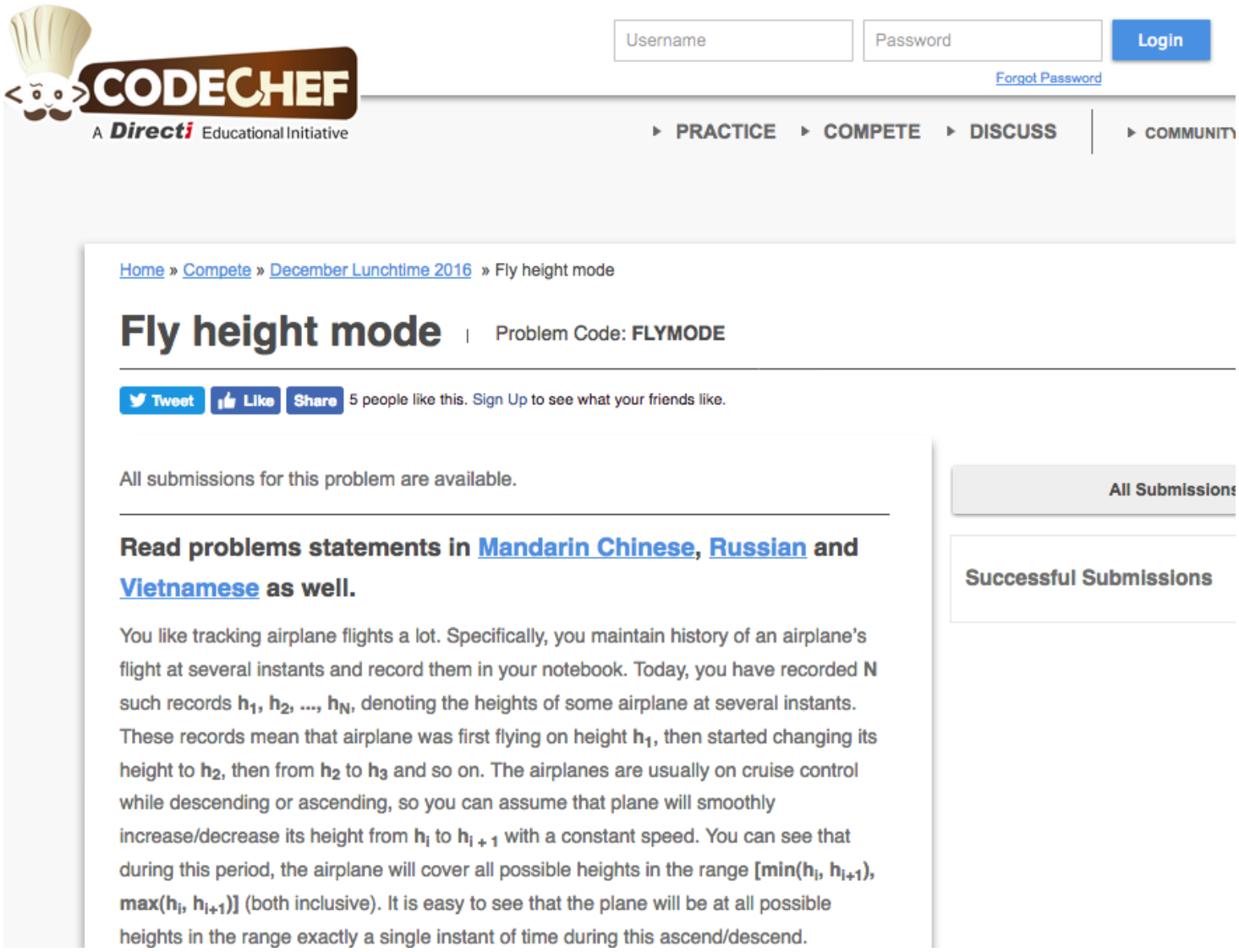
Les algorithmes de type « Sweep Line »

