# Informatique 1
# Introduction à la programmation

## Mission 6 : introduction

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# Mission 6

- Objectifs
  - fichiers
  - exceptions

- Problème
  - Création d'un outil dans lequel l'utilisateur peut donner des commandes; doit continuer même si l'utilisateur donne des mauvaises commandes

# Fichiers

**Disque dur de l'ordinateur**


128Go, 256Go, …

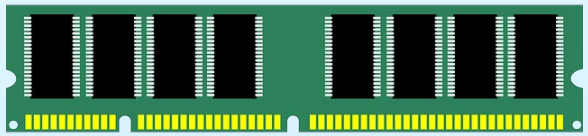
Plus lente

Contient de l'information même si l'ordinateur n'est pas allumé

Lire / Read

Écrire / Write

**Mémoire de l'ordinateur**



8Go, 16Go, …

Plus vite

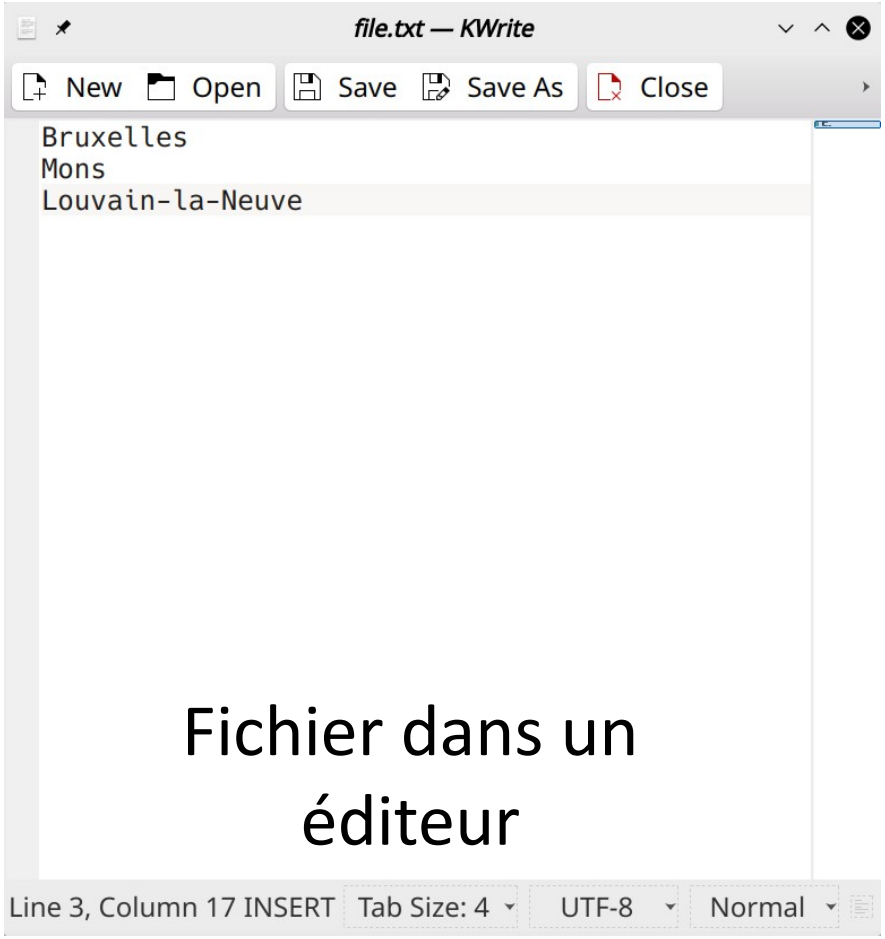
Contient de l'information seulement si l'ordinateur est allumé

# Fichiers de Texte

| | | | | | |
|---|---|---|---|---|---|
| B | r | u | x | e | l |
| l | e | s | \n | M | o |
| n | s | \n | L | o | u |
| v | a | i | n | - | l |
| a | - | N | e | u | v |
| e | \n | EOF | | | |

`file.txt`

Disque dur de l'ordinateur




Fichier dans un éditeur

# Lire Fichiers de Texte

## *approche simple*

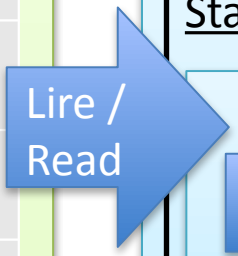
(1) Ouverture

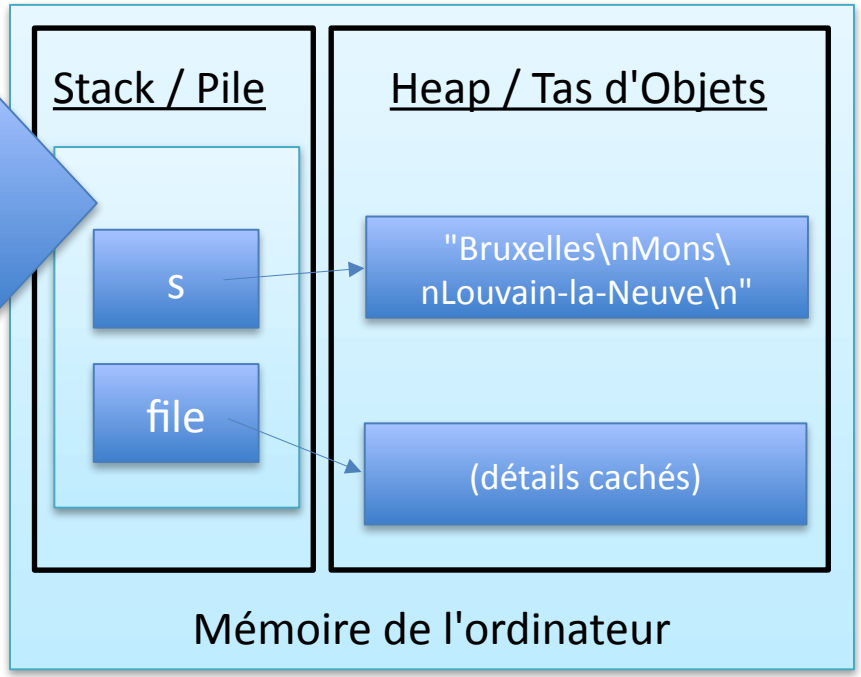
```
file = open ( "file.txt", "r" )
s = file.read ()
file.close ()
```

| | | | | | |
|---|---|---|---|---|---|
| B | r | U | x | e | l |
| l | e | s | \n | M | o |
| n | s | \n | L | o | u |
| v | a | i | n | - | l |
| a | - | N | e | u | v |
| e | \n | EOF | | | |

`file.txt`

Disque dur de l'ordinateur




Mémoire de l'ordinateur

# Lire Fichiers de Texte

## *approche simple*

(1) Ouverture

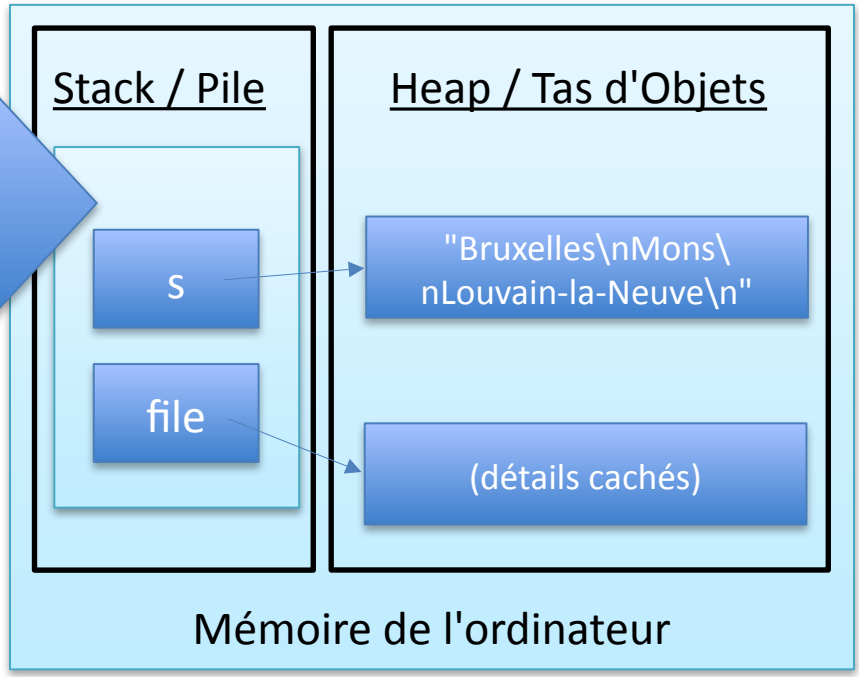
```
file = open ( "file.txt", "r" )
s = file.read ()  (2) Traitement
file.close ()
```

| | | | | | |
|---|---|---|---|---|---|
| B | r | u | x | e | l |
| l | e | s | \n | M | o |
| n | s | \n | L | o | u |
| v | a | i | n | - | l |
| a | - | N | e | u | v |
| e | \n | EOF | | | |

`file.txt`

Disque dur de l'ordinateur

Lire / Read



# Lire Fichiers de Texte

## *approche simple*

(1) Ouverture

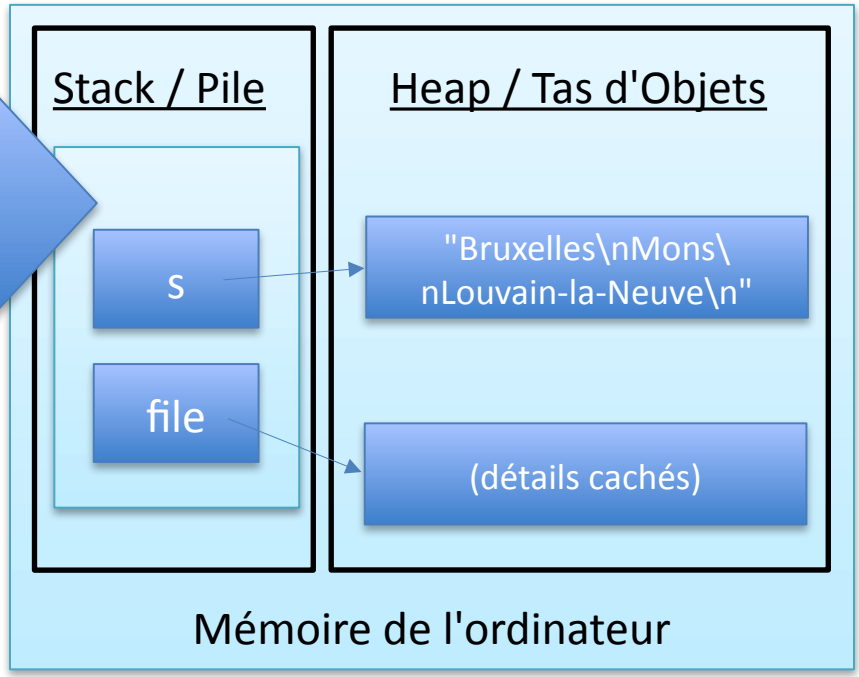
```
file = open ( "file.txt", "r" )
s = file.read ()  (2) Traitement
file.close ()  (3) Fermeture
```

| | | | | | |
|---|---|---|---|---|---|
| B | r | u | x | e | l |
| l | e | s | \n | M | o |
| n | s | \n | L | o | u |
| v | a | i | n | - | l |
| a | - | N | e | u | v |
| e | \n | EOF | | | |

