

**Exercises for the course**  
**An Introduction to R – WS 2019/2020**  
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**SOLUTION****Exercise 1**

## Algorithm 1

A = 3

B = 4

## Algorithm 2

A = 2

B = 3

C = 1

## Algorithm 3

A = 6

B = 2

## Algorithm 4

A = 13

B = 13

C = 13

## Algorithm 5

A = 2

B = 2

**Exercise 2****Note:**

We must use a variable C to save the value of A (or B).

Begin

A ← 5

B ← 8

C ← A

A ← B

B ← C

End

**Exercise 3****Solution that does not check if the user actually entered a valid number:**

Begin

Write: "Please enter a number:"

Read num

num2 ← num\*num

Write num2

End

**Solution that checks if the user entered a number:**

```
Begin
Write: "Please enter a number:"
Read num
While num NO number then
Write: "Please enter a number:"
Read num
End While
num2 <- num*num
Write num2
End
```

**Exercise 4****Version 1**

```
Begin
Write: "Please enter a number:"
Read num
If num > 0 then
    Write "The number is positive"
End If
If num < 0 then
    Write "The number is negative"
End If
End
```

**Version 2**

```
Begin
Write: "Please enter a number:"
Read num
If num > 0 then
    Write "The number is positive"
Else then
If num = 0 then
    Write "The number is 0"
Else then
    Write "The number is negative"
End If
End If
End
```

**Note:**

You can also check if the user really entered a number in both cases (see above, exercise 3).

**Exercise 5**

```
Begin
Write: "Please enter a first number:"
Read num1
Write: "Please enter a second number:"
Read num2
If num1 = 0 OR num2 = 0 then
```

```

        Write "The product is null"
    Else then
        If (num1 > 0 AND num2 > 0) OR (num1 < 0 AND num2 < 0) then
            Write "The product is positive"
        Else then
            Write "The product is negative"
        End If
    End If
End

```

**Note the use of the parentheses in the condition.**

### Exercise 6

```

Begin
Write: "Please enter the age of the bird:"
Read age
Write: "Please enter the sex of the bird (M/F):"
Read sex
Define nest as boolean
If sex = "F" then
    If age < 1 then
        nest <- FALSE
    Else then
        nest <- TRUE
    End If
Else then
    If age < 1 OR age > 5 then
        nest <- FALSE
    Else then
        nest <- TRUE
    End If
End If
If nest = TRUE then
    Write "The bird will build a nest"
Else then
    Write "The bird will not build a nest"
End If
End

```

### Notes:

- We could check if the user entered a correct age and sex (not done here to save space).
- We used the nest variable to avoid repeating the Write command in the script (not mandatory).
- We could also save the Else commands by setting the value of nest to TRUE in the first place and changing it only to FALSE when needed.

### Exercise 7

```

Begin
Write: "Please enter a number between 1 and 10:"
Read num
while (num NO number) OR (num > 10) OR (num < 1) then
    Write: "Not correct: Please enter a number between 1 and 10:"

```

```
Read num
End While
End
```

**Exercise 8**

```
Begin
Write: "Please enter an integer:"
Read int
Define res as integer
res <- 1
For i varying from 1 to int then
    res <- res * i
End For
Write: "The factorial value of" & int & "is: " & res
End
```

**Note:**

In R, there is a function `factorial()` that could be used here.