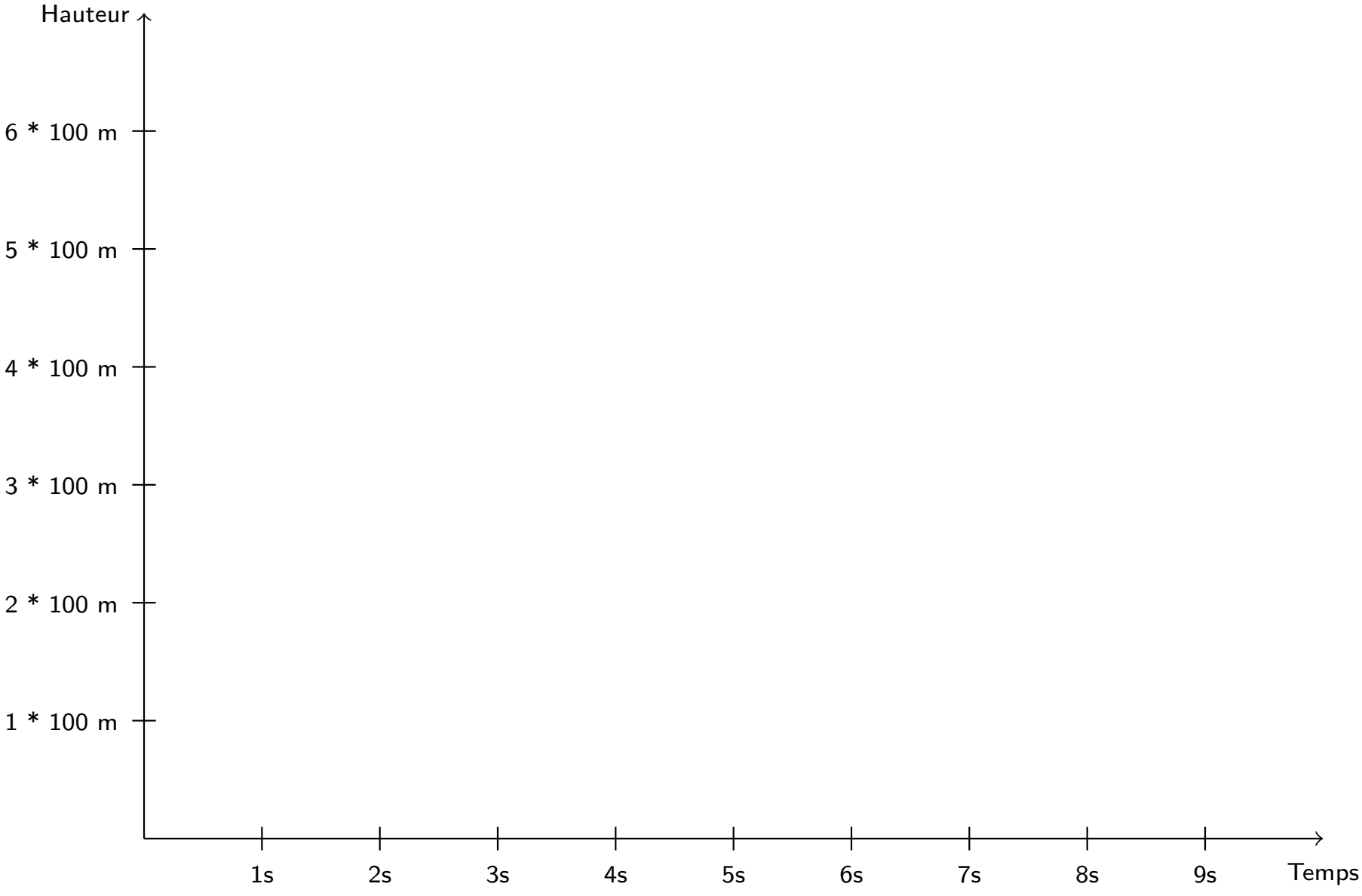
José Vander Meulen

30 novembre 2017