file.txt

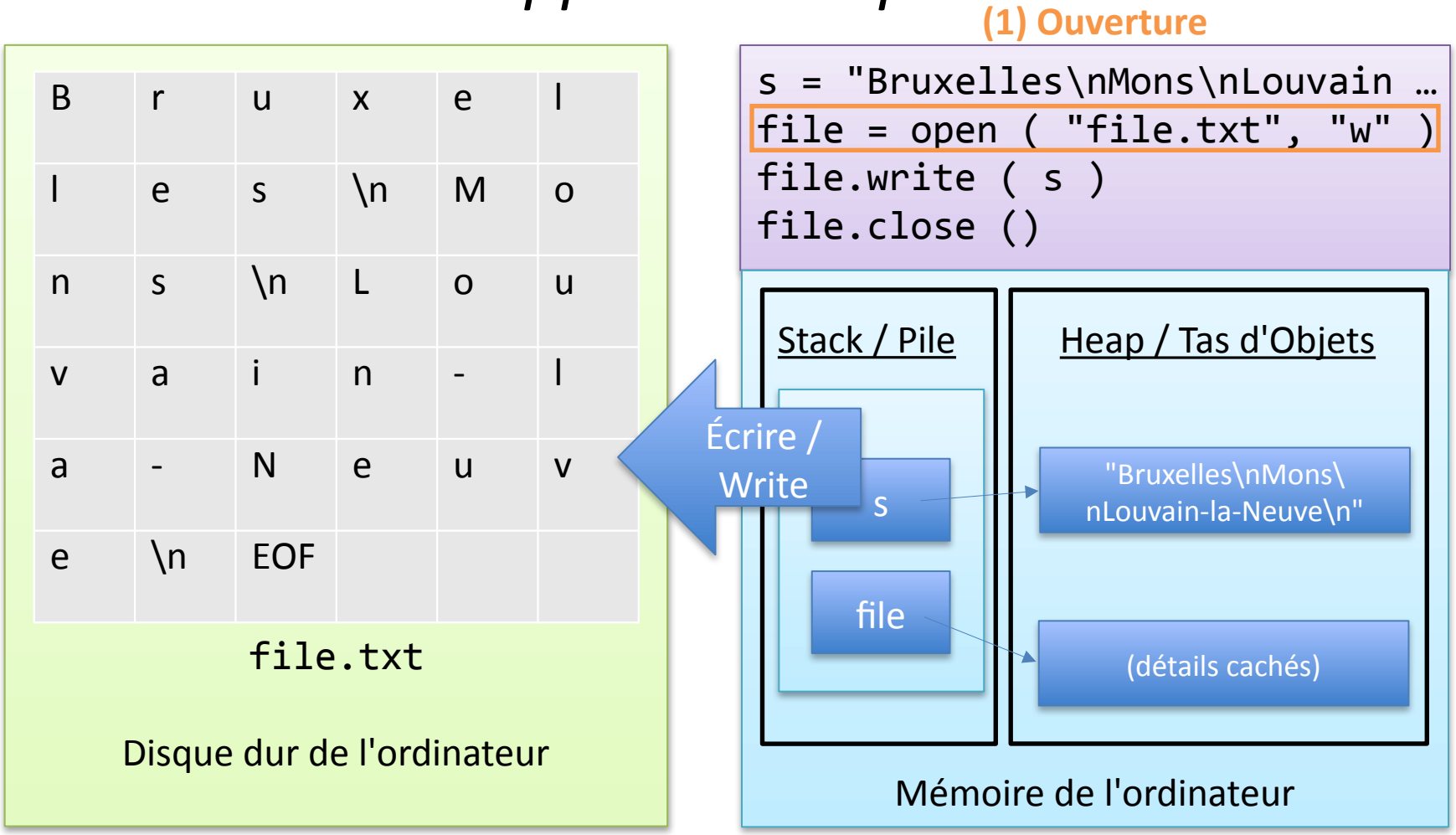
Disque dur de l'ordinateur

Lire / Read



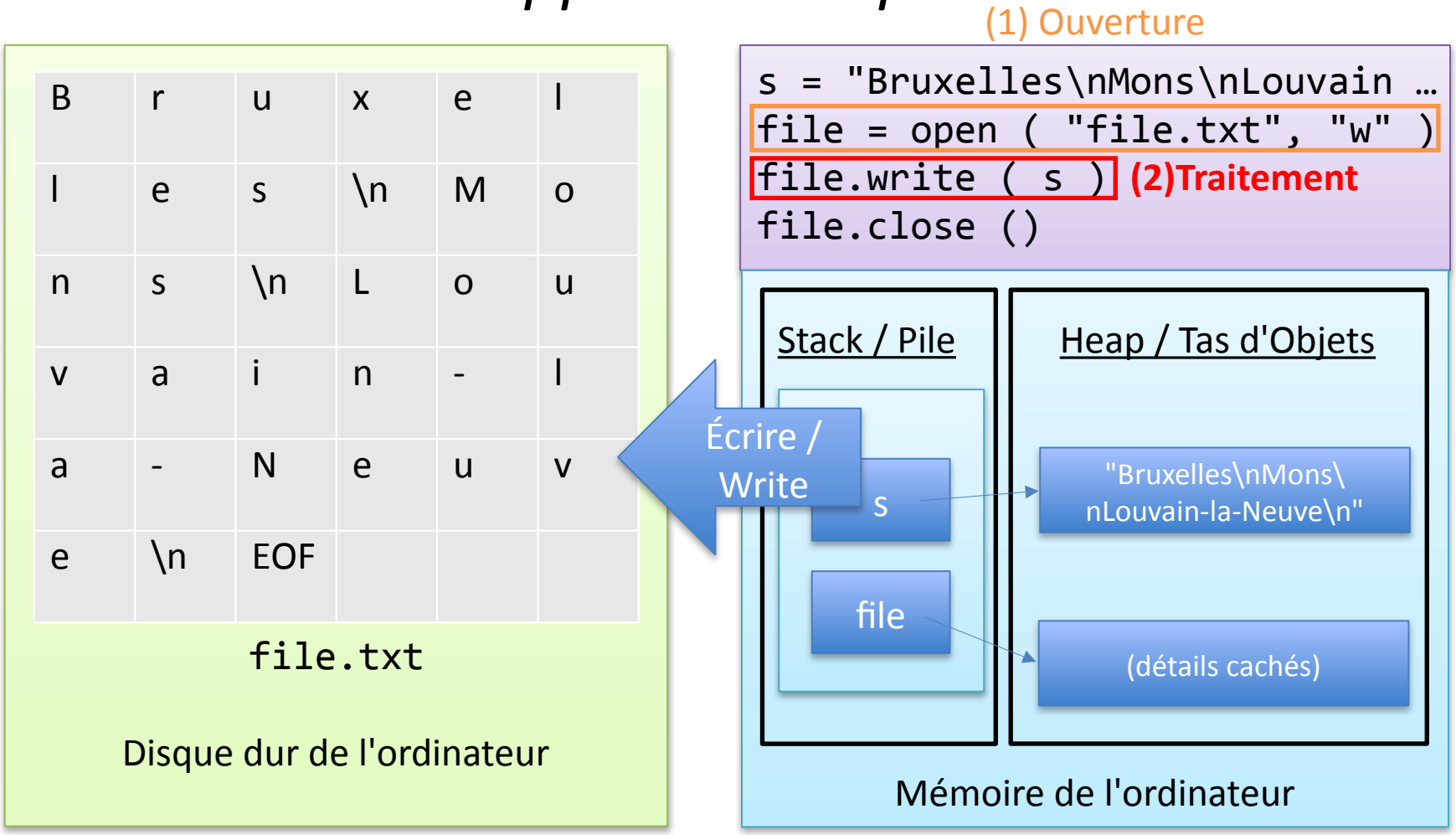
# Écrire Fichiers de Texte

## *approche simple*



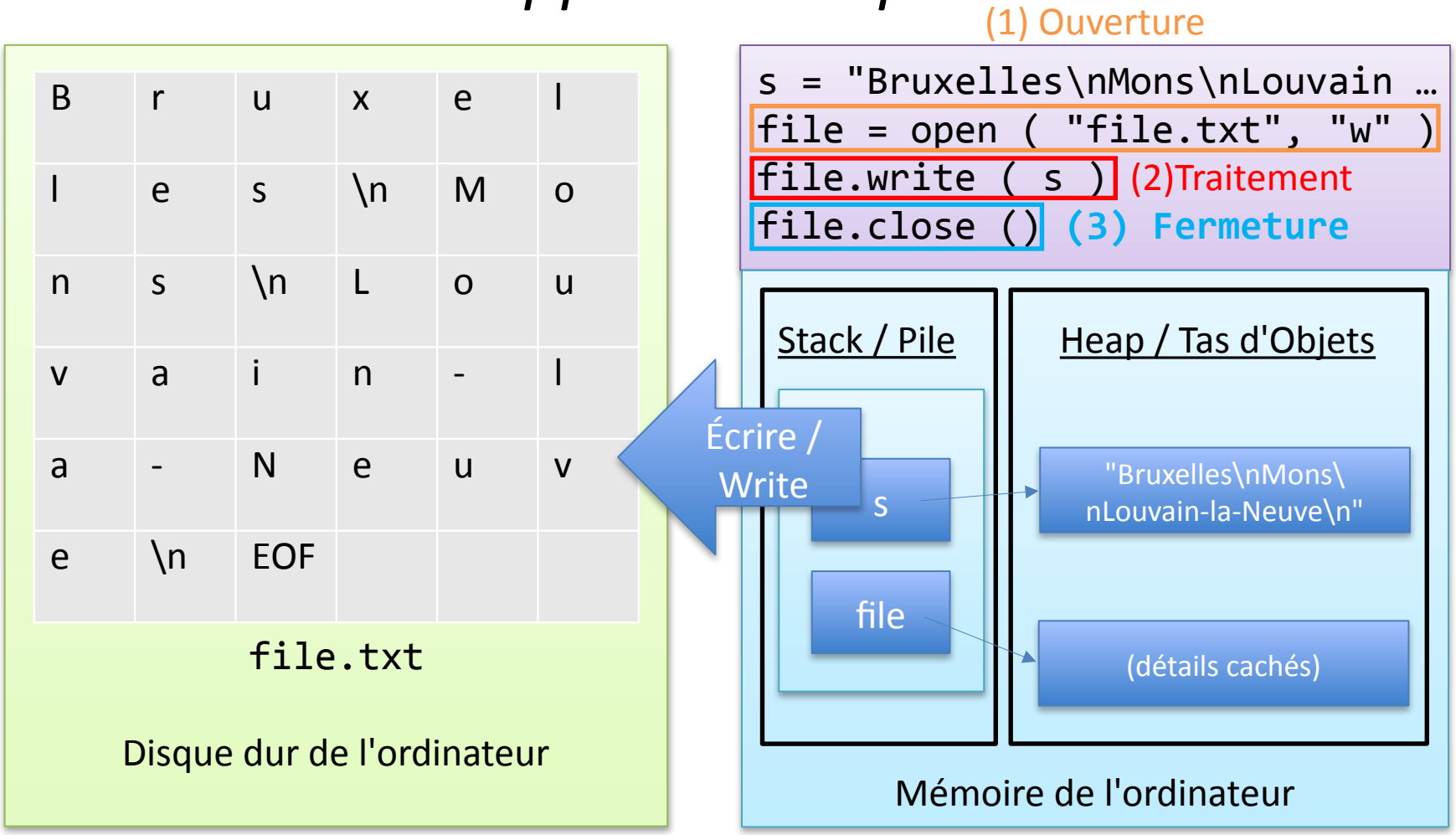
# Écrire Fichiers de Texte

## *approche simple*



# Écrire Fichiers de Texte

## *approche simple*



# Lire Fichiers de Texte

## *boucle while*

| | | | | | |
|---|---|---|---|---|---|
| B | r | u | x | e | l |
| l | e | s | \n | M | o |
| n | s | \n | L | o | u |
| v | a | i | n | - | l |
| a | - | N | e | u | v |
| e | \n | EOF | | | |

`file.txt`

Disque dur de l'ordinateur

Lire / Read

(1) Ouverture

```
file = open ( "file.txt", "r" )
s = file.readline ()
while s:
  print ( s )
  s = file.readline ()
file.close ()
```

