

Exercices constructions élémentaires

Correction

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Première - NSI

Lang 03



Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

1. Exercice 1
2. Exercice 2
3. Exercice 3
4. Exercice 4
5. Exercice 5
6. Exercice 6
7. Exercice 7
8. Exercice 8
9. Exercice 9
10. Exercice 10
11. Exercice 11

12. Exercice 12
13. Exercice 13
14. Exercice 14
15. Exercice 15
16. Exercice 16
17. Exercice 17
18. Exercice 18
19. Exercice 19
20. Exercice 20
21. Exercice 21
22. Exercice 22
23. Exercice 23

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 1

```
1 >>> a = 3 # 3
2 >>> a = 4 # 4
3 >>> a = a+2 # 6
4 >>> a
5 6
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

```
1 >>> a = 2 # 2
2 >>> b = a*a # 4
3 >>> b = a*b # 8
4 >>> b = b*b # 64
5 >>> b
6 64
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

```
1 >>> print("i+")
2 'i+'
```

Code 1 – On affiche une chaîne de caractères

```
1 >>> print(i+)
2 File "<stdin>", line 1
3     print(i+)
4           ^
5 SyntaxError: invalid syntax
```

Code 2 – Erreur de syntaxe : on veut additionner la variable `i` (qui n'existe d'ailleurs pas) avec rien du tout.

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

```
1 a = 2
2 b = 3
3 tmp = a
4 a = b
5 b = tmp
```

- ▶ Ce code inverse les valeurs de **a** et **b**.
- ▶ La variable **tmp** (pour temporaire) évite de perdre la valeur référencée par **a**.

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

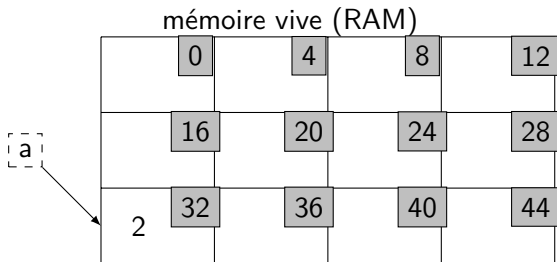
Exercice 16

Exercice 17

Exercice 18

1 a = 2

Code 3 – Affectation de la valeur 2 à la variable a.



Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

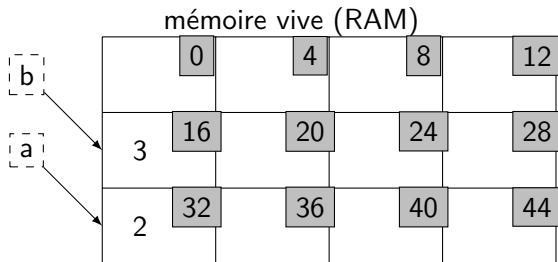
Exercice 16

Exercice 17

Exercice 18

1 `b = 3`

Code 4 – Affectation de la valeur 3 à la variable `b`.



Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

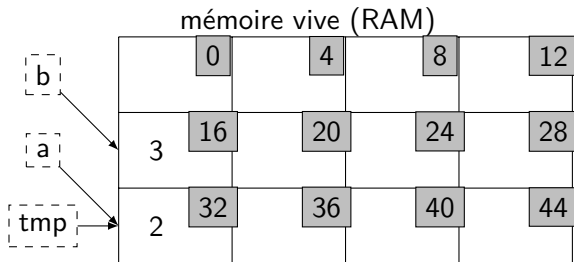
Exercice 16

Exercice 17

Exercice 18


```
1 tmp = a
```

Code 5 – Affectation de la valeur 2 à la variable `tmp`.



Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

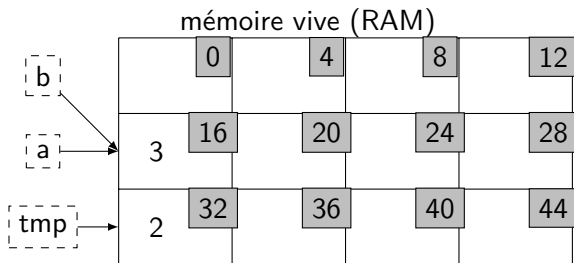
Exercice 16

Exercice 17

Exercice 18

1 a = b

Code 6 – Affectation de la valeur 3 à la variable a.



Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

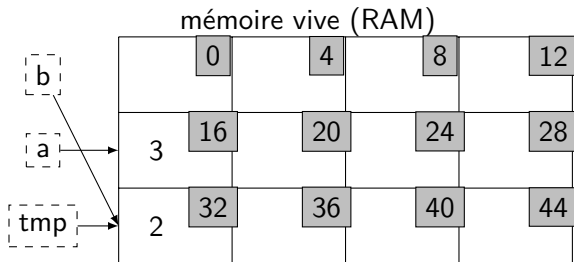
Exercice 16

Exercice 17

Exercice 18

1 `b = tmp`

Code 7 – Affectation de la valeur 2 à la variable b.



Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Remarque

```
1 a, b = b, a
```

Code 8 – Python permet d'effectuer cette opération en 1 seule ligne.

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 2

```
1 longueur = int(input("Entrez la longueur (en cm): "))
2 largeur = int(input("Entrez la largeur (en cm): "))
3 aire = longueur*largeur
4 print("Aire du rectangle ", aire)
```

Code 9 – Version 1

```
1 longueur = int(input("Entrez la longueur (en cm): "))
2 largeur = int(input("Entrez la largeur (en cm): "))
3 print("Aire du rectangle ", longueur*largeur)
```

Code 10 – Version 2

```
1 print("Aire du rectangle ", aire, "cm2")
```

Code 11 – Variante pour l'affichage

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 3

```
1 age = int(input("Quel est votre âge? "))
2 if age >= 18:
3     print("Vous êtes majeur.")
4 else:
5     print("Vous êtes mineur.")
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 4

```
1 rayon = int(input("rayon: "))
2 hauteur = int(input("hauteur: "))
3 volume = 3.14 * rayon**2 * hauteur / 3
4 print("Le volume est ", volume)
```

Code 12 – Avec la valeur usuelle de π

```
1 from math import pi
2
3 rayon = int(input("rayon: "))
4 hauteur = int(input("hauteur: "))
5 volume = pi * rayon**2 * hauteur / 3
6 print("Le volume est ", volume)
```

Code 13 – Avec la bibliothèque `math`

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Remarque

Pour calculer une puissance en Python :

$$a^b \leftrightarrow a ** b$$

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 5

```
1 x = int(input("nombre 1: "))
2 y = int(input("nombre 2: "))
3 z = int(input("nombre 3: "))
4 maxi = x
5 if y > maxi:
6     maxi = y
7 if z > maxi:
8     maxi = z
9 print(maxi)
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 6

```
1 age = int(input("Quel est votre âge? "))
2 if age < 16:
3     print("Le prix de la carte est €10.")
4 else:
5     if age <= 25:
6         """
7         inutile de vérifier si age >= 16, c'est
8         forcément le cas ici.
9         """
10        print("Le prix de la carte est €15.")
11    else:
12        if age <= 59:
13            print("Le prix de la carte est €25.")
14        else:
15            print("Le prix de la carte est €16.")
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

À retenir

En Python, on peut remplacer la structure :

```
1 else:  
2     if ... :
```

par

```
1 elif ... :
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

```
1 age = int(input("Quel est votre âge? "))
2 if age < 16:
3     print("Le prix de la carte est €10.")
4 elif age <= 25:
5     """
6     inutile de vérifier si age >= 16, c'est
7     forcément le cas ici.
8     """
9     print("Le prix de la carte est €15.")
10 elif age <= 59:
11     print("Le prix de la carte est €25.")
12 else:
13     print("Le prix de la carte est €16.")
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 7

```
1 from random import randint
2
3 somme = 0
4 tour = 0
5 while tour < 10:
6     nb = randint(1, 10)
7     somme = somme + nb
8     tour = tour + 1
9
10 print(somme)
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 8

```
1 from random import randint
2
3 nb = randint(1,10)
4 essai = 0
5 # valeur impossible pour démarrer la boucle
6 trouve = -1
7 while nb != trouve:
8     trouve = int(input("Quel nombre? "))
9     essai = essai + 1
10
11 print(essai)
```

Code 14 – Une solution

```
1 while not(nb == trouve):
```

Code 15 – Variante pour vérifier la *non-égalité*

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 9

- ▶ Initialiser la **somme** à 0.
- ▶ Tant que l'**entier** est inférieur ou égal à 100 :
 - ▶ Ajouter l'**entier** à la **somme**.
- ▶ Afficher la **somme**.