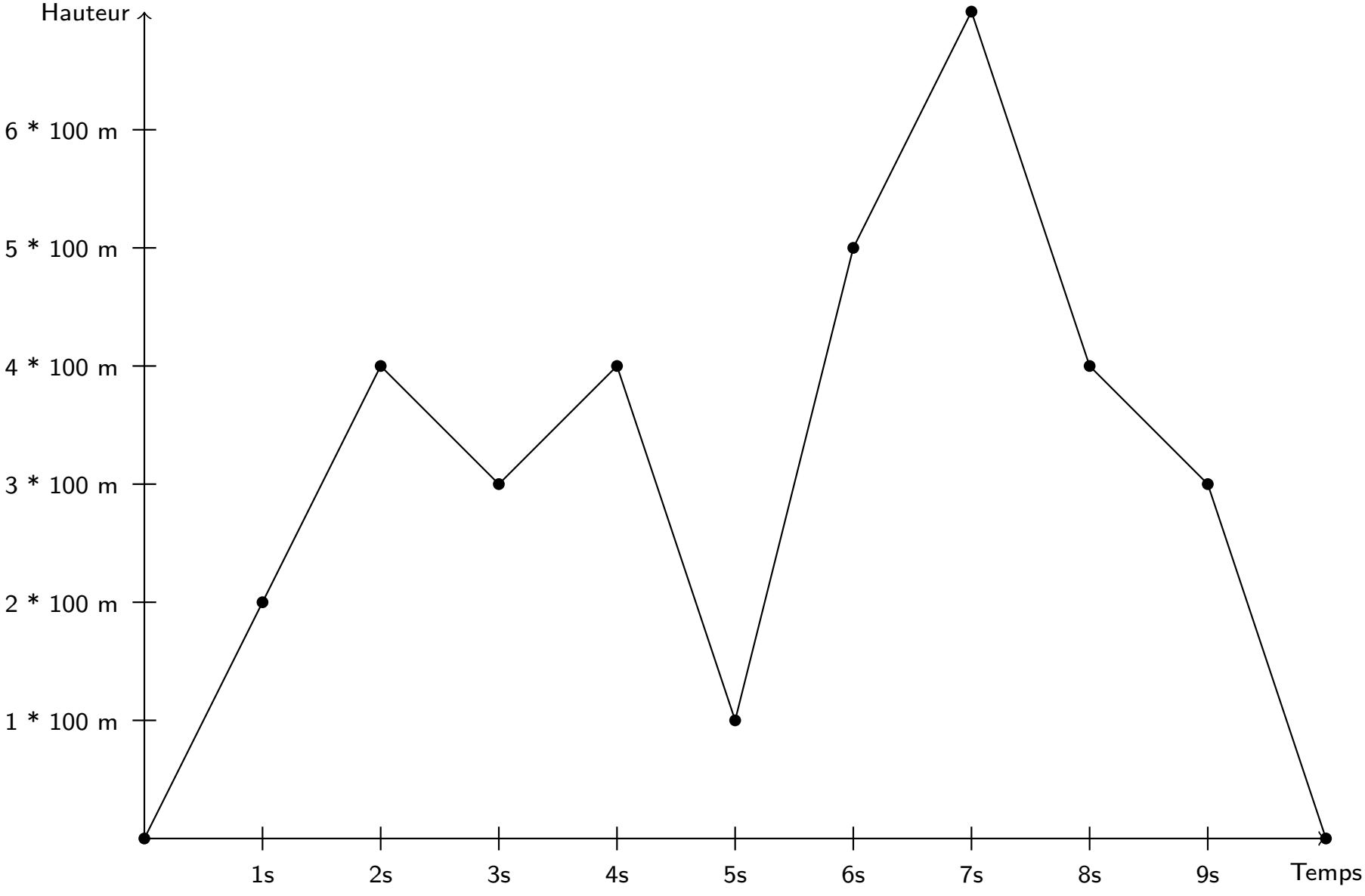
https://www.codechef.com/LTIME43/problems/FLYMODE