(2) Traitement

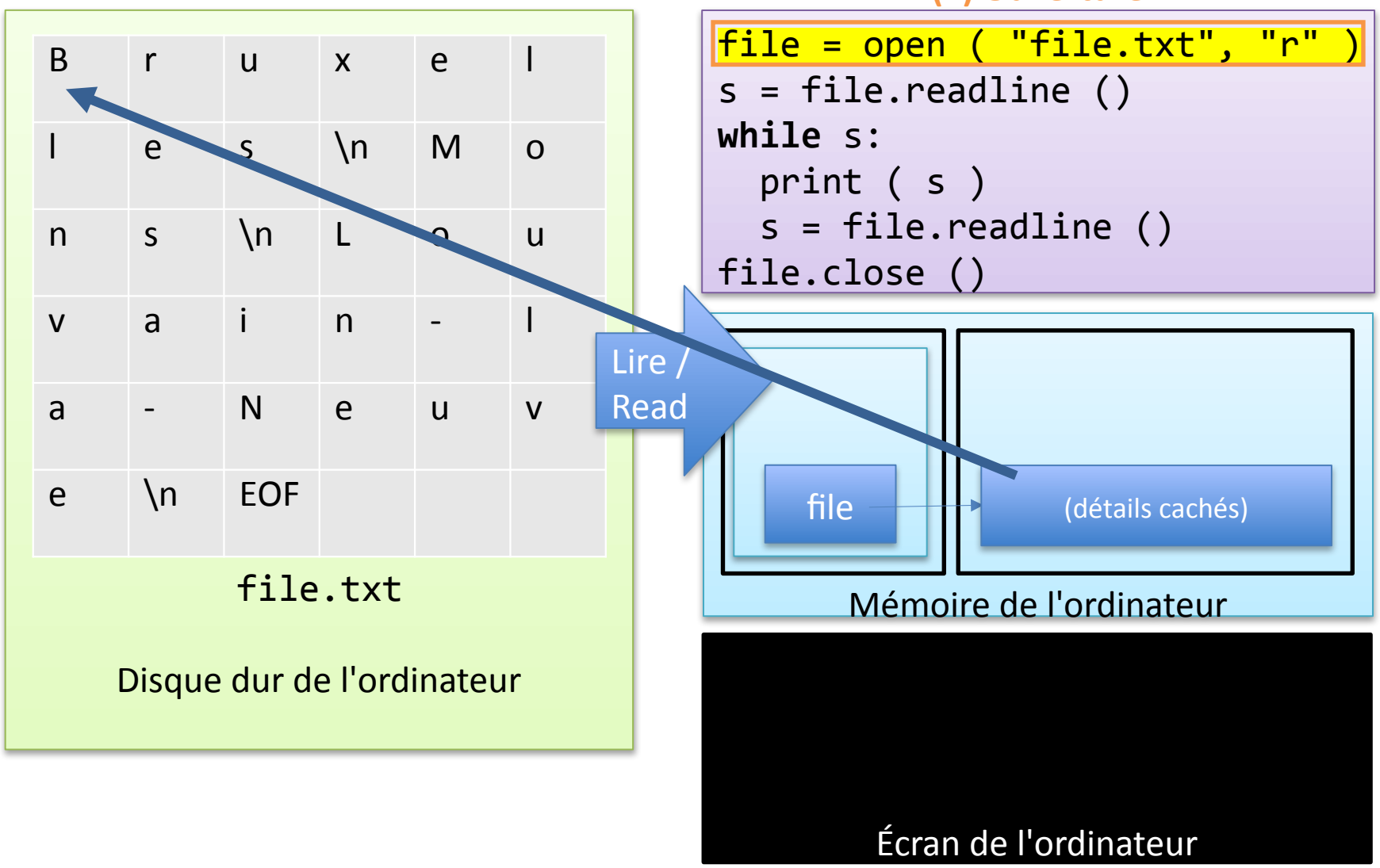
(3) Fermeture

Mémoire de l'ordinateur

Écran de l'ordinateur

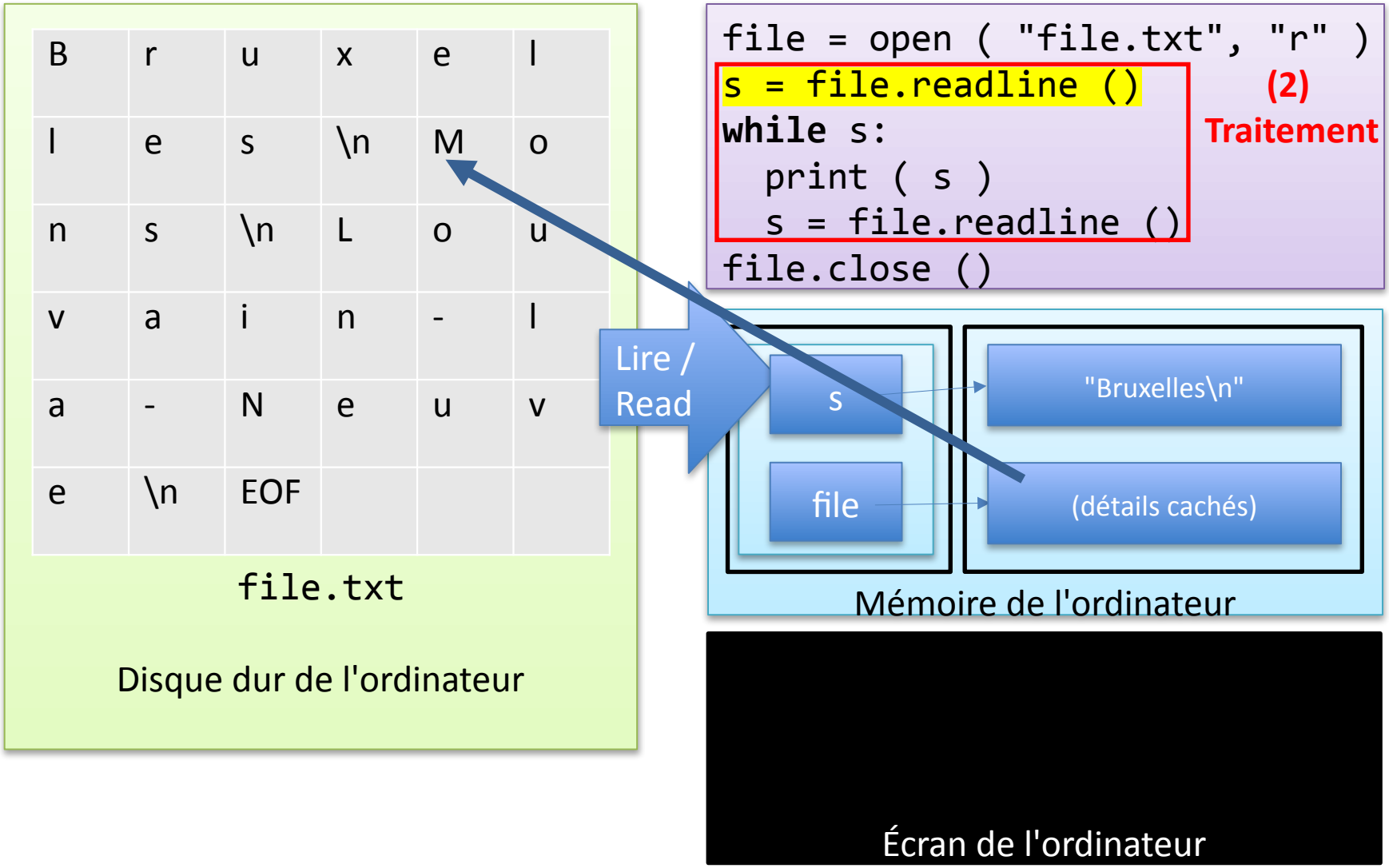
# Lire Fichiers de Texte

## *boucle while*



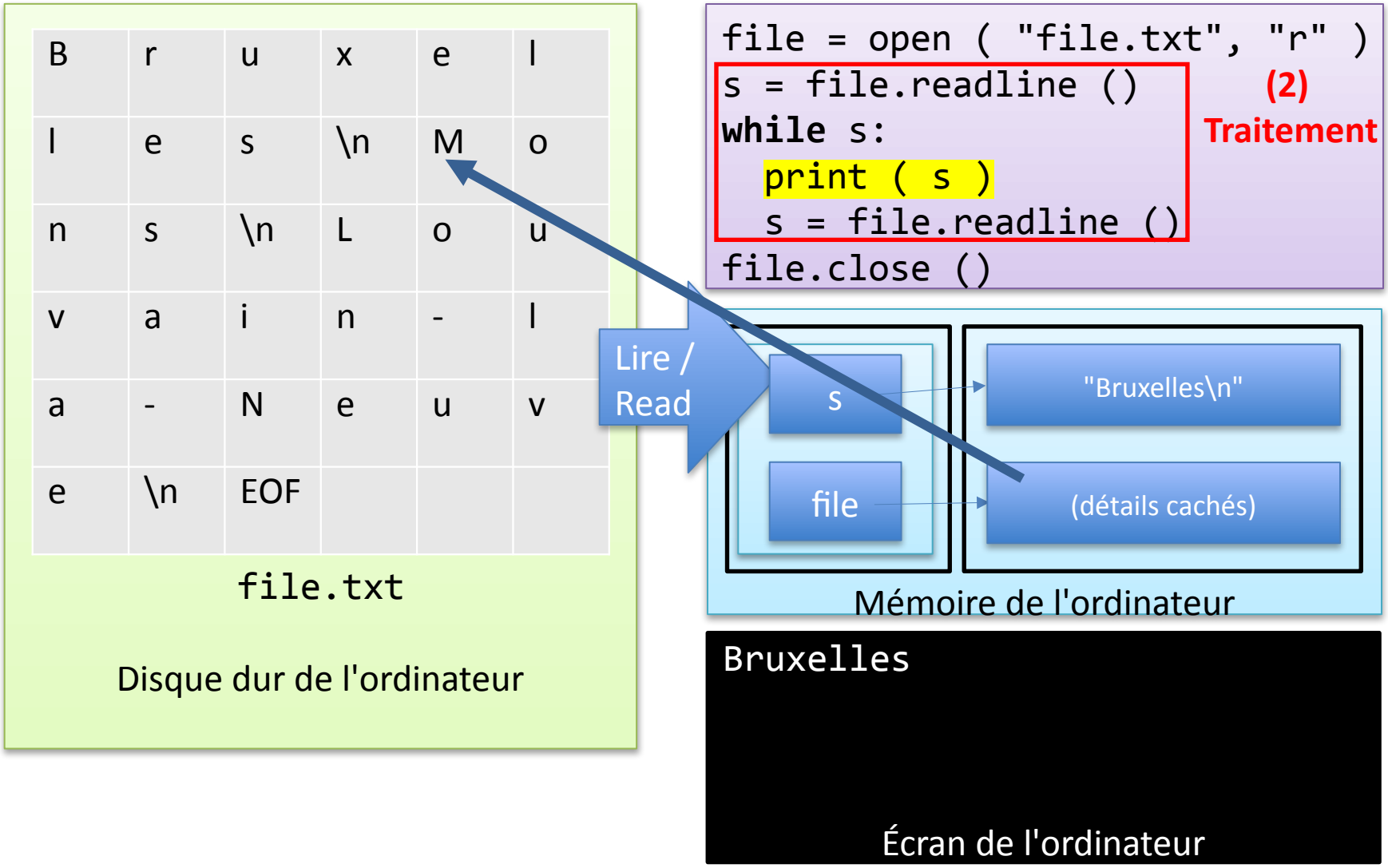
# Lire Fichiers de Texte

## *boucle while*



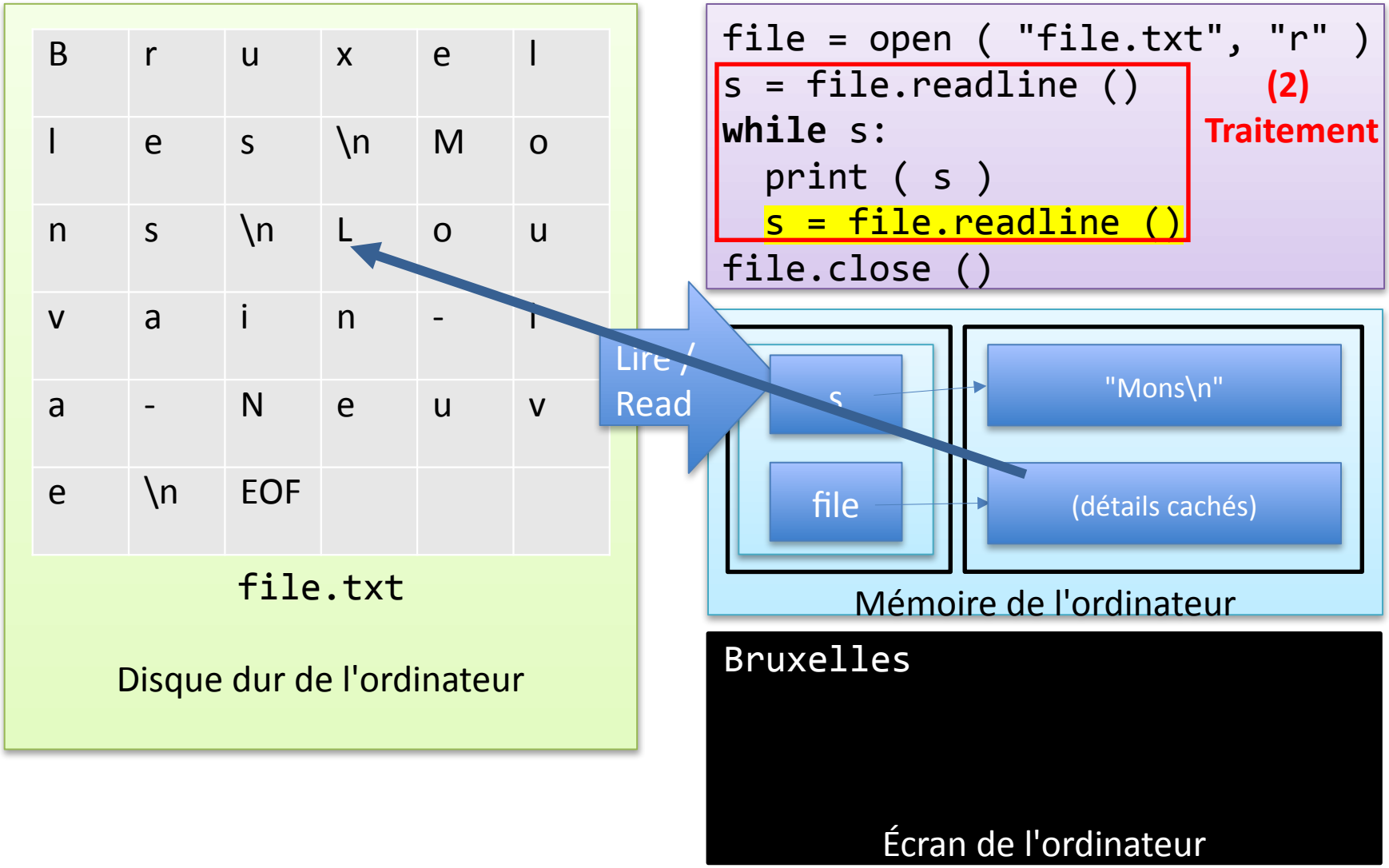
# Lire Fichiers de Texte

## *boucle while*



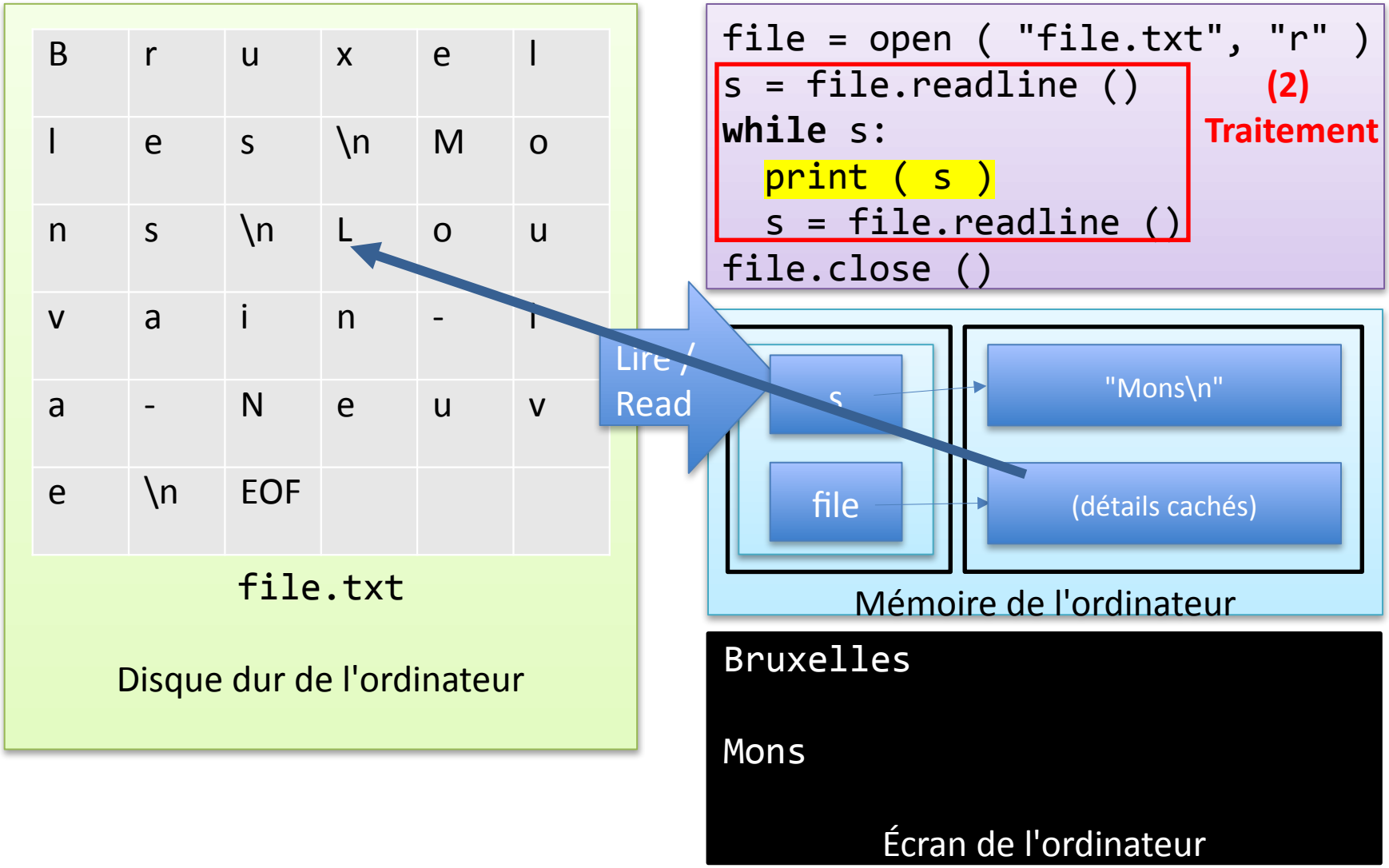
# Lire Fichiers de Texte

## *boucle while*



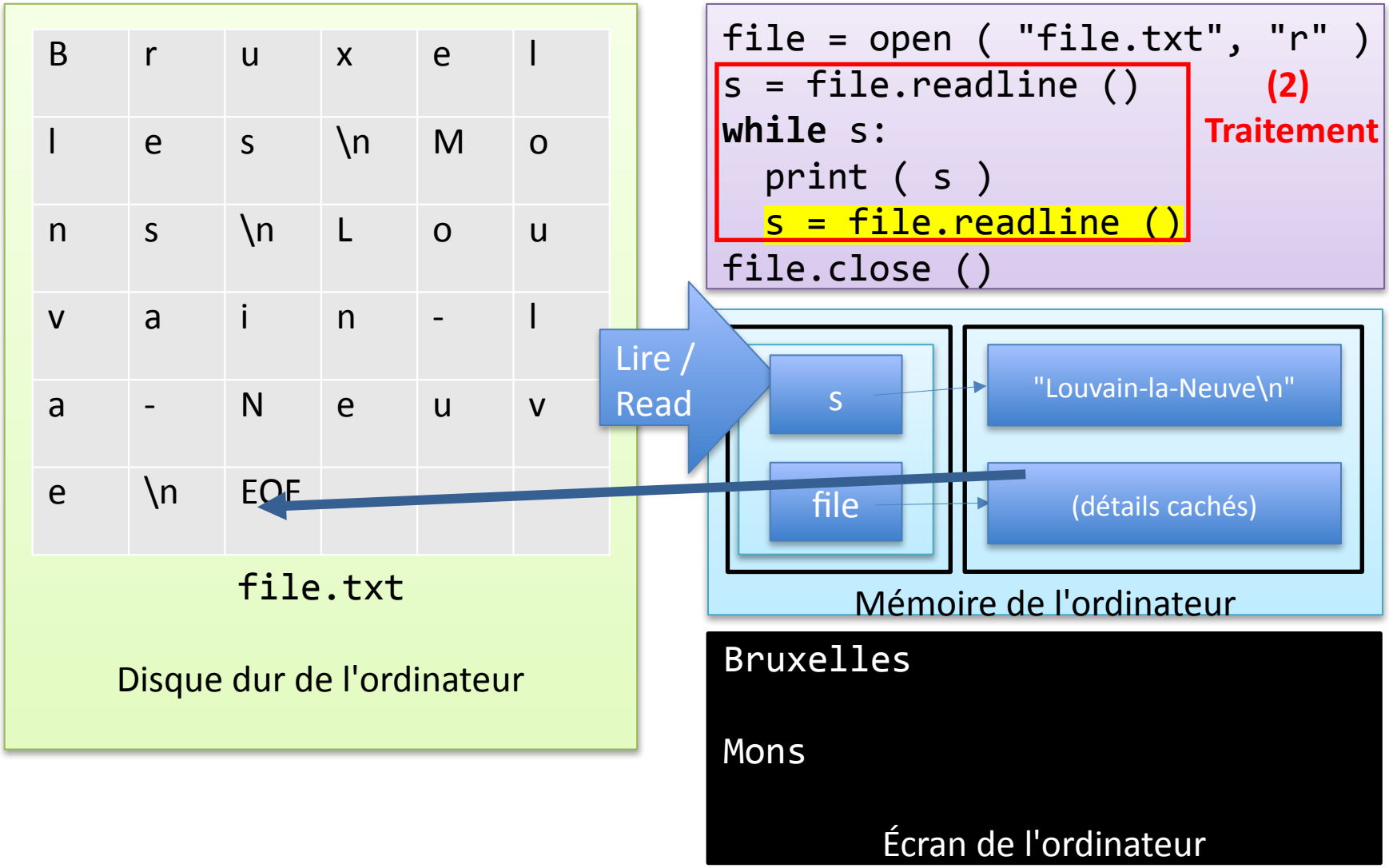
# Lire Fichiers de Texte

## *boucle while*



# Lire Fichiers de Texte

## *boucle while*



# Lire Fichiers de Texte

## *boucle while*

| | | | | | |
|---|---|---|---|---|---|
| B | r | u | x | e | l |
| l | e | s | \n | M | o |
| n | s | \n | L | o | u |
| v | a | i | n | - | l |
| a | - | N | e | u | v |
| e | \n | EOF | | | |