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

```
1 somme = 0
2 entier = 1
3 while entier <= 100:
4     somme = somme + entier
5     entier = entier + 1
6
7 print(somme)
```

Code 16 – Implémentation

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 10

```
1 somme_impair = 0
2 entier = 1
3 while entier < 100:
4     somme_impair = somme_impair + entier
5     # sauter d'impair en impair
6     entier = entier + 2
7
8 print(somme_impair)
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 11

```
1 nb = int(input("Quelle table voulez-vous afficher? "))
2 ligne = 0
3 while ligne <= 10:
4     print(ligne,"x",nb," = ",ligne*nb)
5     ligne = ligne + 1
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 12

```
1 tour = 10
2 while tour >= 0:
3     print(tour)
4     tour = tour - 1
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 13

```
1 nb = 2
2 while nb < 25:
3     print(nb)
4     nb = nb + 2
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 14

- ▶ $20/3$ renvoie le résultat de la division. C'est un **nombre flottant**.
- ▶ $20//3$ renvoie la partie entière de la division. C'est un **entier**.
- ▶ $20\%3$ renvoie le reste de la division. C'est un **entier**. On appelle cette opération le **modulo**.

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

```
1 secondes = int(input("Nombre de secondes: "))
2 heures = secondes // 3600
3 minutes = (secondes % 3600) // 60
4 secondes = (secondes % 3600) % 60
```

Code 17 – Durée

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

```
1 if heures < 10:  
2     heures = "0"+str(heures)  
3 if minutes < 10:  
4     minutes = "0"+str(minutes)  
5 if secondes < 10:  
6     secondes = "0"+str(secondes)  
7 print(heures, "h", minutes, "min", secondes, "s")
```

Code 18 – Affichage

Remarque

Les variables sont des entiers et deviennent des chaînes de caractères (**string**). Python permet de changer le type d'une variable. Ce n'est pas le cas de tous les langages.

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 15

```
1 nb = (int(input("nombre: ")))
2 if nb%2 == 0: # le reste de la division est nul
3     print("PAIR")
4 else:
5     print("IMPAIR")
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 16

```
1 a = int(input("a: "))
2 b = int(input("b: "))
3 print("Le quotient de", a, "÷", b, " est", a//b)
4 print("Le reste de est", a, "÷", b, " est", a%b)
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 17

- ▶ Initialiser l'épaisseur.
- ▶ Initialiser le nombre de plis.
- ▶ Tant que l'épaisseur est inférieure à la taille de la tour Eiffel :
 - ▶ Mettre à jour l'épaisseur.
 - ▶ Plier.
- ▶ Afficher le nombre de plis.

Remarque

Attention aux unités.

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

```
1 epaisseur = 0.1
2 pli = 0
3 while epaisseur < 324000:
4     epaisseur = epaisseur * 2
5     pli = pli + 1
6 print("nombre de plis: ", pli)
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 18

```
1 nb = int(input("nombre: "))
2 diviseur = 1
3 while diviseur < nb:
4     # si le reste est nul c'est un diviseur
5     if nb%diviseur == 0:
6         print(diviseur)
7     # passe au diviseur suivant
8     diviseur = diviseur + 1
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 19

```
1 # 3, 4, 5, 6
2 range(3, 7)
3
4 # 5, 10, 15, 20, 25
5 range(5, 26, 5)
6
7 # 5, 4, 3, 2, 1
8 range(5, 0, -1)
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 20

```
1 for i in range(10):  
2     resultat = i*i  
3     print(resultat)
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 21

```
1 for k in range(10, 0, -2):  
2     print(k*k)
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 22

```
1 res = 0
2 i = 0
3 while i < 25:
4     res = res + i
5     i = i + 3
6 print(res)
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18

Exercice 23

```
1 n = int(input("Quelle puissance? "))
2 res = 1
3 for i in range(n):
4     res = res*10
5 print("10**", n, " = ", res)
```

Exercice 1

Exercice 2

Exercice 3

Exercice 4

Exercice 5

Exercice 6

Exercice 7

Exercice 8

Exercice 9

Exercice 10

Exercice 11

Exercice 12

Exercice 13

Exercice 14

Exercice 15

Exercice 16

Exercice 17

Exercice 18