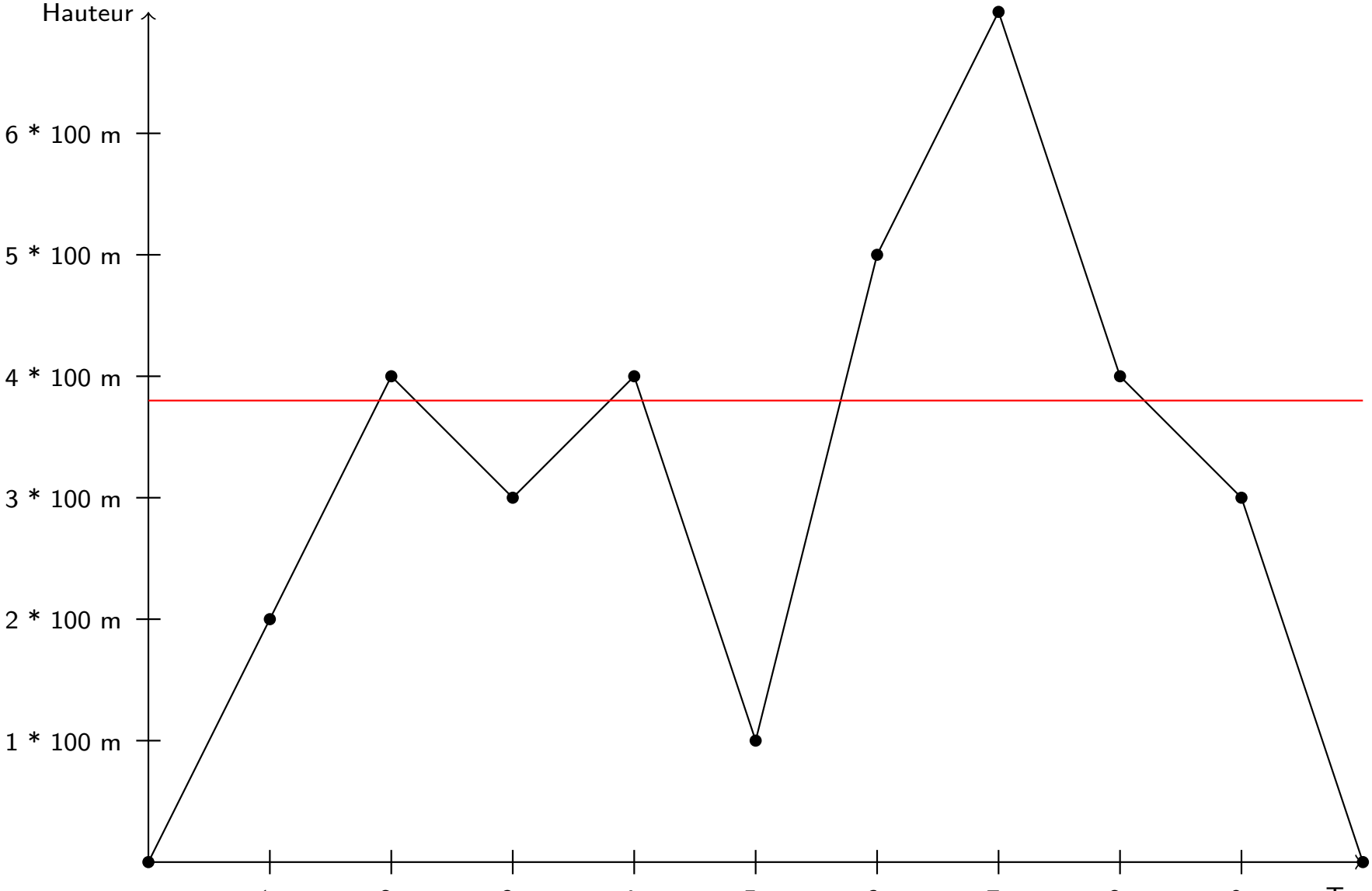
Données

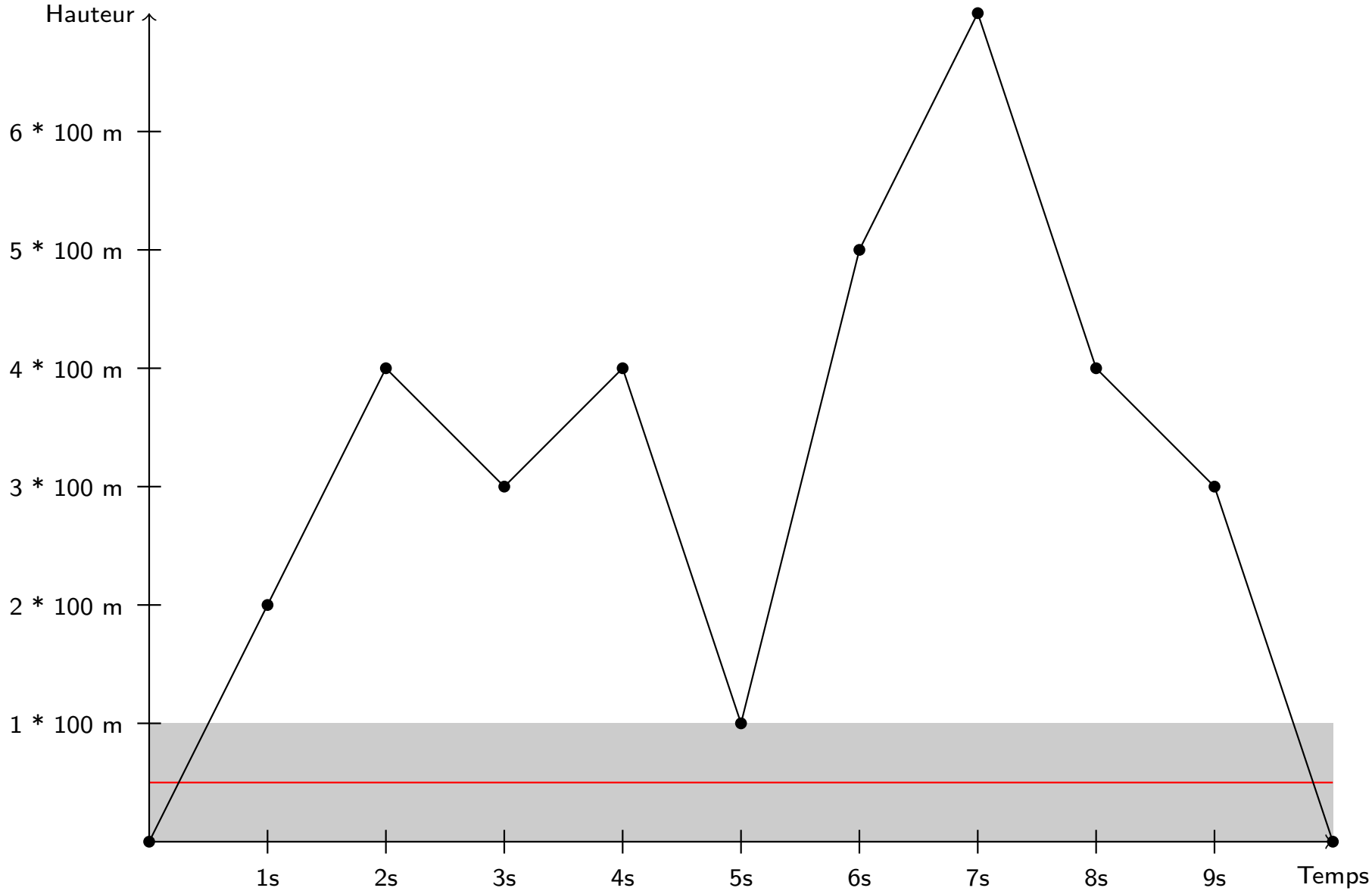

Hauteur
6 * 100 m
5 * 100 m
4 * 100 m
3 * 100 m
2 * 100 m
1 * 100 m
1s
2s
3s
4s
5s
6s
7s
8s
9s
Temps