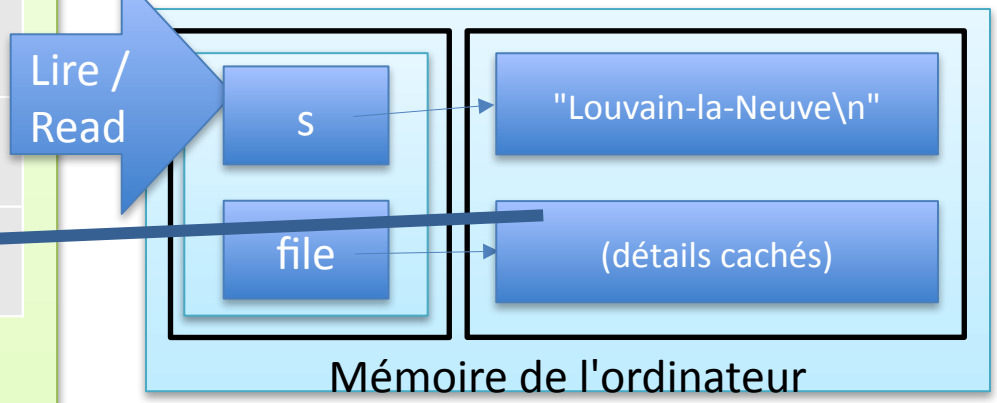
`file.txt`

Disque dur de l'ordinateur

```
file = open ( "file.txt", "r" )
s = file.readline ()
while s:
   print ( s )
   s = file.readline ()
file.close ()
```

**(2) Traitement**

Lire / Read




Mémoire de l'ordinateur

```
Bruxelles

Mons

Louvain-la-Neuve
```

# Lire Fichiers de Texte

## *boucle while*

| | | | | | |
|---|---|---|---|---|---|
| B | r | u | x | e | l |
| l | e | s | \n | M | o |
| n | s | \n | L | o | u |
| v | a | i | n | - | l |
| a | - | N | e | u | v |
| e | \n | EOF | | | |

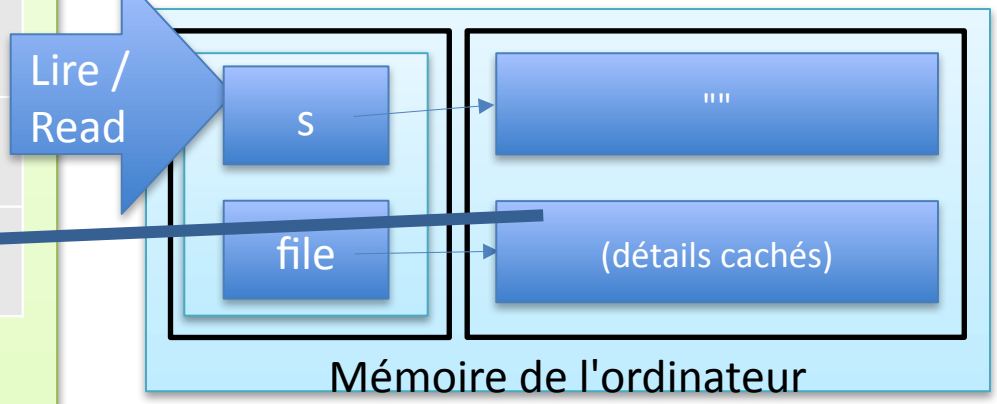
`file.txt`

Disque dur de l'ordinateur

```
file = open ( "file.txt", "r" )
s = file.readline ()
while s:
  print ( s )
  s = file.readline ()
file.close ()
```

**(2) Traitement**

Lire / Read




Mémoire de l'ordinateur

```
Bruxelles

Mons

Louvain-la-Neuve
```

# Lire Fichiers de Texte

## *boucle while*

| | | | | | |
|---|---|---|---|---|---|
| B | r | u | x | e | l |
| l | e | s | \n | M | o |
| n | s | \n | L | o | u |
| v | a | i | n | - | l |
| a | - | N | e | u | v |
| e | \n | EOF | | | |

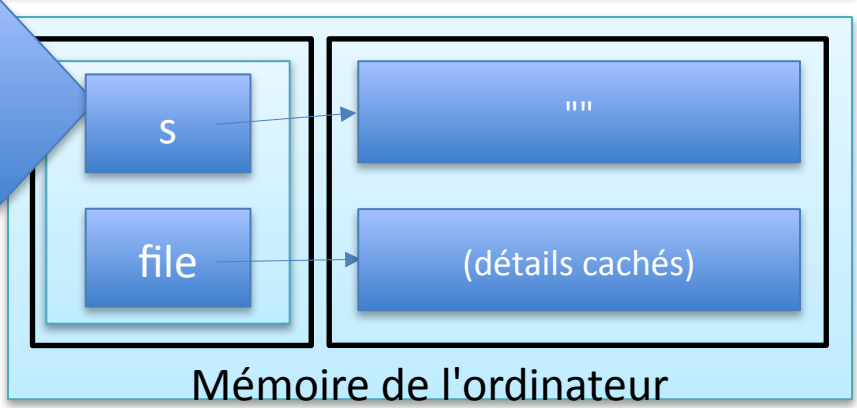
`file.txt`

Disque dur de l'ordinateur

```
file = open ( "file.txt", "r" )
s = file.readline ()
while s:
  print ( s )
  s = file.readline ()
file.close ()
```

(3) Fermeture

Lire / Read



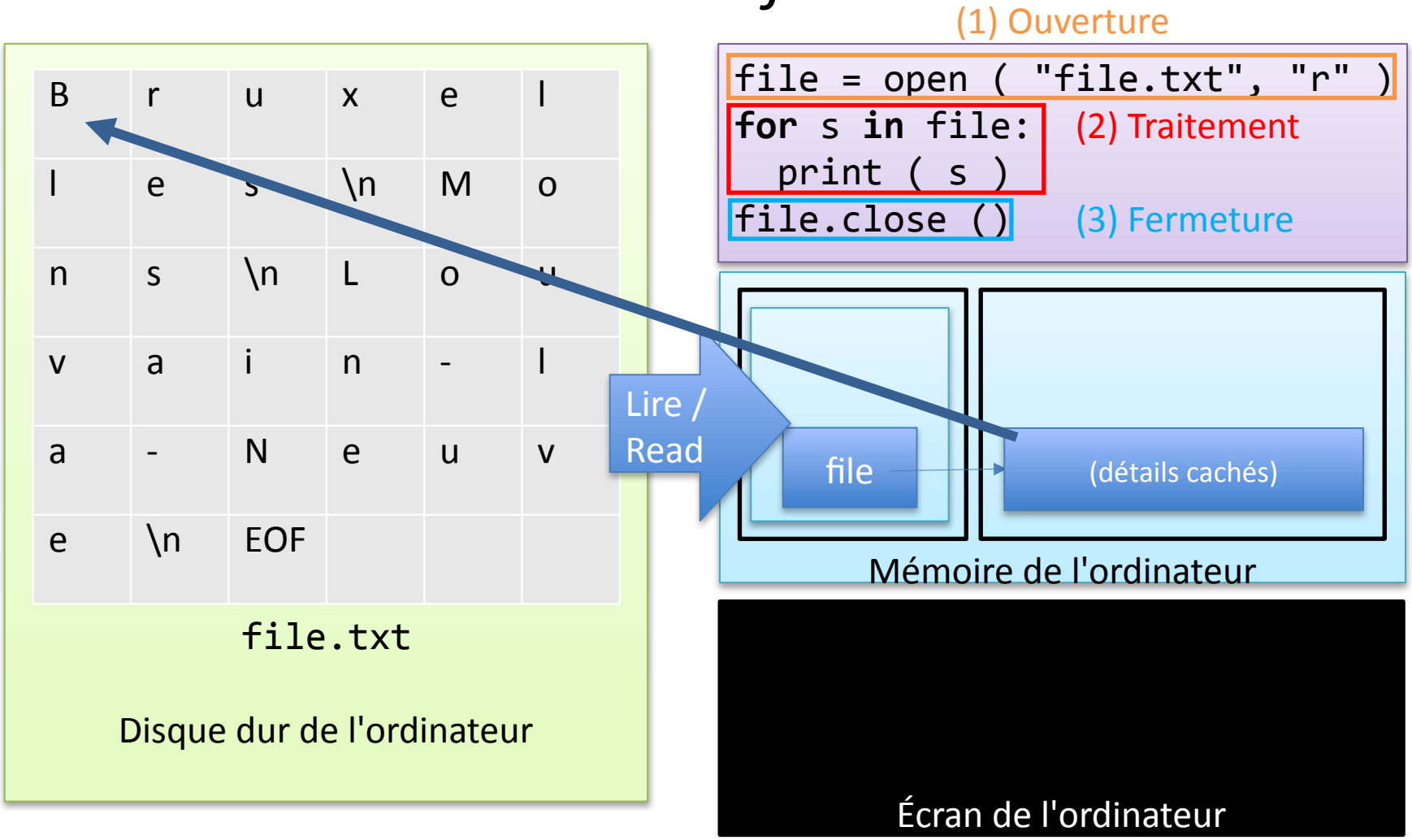

```
Bruxelles

Mons

Louvain-la-Neuve
```

