
```



```
> cities <- c("New York", "Paris",  
              "London", "Tokyo",  
              "Rio de Janeiro", "Cape Town")  
  
> for(var in seq) {  
  expr  
}
```

for loop

```
for(var in seq) {  
  expr  
}
```



```
> cities <- c("New York", "Paris",  
              "London", "Tokyo",  
              "Rio de Janeiro", "Cape Town")  
  
> for(city in cities) {  
  expr  
}
```

for loop

```
for(var in seq) {  
  expr  
}
```



```
> cities <- c("New York", "Paris",  
              "London", "Tokyo",  
              "Rio de Janeiro", "Cape Town")  
  
> for(city in cities) {  
  print(city)  
}
```


for loop

```
for(var in seq) {  
  expr  
}
```



```
> cities <- c("New York", "Paris",  
              "London", "Tokyo",  
              "Rio de Janeiro", "Cape Town")  
  
> for(city in cities) {  
  print(city)  
}  
[1] "New York"
```

city: "New York"

for loop

```
for(var in seq) {  
  expr  
}
```



```
> cities <- c("New York", "Paris",  
              "London", "Tokyo",  
              "Rio de Janeiro", "Cape Town")  
  
> for(city in cities) {  
  print(city)  
}  
[1] "Paris"
```

city: "Paris"

for loop

```
> cities <- c("New York", "Paris",  
              "London", "Tokyo",  
              "Rio de Janeiro", "Cape Town")  
  
> for(city in cities) {  
  print(city)  
}  
[1] "New York"  
[1] "Paris"  
[1] "London"  
[1] "Tokyo"  
[1] "Rio de Janeiro"  
[1] "Cape Town"
```

for loop over list

```
> cities <- list("New York", "Paris",  
                 "London", "Tokyo",  
                 "Rio de Janeiro", "Cape Town")  
  
> for(city in cities) {  
  print(city)  
}  
[1] "New York"  
[1] "Paris"  
[1] "London"  
[1] "Tokyo"  
[1] "Rio de Janeiro"  
[1] "Cape Town"
```

break statement

```
> cities <- list("New York", "Paris",  
                "London", "Tokyo",  
                "Rio de Janeiro", "Cape Town")  
  
> for(city in cities) {  
  if(nchar(city) == 6) {  
    break  
  }  
  print(city)  
}
```

break statement

```
> cities <- list("New York", "Paris",  
                "London", "Tokyo",  
                "Rio de Janeiro", "Cape Town")  
  
> for(city in cities) {  
  if(nchar(city) == 6) { FALSE  
    break  
  }  
  print(city)  
}  
[1] "New York"
```

city: "New York"

break statement

```
> cities <- list("New York", "Paris",  
                "London", "Tokyo",  
                "Rio de Janeiro", "Cape Town")  
  
> for(city in cities) {  
  if(nchar(city) == 6) {  
    break  
  }  
  print(city)  
}  
[1] "Paris"
```

city: "Paris"

FALSE

break statement

```
> cities <- list("New York", "Paris",  
                "London", "Tokyo",  
                "Rio de Janeiro", "Cape Town")  
  
> for(city in cities) {  
  if(nchar(city) == 6) {  
    break  
  }  
  print(city)  
}
```

city: "London"

for loop abandoned, no printout

break statement

```
> cities <- list("New York", "Paris",  
                 "London", "Tokyo",  
                 "Rio de Janeiro", "Cape Town"))  
  
> for(city in cities) {  
  if(nchar(city) == 6) {  
    break  
  }  
  print(city)  
}  
[1] "New York"  
[1] "Paris"
```

next statement

```
> cities <- list("New York", "Paris",  
                 "London", "Tokyo",  
                 "Rio de Janeiro", "Cape Town")  
  
> for(city in cities) {  
  if(nchar(city) == 6) {  
    next  
    next: skip to next iteration  
  }  
  print(city)  
}  
[1] "New York"  
[1] "Paris"  
[1] "Tokyo" "London" is not printed!  
[1] "Rio de Janeiro"  
[1] "Cape Town"
```

for loop: v2

```
> cities <- c("New York", "Paris",  
              "London", "Tokyo",  
              "Rio de Janeiro", "Cape Town")  
  
> for(city in cities) {  
  print(city)  
}
```

for loop: v2

```
> cities <- c("New York", "Paris",  
              "London", "Tokyo",  
              "Rio de Janeiro", "Cape Town")  
  
> for(i in 1:length(cities)) {  
  print(city)  
}
```

1:6 == c(1, 2, 3, 4, 5, 6)

for loop: v2

```
> cities <- c("New York", "Paris",  
              "London", "Tokyo",  
              "Rio de Janeiro", "Cape Town")  
  
> for(i in 1:length(cities)) {  
  print(cities[i])  
}  
[1] "New York"  
[1] "Paris"  
[1] "London"  
[1] "Tokyo"  
[1] "Rio de Janeiro"  
[1] "Cape Town"
```

for loop: v2

```
> cities <- c("New York", "Paris",  
             "London", "Tokyo",  
             "Rio de Janeiro", "Cape Town")  
  
> for(i in 1:length(cities)) {  
  print(paste(cities[i], "is on position",  
             i, "in the cities vector."))  
}  
[1] "New York is on position 1 in the cities vector."  
[1] "Paris is on position 2 in the cities vector."  
[1] "London is on position 3 in the cities vector."  
[1] "Tokyo is on position 4 in the cities vector."  
[1] "Rio de Janeiro is on position 5 in the cities vector."  
[1] "Cape Town is on position 6 in the cities vector."
```

for loop: wrap-up

```
> cities <- c("New York", "Paris",  
             "London", "Tokyo",  
             "Rio de Janeiro", "Cape Town")
```

```
> for(city in cities) {  
  print(city)  
}
```

- + Concise
- + Easy to read
- No access to looping index

```
> for(i in 1:length(cities)) {  
  print(cities[i])  
}
```

- Harder to read and write
- + More versatile