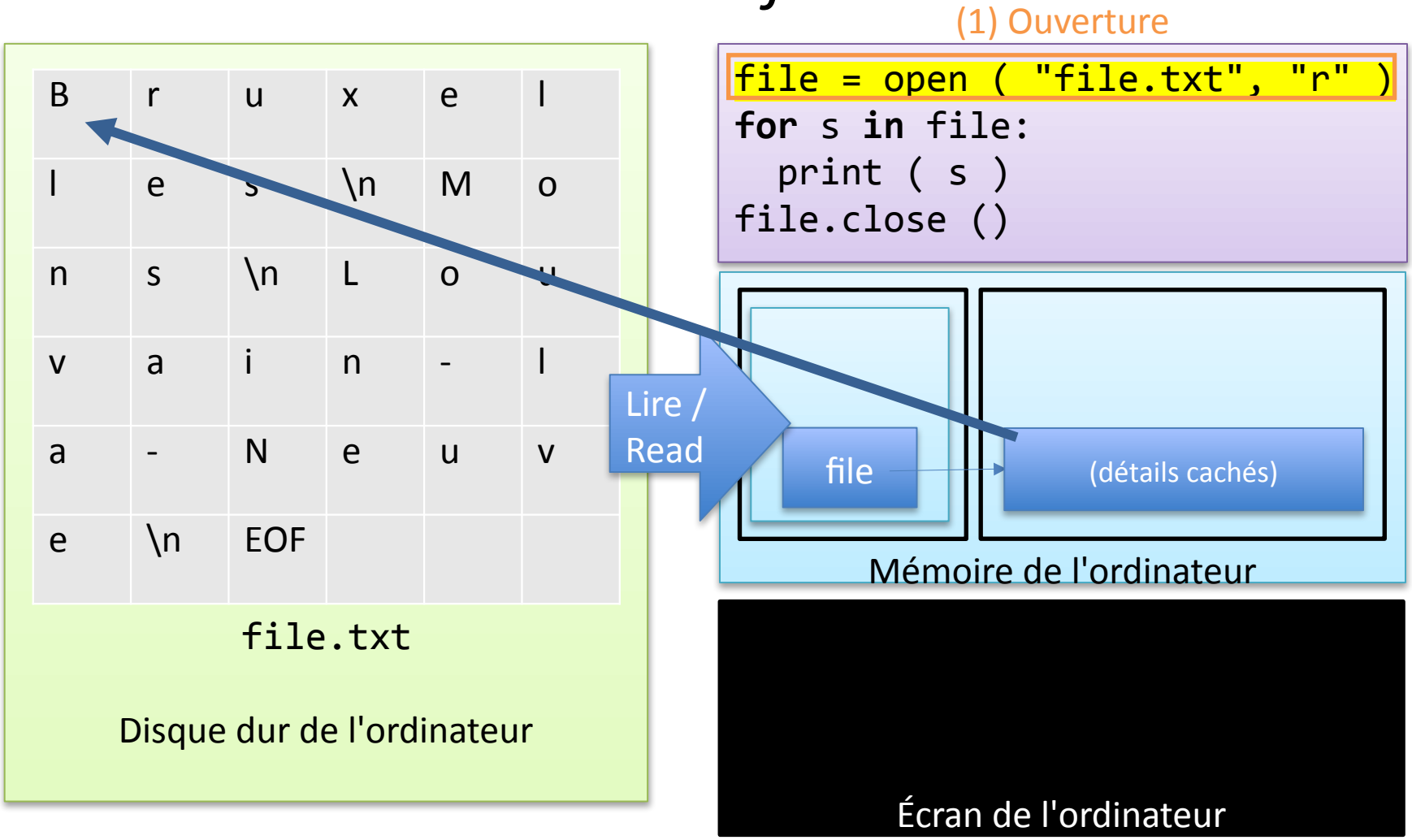
# Lire Fichiers de Texte

## *boucle for*



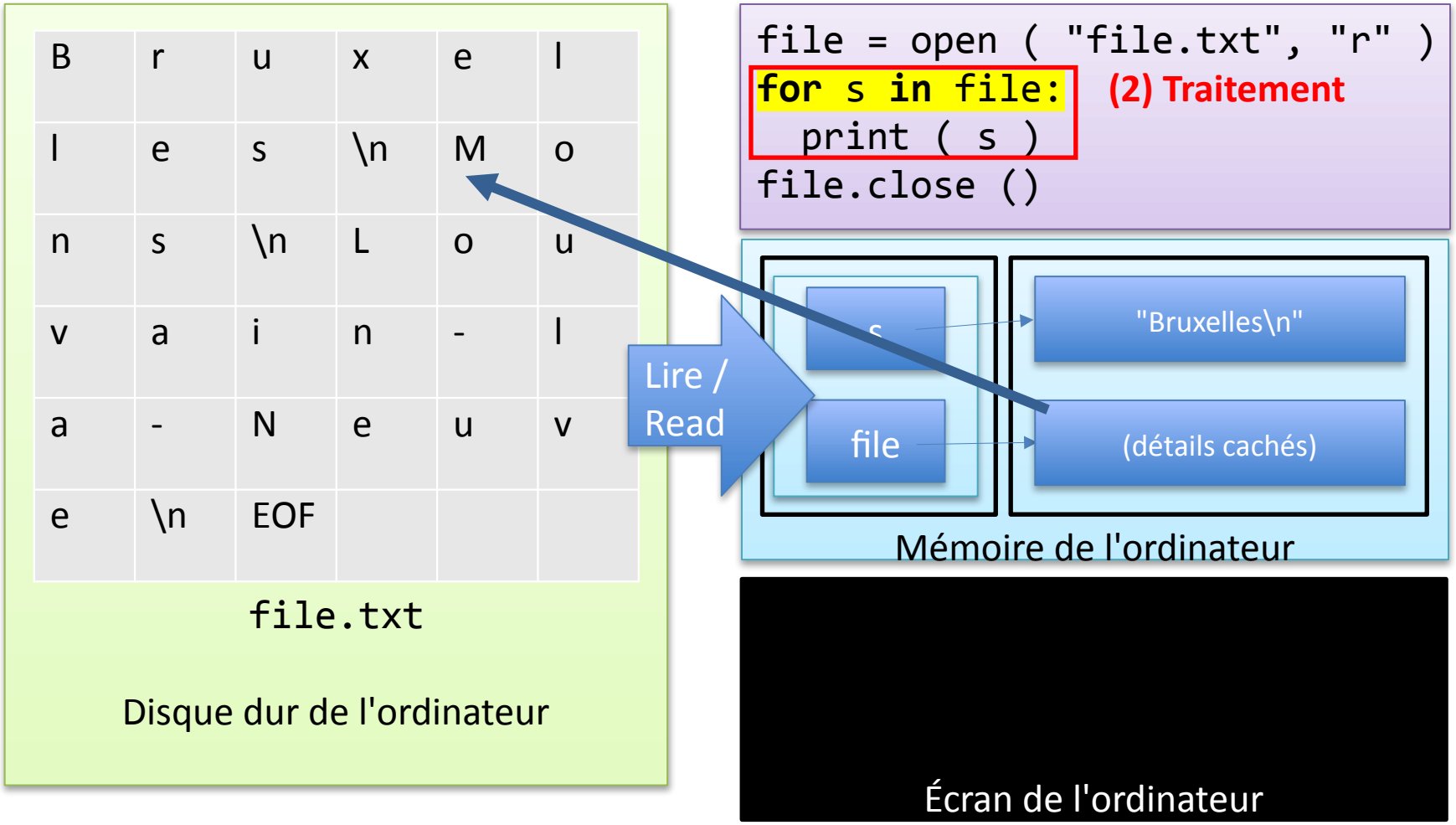
# Lire Fichiers de Texte

## *boucle for*



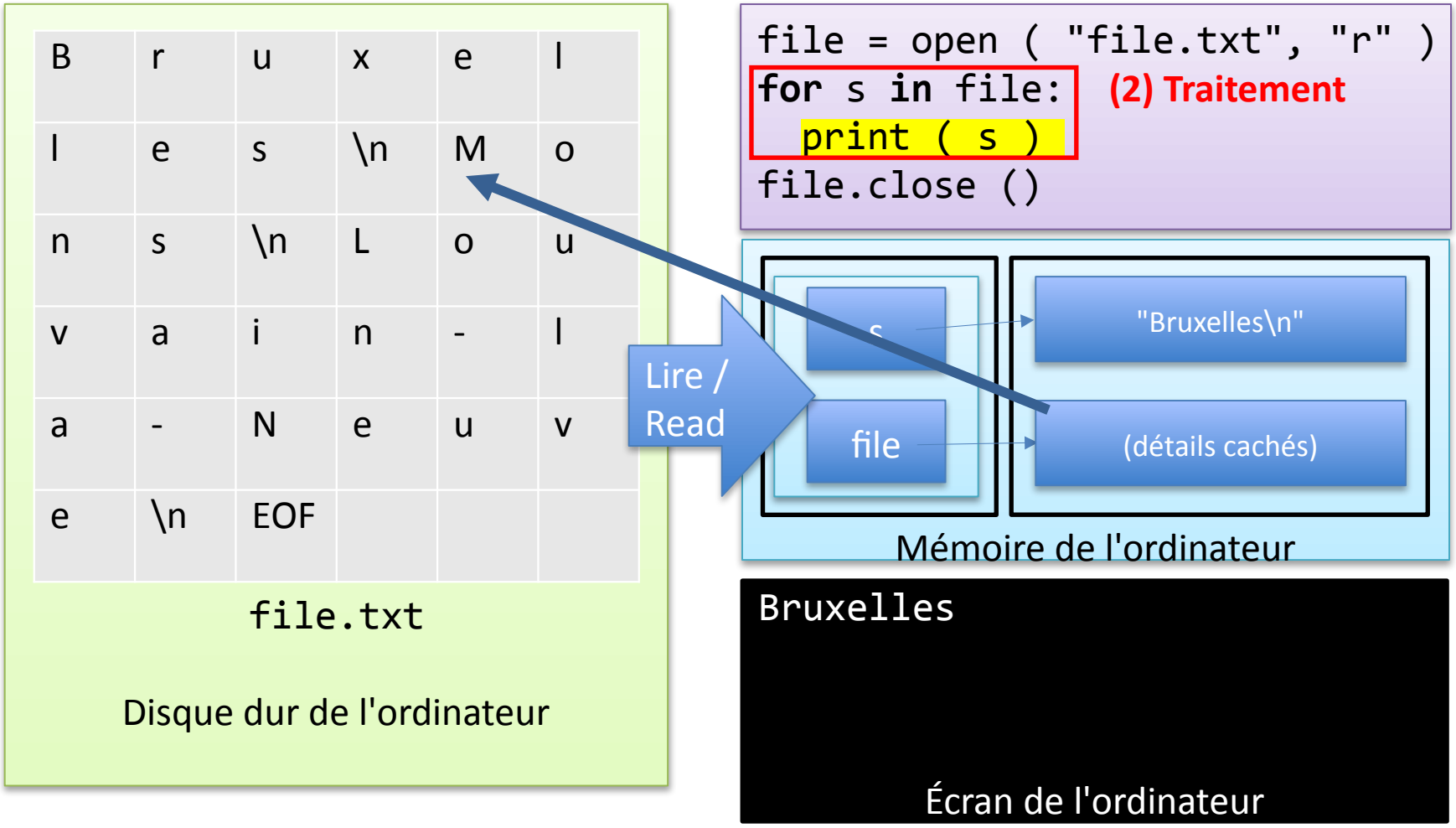
# Lire Fichiers de Texte

## *boucle for*



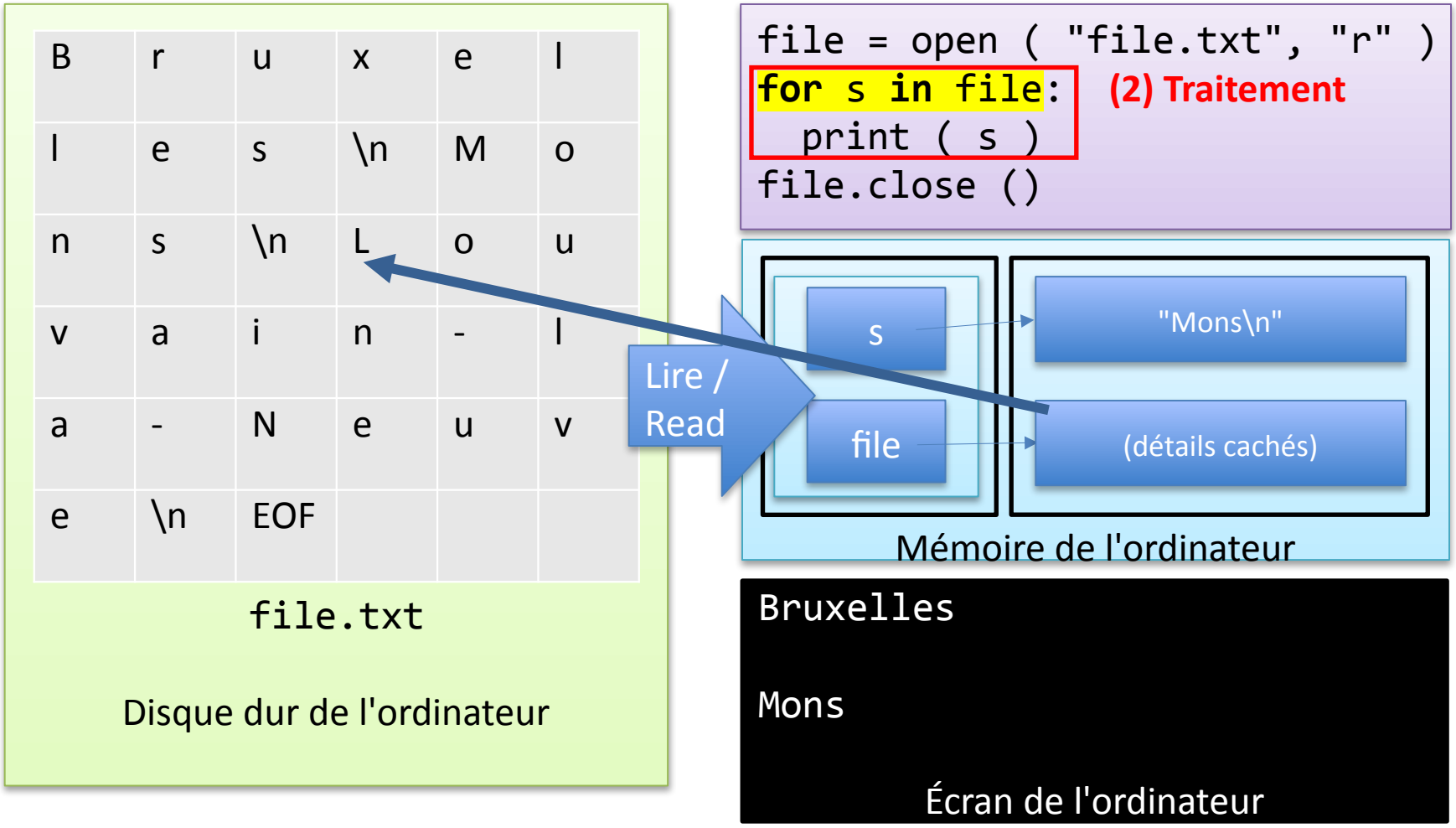
# Lire Fichiers de Texte

## *boucle for*



# Lire Fichiers de Texte

## *boucle for*



# Lire Fichiers de Texte

## *boucle for*

| | | | | | |
|---|---|---|---|---|---|
| B | r | u | x | e | l |
| l | e | s | \n | M | o |
| n | s | \n | L | o | u |
| v | a | i | n | - | l |
| a | - | N | e | u | v |
| e | \n | EOF | | | |

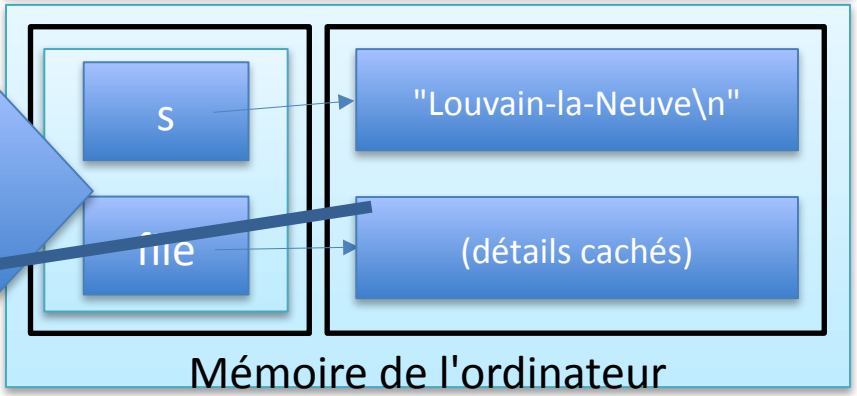
`file.txt`

Disque dur de l'ordinateur

Lire / Read

```
file = open ( "file.txt", "r" )
for s in file:
  print ( s )
file.close ()
```

(2) Traitement




```
Bruxelles

Mons

Louvain-la-Neuve
```

# Lire Fichiers de Texte

## *boucle for*

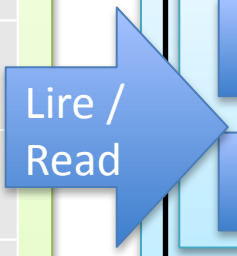
| | | | | | |
|---|---|---|---|---|---|
| B | r | u | x | e | l |
| l | e | s | \n | M | o |
| n | s | \n | L | o | u |
| v | a | i | n | - | l |
| a | - | N | e | u | v |
| e | \n | EOF | | | |

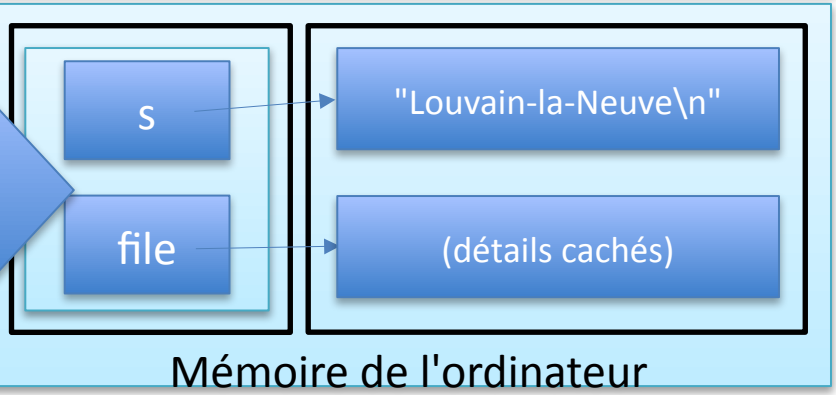
`file.txt`

Disque dur de l'ordinateur

```
file = open ( "file.txt", "r" )
for s in file:
  print ( s )
file.close ()
```

(3) Fermeture




```
Bruxelles

Mons

Louvain-la-Neuve
```

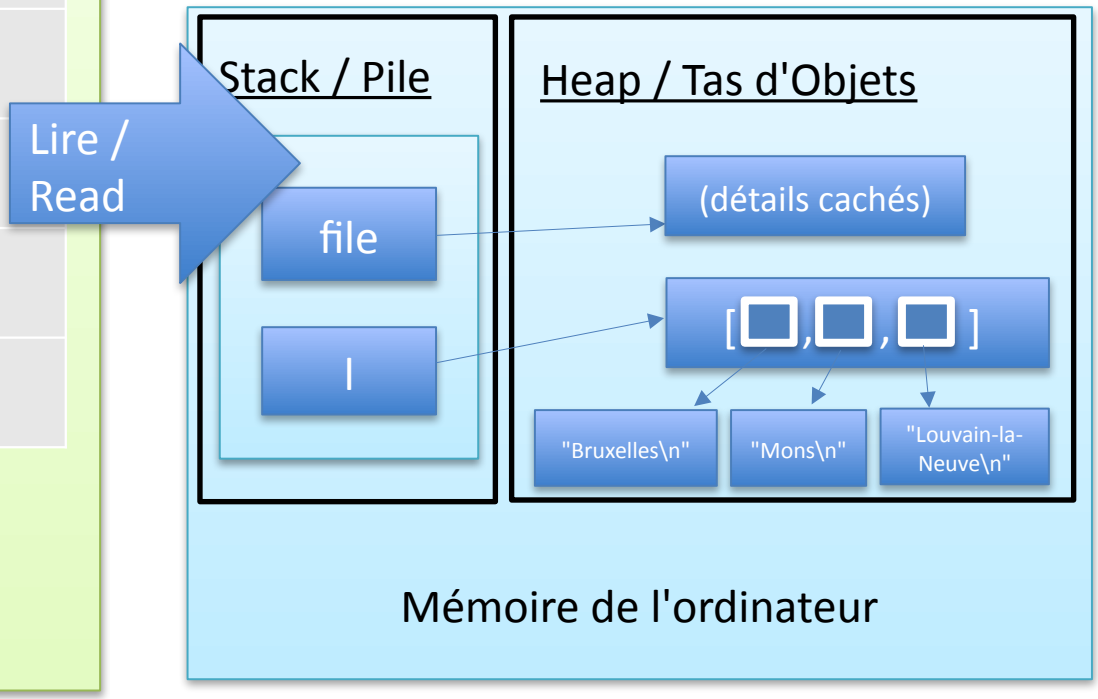
# Lire Fichiers de Texte

| | | | | | |
|---|---|---|---|---|---|
| B | r | u | x | e | l |
| l | e | s | \n | M | o |
| n | s | \n | L | o | u |
| v | a | i | n | - | l |
| a | - | N | e | u | v |
| e | \n | EOF | | | |

`file.txt`

Disque dur de l'ordinateur

```
file = open ( "file.txt", "r" )
l = file.readlines ()
file.close ()
```



# Écrire Fichiers de Texte

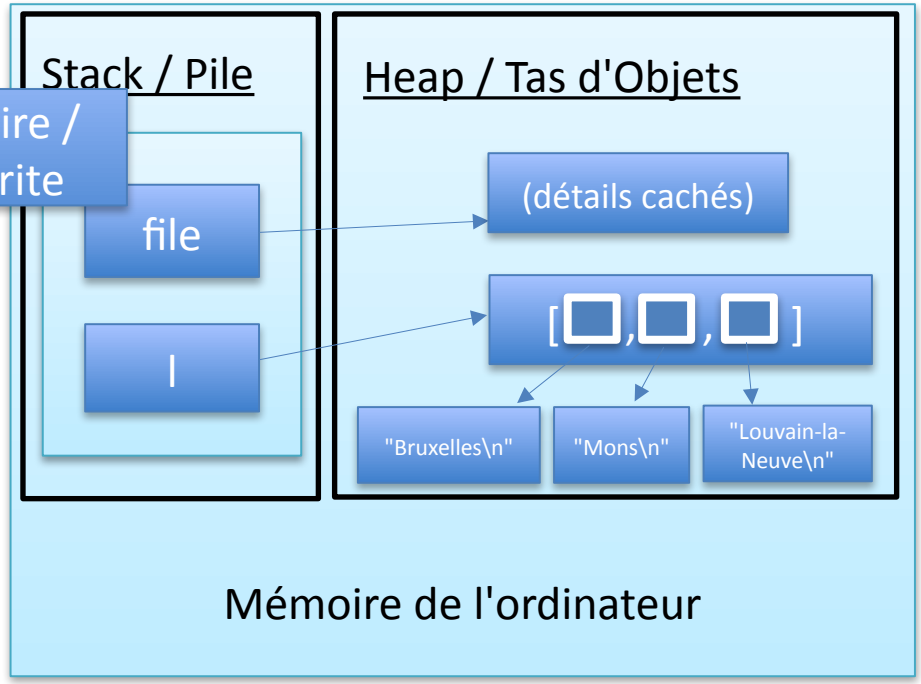
```
file = open ( "file.txt", "w" )
file.writelines ( l )
file.close ()
```

| | | | | | |
|---|---|---|---|---|---|
| B | r | u | x | e | l |
| l | e | s | \n | M | o |
| n | s | \n | L | o | u |
| v | a | i | n | - | l |
| a | - | N | e | u | v |
| e | \n | EOF | | | |

`file.txt`

Disque dur de l'ordinateur

Écrire / Write




Mémoire de l'ordinateur

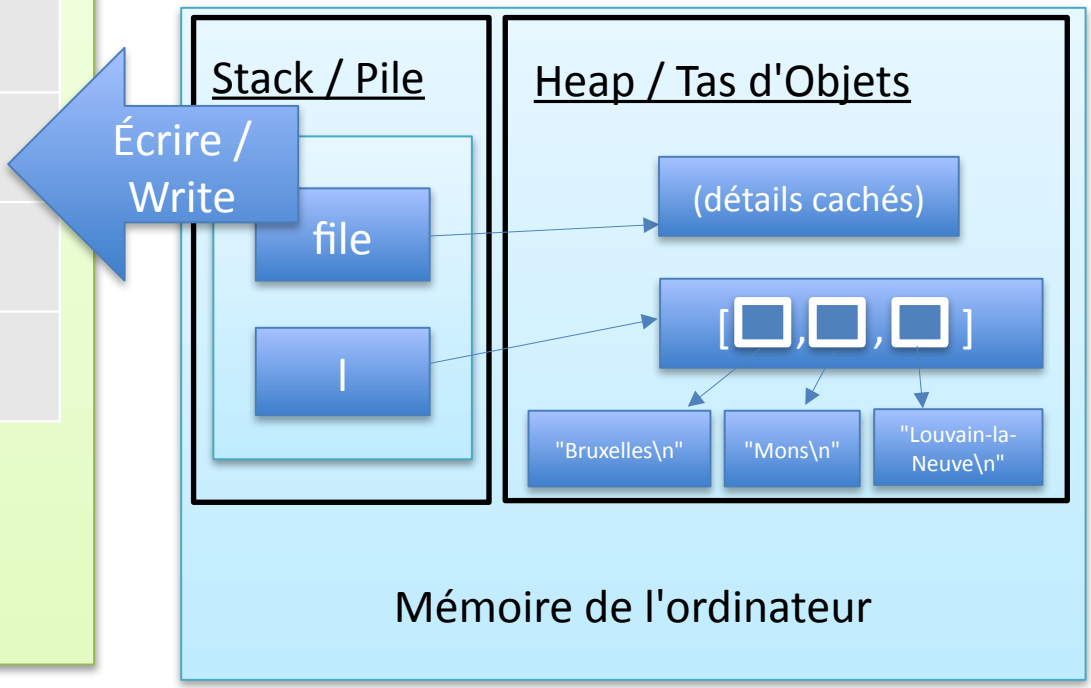
# Écrire Fichiers de Texte

| | | | | | |
|---|---|---|---|---|---|
| B | r | u | x | e | l |
| l | e | s | \n | M | o |
| n | s | \n | L | o | u |
| v | a | i | n | - | l |
| a | - | N | e | u | v |
| e | \n | EOF | | | |

`file.txt`

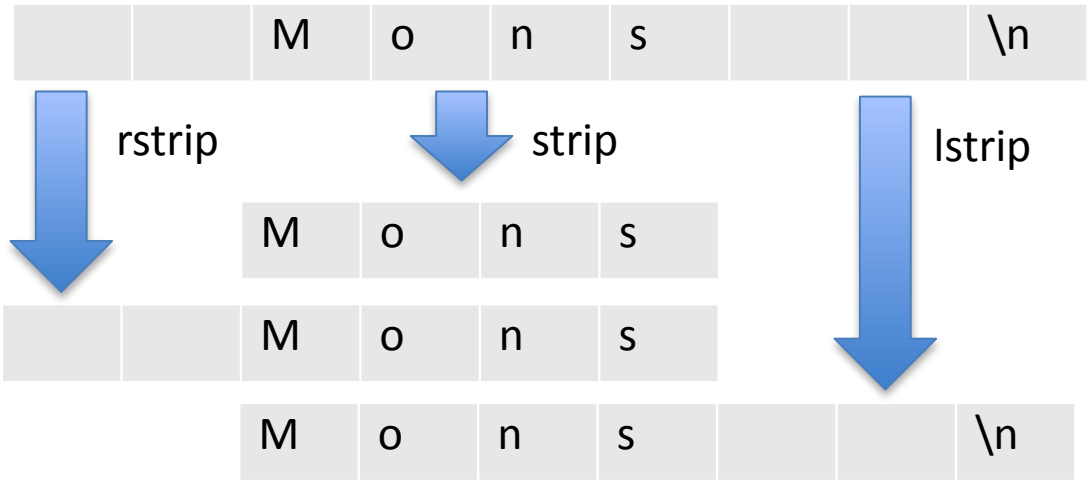
Disque dur de l'ordinateur

```
file = open ( "file.txt", "w" )
for s in l:
  file.write (  s  )
file.close ()
```



# Méthodes sur Chaînes

- Des méthodes importantes sur chaînes de caractères dans le contexte de l'étape (2) **traitement** de fichiers:
  - `strip ()`: enlever les espaces à gauche et à droite
  - `lstrip ()`: enlever les espaces à gauche
  - `rstrip ()`: enlever les espaces à droite



# Lire Fichiers de Texte

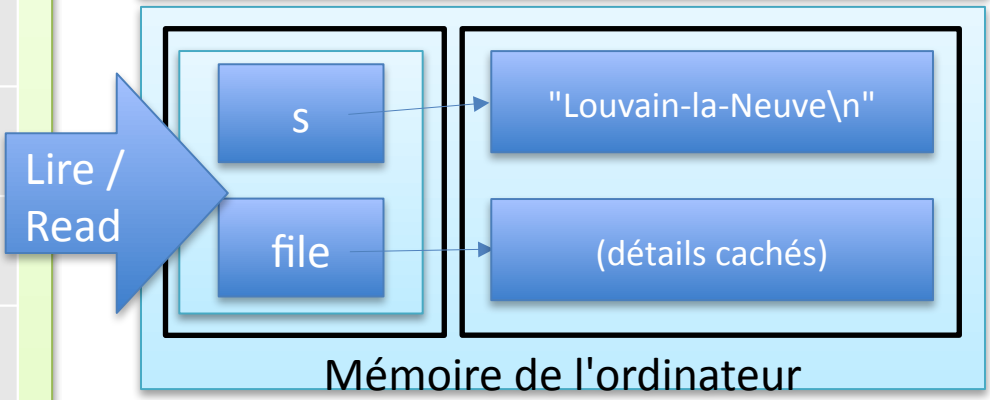
## *boucle for*

| | | | | | |
|---|---|---|---|---|---|
| B | r | u | x | e | l |
| l | e | s | \n | M | o |
| n | s | \n | L | o | u |
| v | a | i | n | - | l |
| a | - | N | e | u | v |
| e | \n | EOF | | | |

`file.txt`

Disque dur de l'ordinateur

```
file = open ( "file.txt", "r" )
for s in file:
  print ( s )
file.close ()
```




```
Bruxelles

Mons

Louvain-la-Neuve
```

# Lire Fichiers de Texte

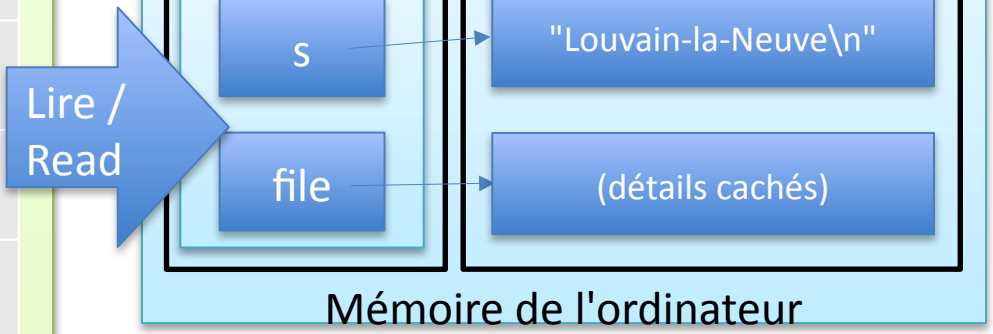
## *boucle for*

| | | | | | |
|---|---|---|---|---|---|
| B | r | u | x | e | l |
| l | e | s | \n | M | o |
| n | s | \n | L | o | u |
| v | a | i | n | - | l |
| a | - | N | e | u | v |
| e | \n | EOF | | | |

`file.txt`

Disque dur de l'ordinateur

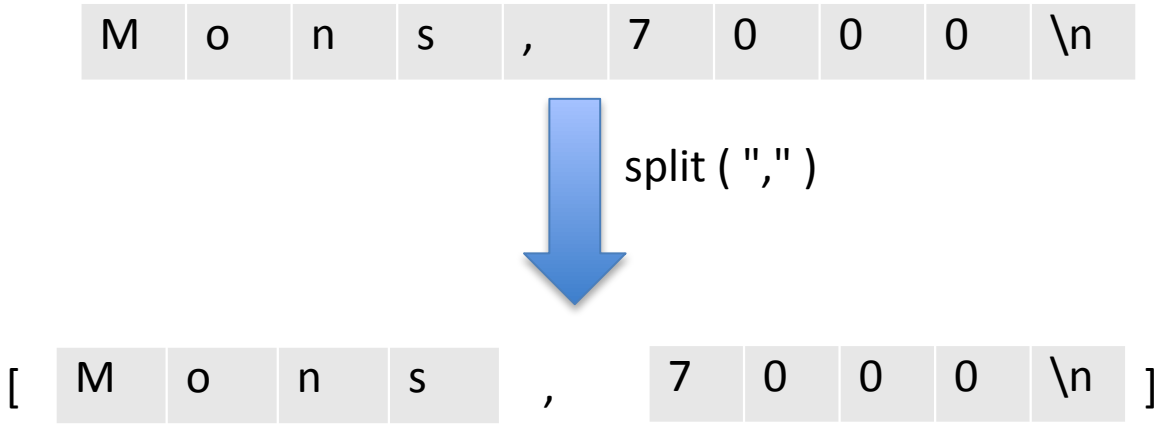
```
file = open ( "file.txt", "r" )
for s in file:
  print ( s.strip () )
file.close ()
```




```
Bruxelles
Mons
Louvain-la-Neuve
```

# Méthodes sur Chaînes

- Des méthodes importantes sur chaînes de caractères dans le contexte de fichiers:
  - `split ()`: séparer des champs



# Erreurs

- Qu'est-ce qui peut se passer à l'exécution de ce programme?

```
name = input ( "Provide a file name: " )
file = open ( name, "r" )
for line in file:
  print(line)
file.close ()
```

```
Provide a file name:
```

# Erreurs

- Qu'est-ce qui peut se passer à l'exécution de ce programme?

```
name = input ( "Provide a file name: " )
file = open ( name, "r" )
for line in file:
  print(line)
file.close ()
```

```
Provide a file name: nexistepas.txt
```

# Erreurs

- Qu'est-ce qui peut se passer à l'exécution de ce programme?

```
name = input ( "Provide a file name: " )
file = open ( name, "r" )
for line in file:
  print(line)
file.close ()
```

```
Provide a file name: nexistepas.txt
Traceback (most recent call last):
  File "test.py", line 2, in <module>
    file = open ( name, "r" )
FileNotFoundError: [Errno 2] No such
file or directory: 'nexistepas.txt'
```

# Erreur

- Comment d'éviter que le programme s'arrête?

```
name = input ( "Provide a file name: " )
try:
  file = open ( name, "r" )
  for line in file:
    print(line)
  file.close ()
except:
  print ( "Error reading file" )
```

# Gestion des Exceptions

- Python **lève** une **exception** s'il y a une erreur
- On peut **intercepter** des exceptions en utilisant un bloc `try … except`

```
name = input ( "Provide a file name: " )
try:
    file = open ( name, "r" )
    for line in file:
      print(line)
    file.close ()
except:
    print ( "Error reading file" )
```

(1) Ouverture
(2) Traitement
(3) Fermeture
(4) Exceptions

# Gestion des Exceptions

- Il y a beaucoup d'erreurs différentes possibles:
  - Fichier n'existe pas
  - Assert error
  - Division par zéro
  - Valeur incorrecte ( `int("Bonjour")` )
  - Index incorrect
- Toutes sont interceptées par **`except`**

# Gestion des Exceptions

- Deux erreurs sont possibles ici:

```
num = input ( "Provide a number: " )
try:
  print ( 1 / int(num) )
except:
  print ( "Error doing calculation" )
```

- Pour toutes les deux, le même message

# Gestion des Exceptions

- Intercepter des erreurs spécifiques :

```
num = input ( "Provide a number: " )
try:
  print ( 1 / int(num) )
except ValueError:
  print ( "No integer provided" )
except ZeroDivisionError:
  print ( "Division by zero" )
```

# Gestion des Exceptions

- Python montre des messages plus détaillés

```
Provide a file name: nexistepas.txt
Traceback (most recent call last):
  File "test.py", line 2, in <module>
    file = open ( name, "r" )
FileNotFoundError: [Errno 2] No such
file or directory: 'nexistepas.txt'
```

# Gestion des Exceptions

- Récupérer le message qui serait montré par Python même

```
num = input ( "Provide a number: " )
try:
  print ( 1 / int(num) )
except ValueError as error:
  print ( "ValueError: " + str ( error ) )
except ZeroDivisionError:
  print ( "Division by zero" )
```

```
Provide a number: age
ValueError: invalid literal for int()
with base 10: 'age'
```

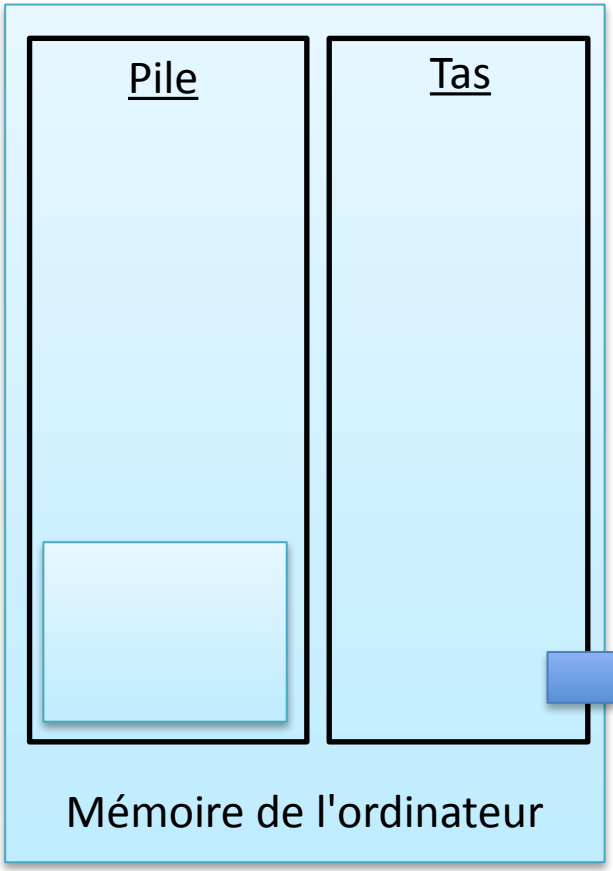
# Gestion des Exceptions

- Lever des exceptions

```
try:
  age = int(input( "Provide your age: " ))
  if age < 0 or age >= 150:
    raise ValueError ( "Age out of range" )
  print ( "Your age is registered" )
except ValueError as error:
  print ( "Invalid age: " + str ( error ) )
```

```
Provide your age: 160
Invalid age: Age out of range
```

# Flux d'Exécution

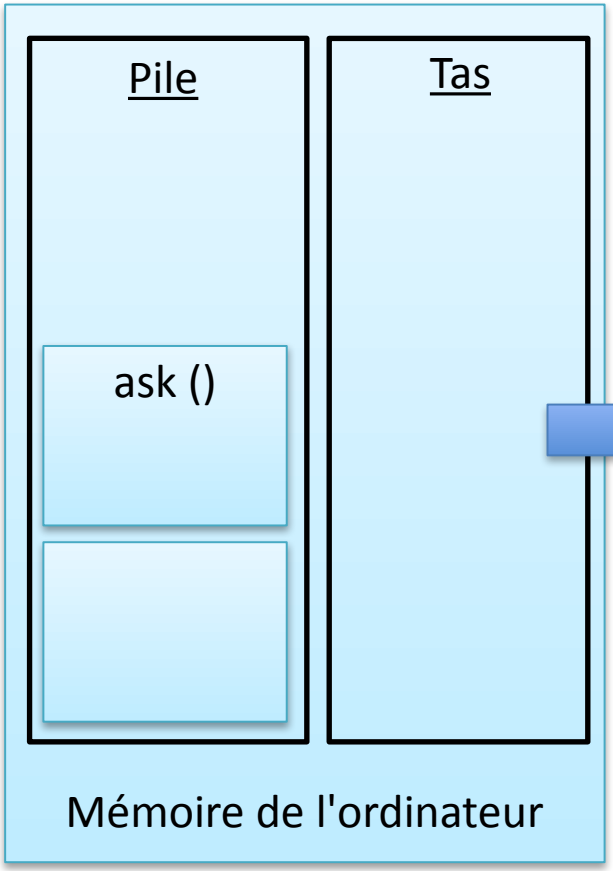



```
def askAge ():
  age = int(input( "Provide your age: " ))
  if age < 0 or age >= 150:
    raise ValueError ( "Age out of range")
  return age

def ask ():
  val = askAge ()
  print ( "Age entered: " + str(val) )
  return val

try:
  age = ask ()
except ValueError as error:
  print ( "Invalid age: " + str ( error ) )
print ( "Program finished" )
```

# Flux d'Exécution

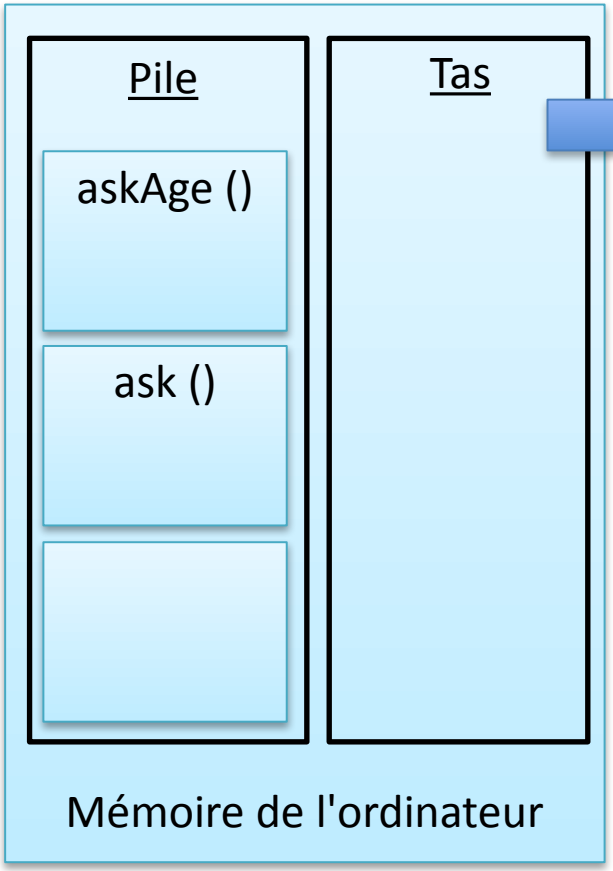



```
def askAge ():
  age = int(input( "Provide your age: " ))
  if age < 0 or age >= 150:
    raise ValueError ( "Age out of range")
  return age

def ask ():
  val = askAge ()
  print ( "Age entered: " + str(val) )
  return val

try:
  age = ask ()
except ValueError as error:
  print ( "Invalid age: " + str ( error ) )
print ( "Program finished" )
```

# Flux d'Exécution

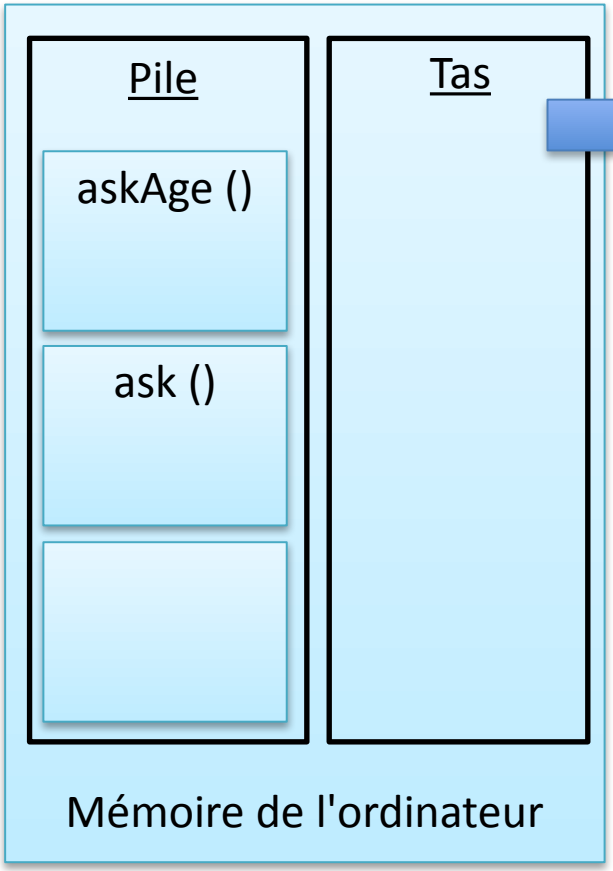



```
def askAge ():
  age = int(input( "Provide your age: " ))
  if age < 0 or age >= 150:
    raise ValueError ( "Age out of range")
  return age

def ask ():
  val = askAge ()
  print ( "Age entered: " + str(val) )
  return val

try:
  age = ask ()
except ValueError as error:
  print ( "Invalid age: " + str ( error ) )
print ( "Program finished" )
```

# Flux d'Exécution



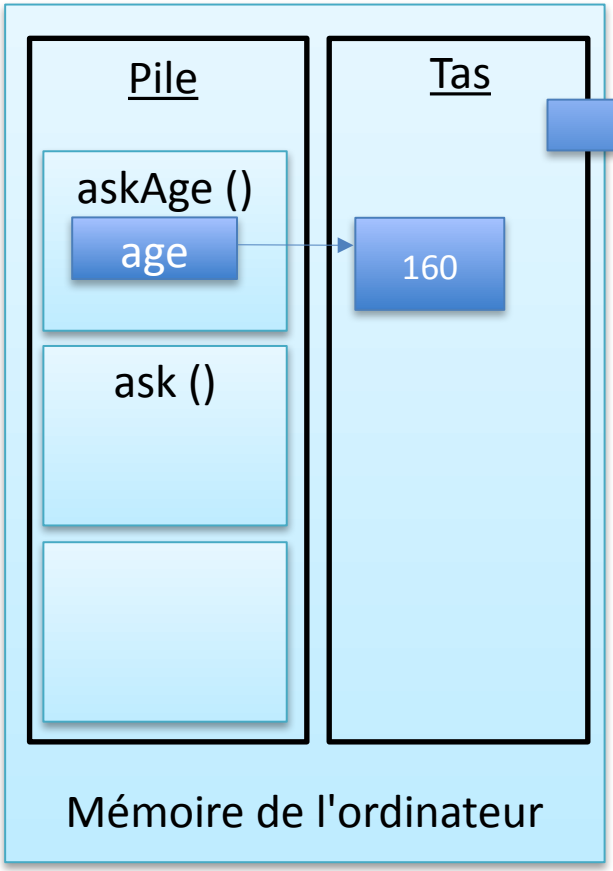

```
def askAge ():
  age = int(input( "Provide your age: " ))
  if age < 0 or age >= 150:
    raise ValueError ( "Age out of range")
  return age

def ask ():
  val = askAge ()
  print ( "Age entered: " + str(val) )
  return val

try:
  age = ask ()
except ValueError as error:
  print ( "Invalid age: " + str ( error ) )
print ( "Program finished" )
```

```
Provide your age:
```

# Flux d'Exécution



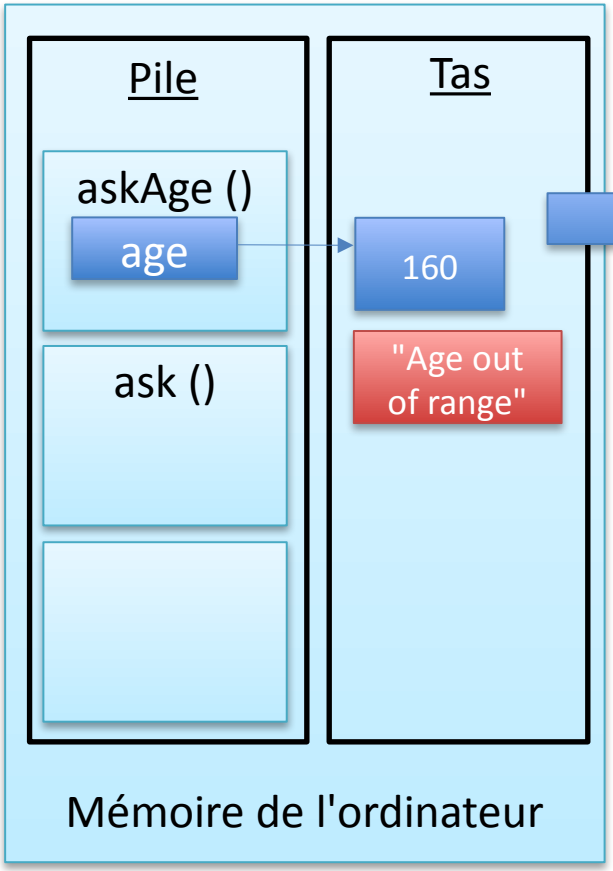

```
def askAge ():
  age = int(input( "Provide your age: " ))
  if age < 0 or age >= 150:
    raise ValueError ( "Age out of range")
  return age

def ask ():
  val = askAge ()
  print ( "Age entered: " + str(val) )
  return val

try:
  age = ask ()
except ValueError as error:
  print ( "Invalid age: " + str ( error ) )
print ( "Program finished" )
```

```
Provide your age: 160
```

# Flux d'Exécution



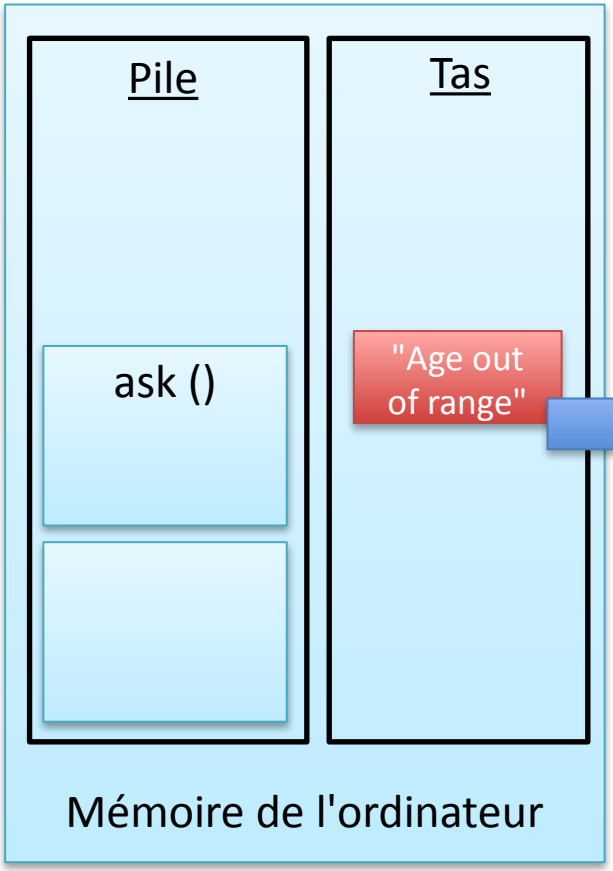

```
def askAge ():
  age = int(input( "Provide your age: " ))
  if age < 0 or age >= 150:
    raise ValueError ( "Age out of range")
  return age

def ask ():
  val = askAge ()
  print ( "Age entered: " + str(val) )
  return val

try:
  age = ask ()
except ValueError as error:
  print ( "Invalid age: " + str ( error ) )
print ( "Program finished" )
```

```
Provide your age: 160
```

# Flux d'Exécution



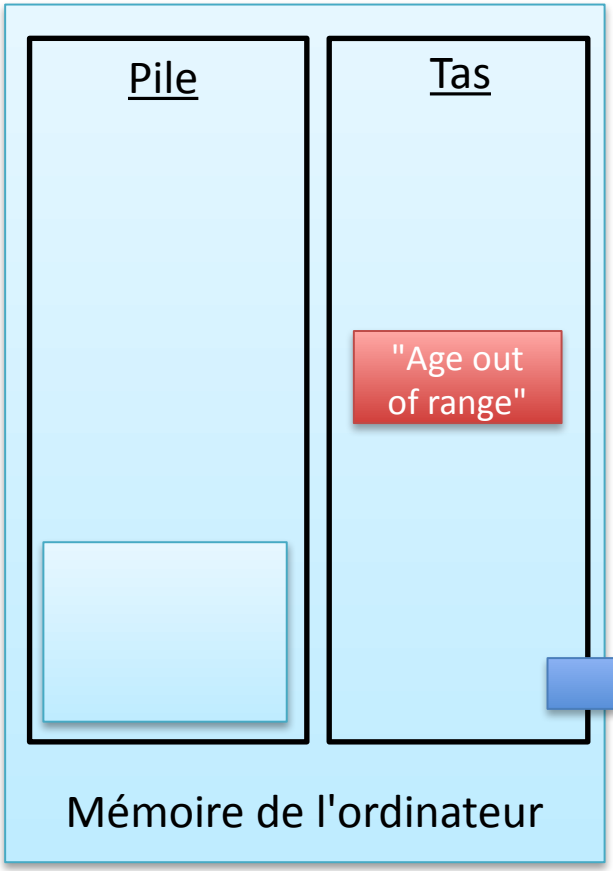

```
def askAge ():
  age = int(input( "Provide your age: " ))
  if age < 0 or age >= 150:
    raise ValueError ( "Age out of range")
  return age

def ask ():
  val = askAge ()
  print ( "Age entered: " + str(val) )
  return val

try:
  age = ask ()
except ValueError as error:
  print ( "Invalid age: " + str ( error ) )
print ( "Program finished" )
```

```
Provide your age: 160
```

# Flux d'Exécution



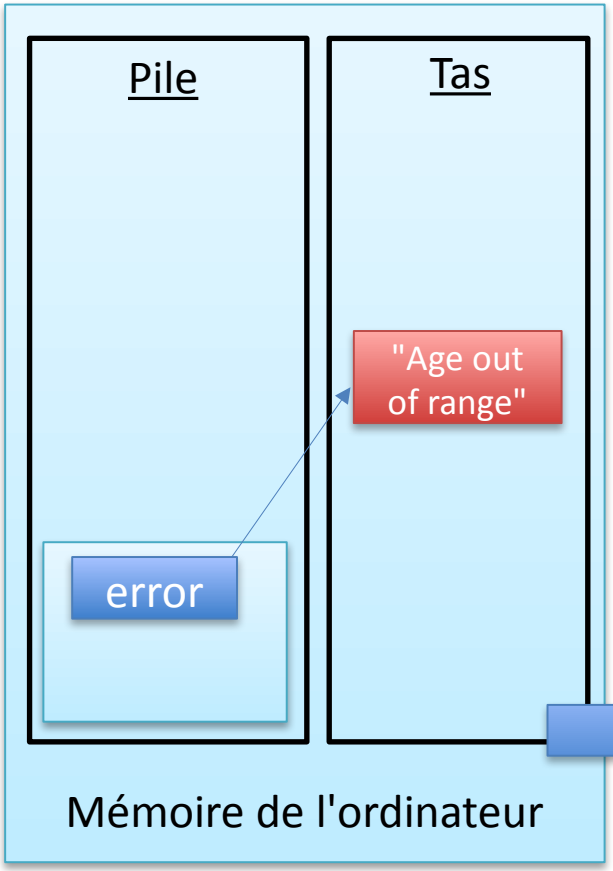

```
def askAge ():
  age = int(input( "Provide your age: " ))
  if age < 0 or age >= 150:
    raise ValueError ( "Age out of range")
  return age

def ask ():
  val = askAge ()
  print ( "Age entered: " + str(val) )
  return val

try:
  age = ask ()
except ValueError as error:
  print ( "Invalid age: " + str ( error ) )
print ( "Program finished" )
```

```
Provide your age: 160
```

# Flux d'Exécution



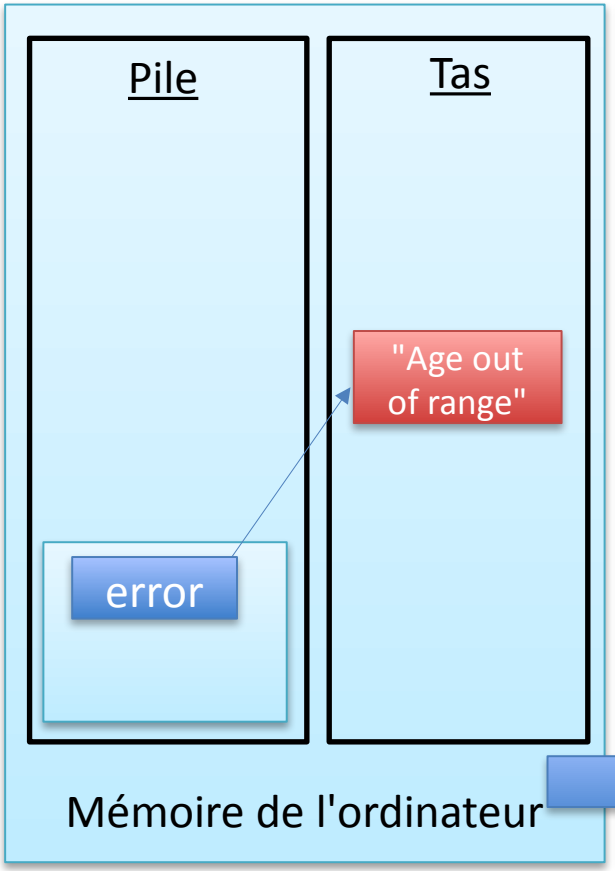

```
def askAge ():
  age = int(input( "Provide your age: " ))
  if age < 0 or age >= 150:
    raise ValueError ( "Age out of range")
  return age

def ask ():
  val = askAge ()
  print ( "Age entered: " + str(val) )
  return val

try:
  age = ask ()
except ValueError as error:
  print ( "Invalid age: " + str ( error ) )
print ( "Program finished" )
```

```
Provide your age: 160
```

# Flux d'Exécution



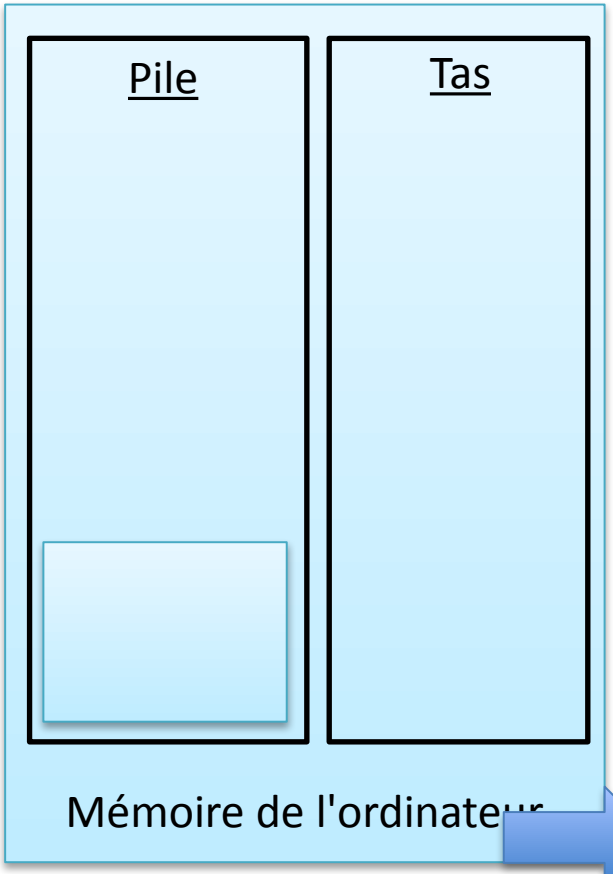

```
def askAge ():
  age = int(input( "Provide your age: " ))
  if age < 0 or age >= 150:
    raise ValueError ( "Age out of range")
  return age

def ask ():
  val = askAge ()
  print ( "Age entered: " + str(val) )
  return val

try:
  age = ask ()
except ValueError as error:
  print ( "Invalid age: " + str ( error ) )
print ( "Program finished" )
```

```
Provide your age: 160
Invalid age: Age out of range
```

# Flux d'Exécution




```
def askAge ():
  age = int(input( "Provide your age: " ))
  if age < 0 or age >= 150:
    raise ValueError ( "Age out of range")
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def ask ():
  val = askAge ()
  print ( "Age entered: " + str(val) )
  return val

try:
  age = ask ()
except ValueError as error:
  print ( "Invalid age: " + str ( error ) )
print ( "Program finished" )
```

```
Provide your age: 160
Invalid age: Age out of range
Program finished
```

# Fermer des Fichiers

```
name = input ( "Provide a file name: " )
try:
  file = open ( name, "w" )
  file.write ( "Numbers:\n" )
  for i in range(10):
    file.write ( str(1/i) )
  file.close ()
except:
  print ( "Error writing file" )
input ( "Press enter to continue" )
```

- Qu'est-ce qui se passe pendant l'exécution de ce programme?

# Fermer des Fichiers

```
name = input ( "Provide a file name: " )
try:
  file = open ( name, "w" )
  file.write ( "Numbers:\n" )
  for i in range(10):
    file.write ( str(1/i) )
  file.close ()
except:
  print ( "Error writing file" )
input ( "Press enter to continue" )
```

```
 Provide a file name:
```

# Fermer des Fichiers

```
name = input ( "Provide a file name: " )
try:
  file = open ( name, "w" )
  file.write ( "Numbers:\n" )
  for i in range(10):
    file.write ( str(1/i) )
  file.close ()
except:
  print ( "Error writing file" )
input ( "Press enter to continue" )
```

```
 Provide a file name: file.txt
```

# Fermer des Fichiers

| | | | | | |
|---|---|---|---|---|---|
| N | u | m | b | e | r |
| s | : | \n | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

file.txt

Disque dur de l'ordinateur

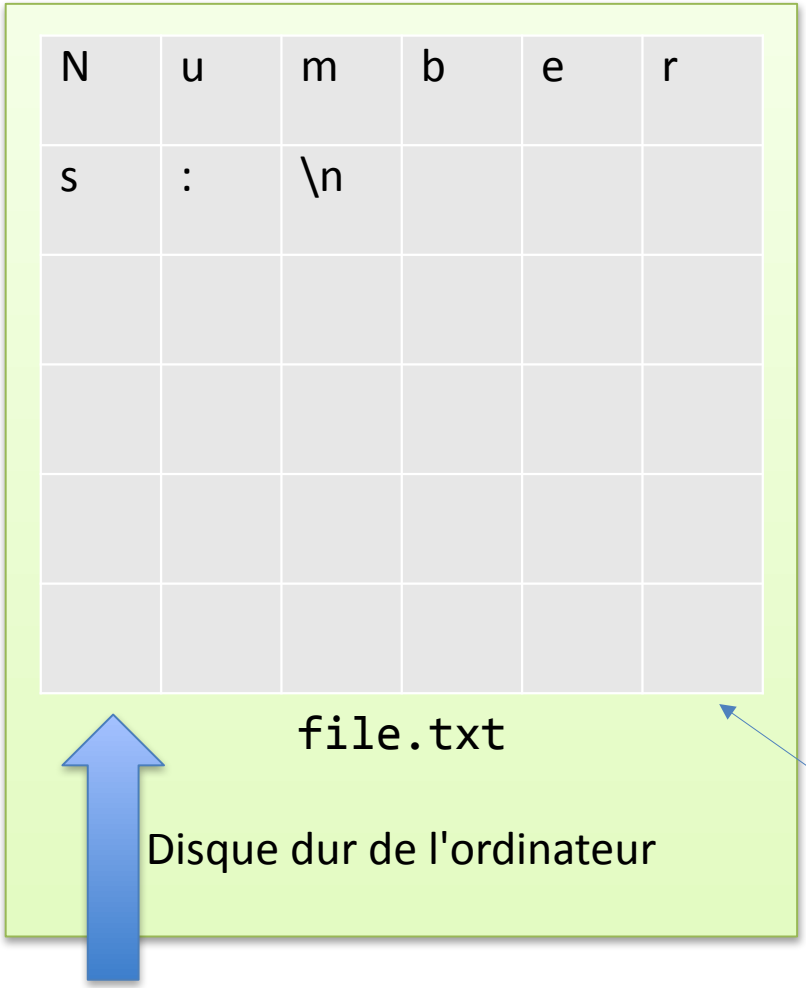
```
name = input ( "Provide a file name: " )
try:
  file = open ( name, "w" )
  file.write ( "Numbers:\n" )
  for i in range(10):
    file.write ( str(1/i) )
  file.close ()
except:
  print ( "Error writing file" )
input ( "Press enter to continue" )
```

```
Provide a file name: file.txt
```

file

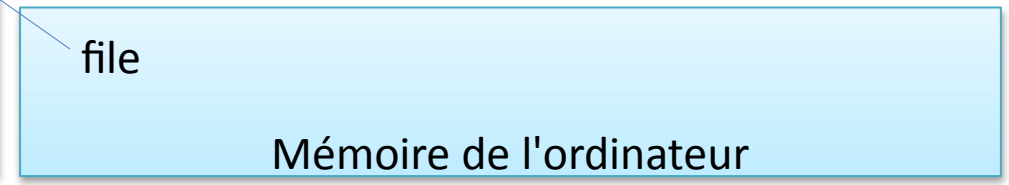
Mémoire de l'ordinateur

# Fermer des Fichiers




```
name = input ( "Provide a file name: " )
try:
  file = open ( name, "w" )
  file.write ( "Numbers:\n" )
  for i in range(10):
    file.write ( str(1/i) )
  file.close ()
except:
  print ( "Error writing file" )
input ( "Press enter to continue" )
```

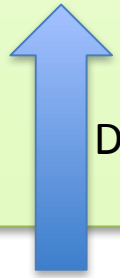
```
Provide a file name: file.txt
Error writing file
Press enter to continue
```



# Fermer des Fichiers

| | | | | | |
|---|---|---|---|---|---|
| N | u | m | b | e | r |
| s | : | \n | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

file.txt



Disque dur de l'ordinateur

```
name = input ( "Provide a file name: " )
try:
  with open ( name, "w" ) as file:
    file.write ( "Numbers:\n" )
    for i in range(10):
      file.write ( str(1/i) )
except:
  print ( "Error writing file" )
input ( "Press enter to continue" )
```

```
Provide a file name: file.txt
Error writing file
Press enter to continue
```

file

Mémoire de l'ordinateur

File est automatiquement fermé si l'exécution sort du bloc 'with'.

Programme **ne demande plus** d'accès!!!

# Fichiers

Approche recommandée

```
name = input ( "Provide a file name: " )
try:
   with open( name, "r" ) as file:
        for line in file:
             print(line)

except:
  print ( "Error reading file" )
```

(1) Ouverture
(3) Fermeture
(2) Traitement
(4)Exceptions