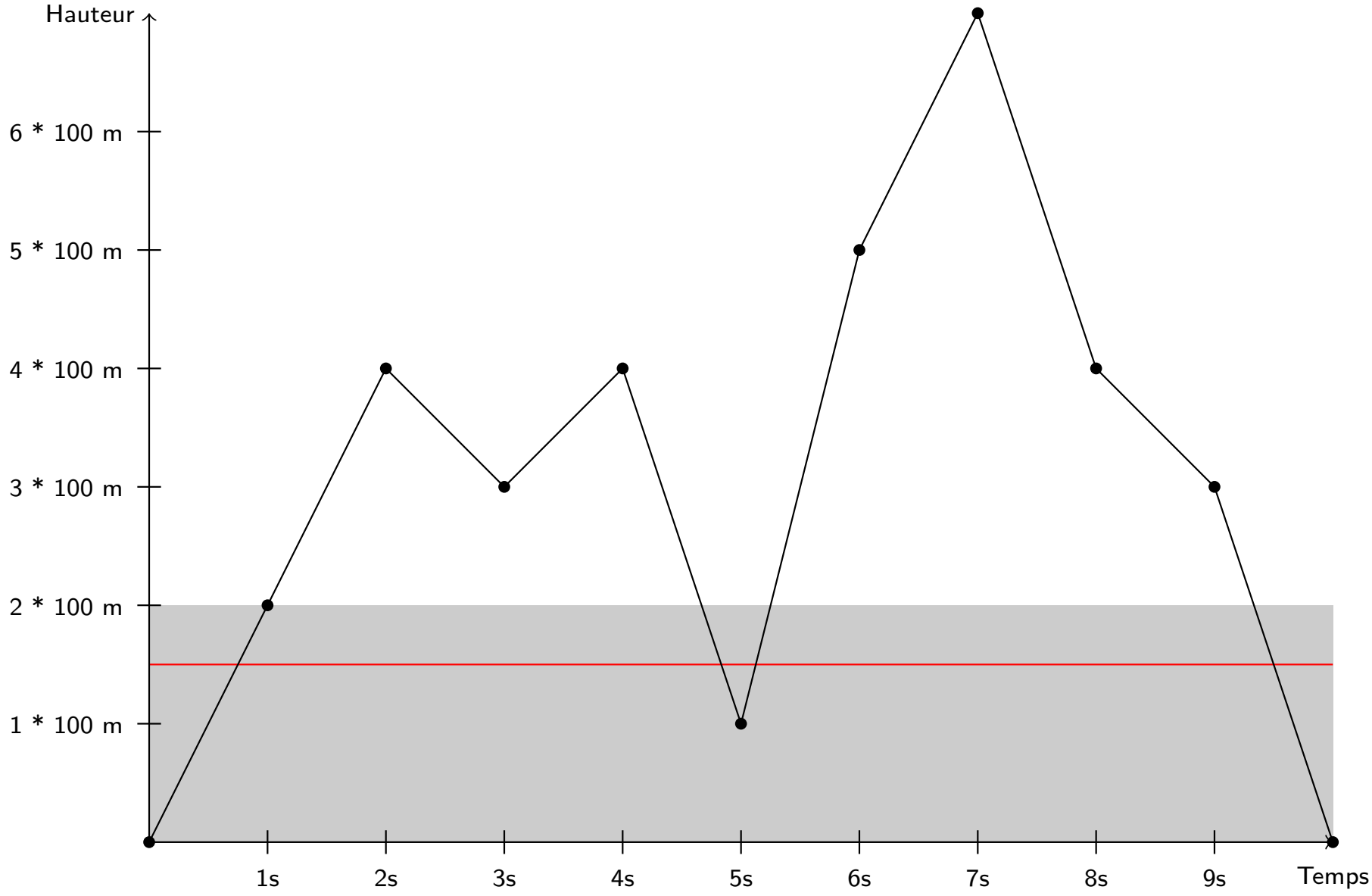
Données

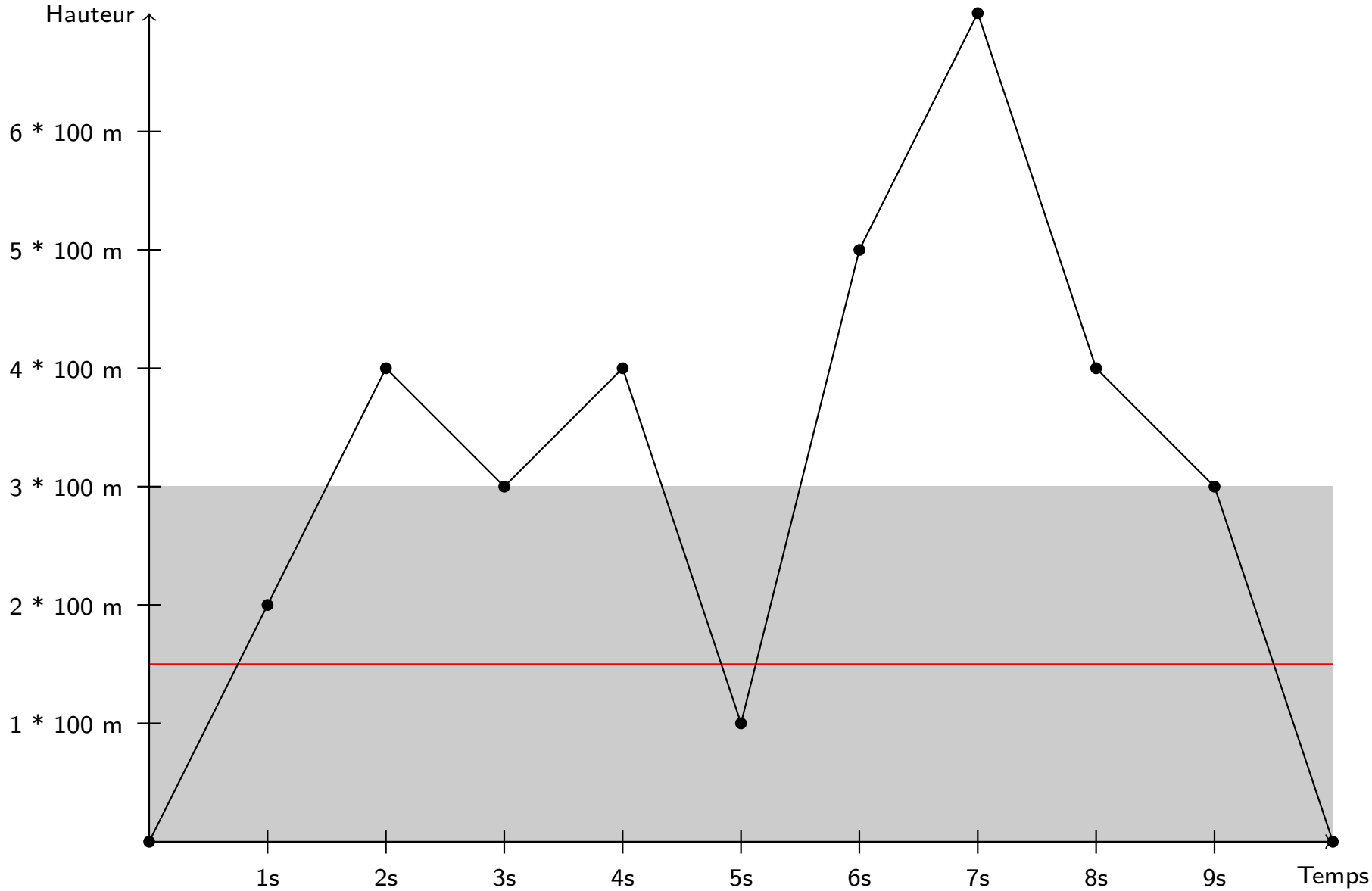

Hauteur
6 * 100 m
5 * 100 m
4 * 100 m
3 * 100 m
2 * 100 m
1 * 100 m
1s
2s
3s
4s
5s
6s
7s
8s
9s
Temps

Soit H une des hauteurs par laquelle on est le plus passé, trouver le nombre de fois qu'on est passé par H




Hauteur
6 * 100 m
5 * 100 m
4 * 100 m
3 * 100 m
2 * 100 m
1 * 100 m
1s
2s
3s
4s
5s
6s
7s
8s
9s
Temps


Hauteur
6 * 100 m
5 * 100 m
4 * 100 m
3 * 100 m
2 * 100 m
1 * 100 m
1s
2s
3s
4s
5s
6s
7s
8s
9s
Temps


Hauteur
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5 * 100 m
4 * 100 m
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2 * 100 m
1 * 100 m
1s
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3s
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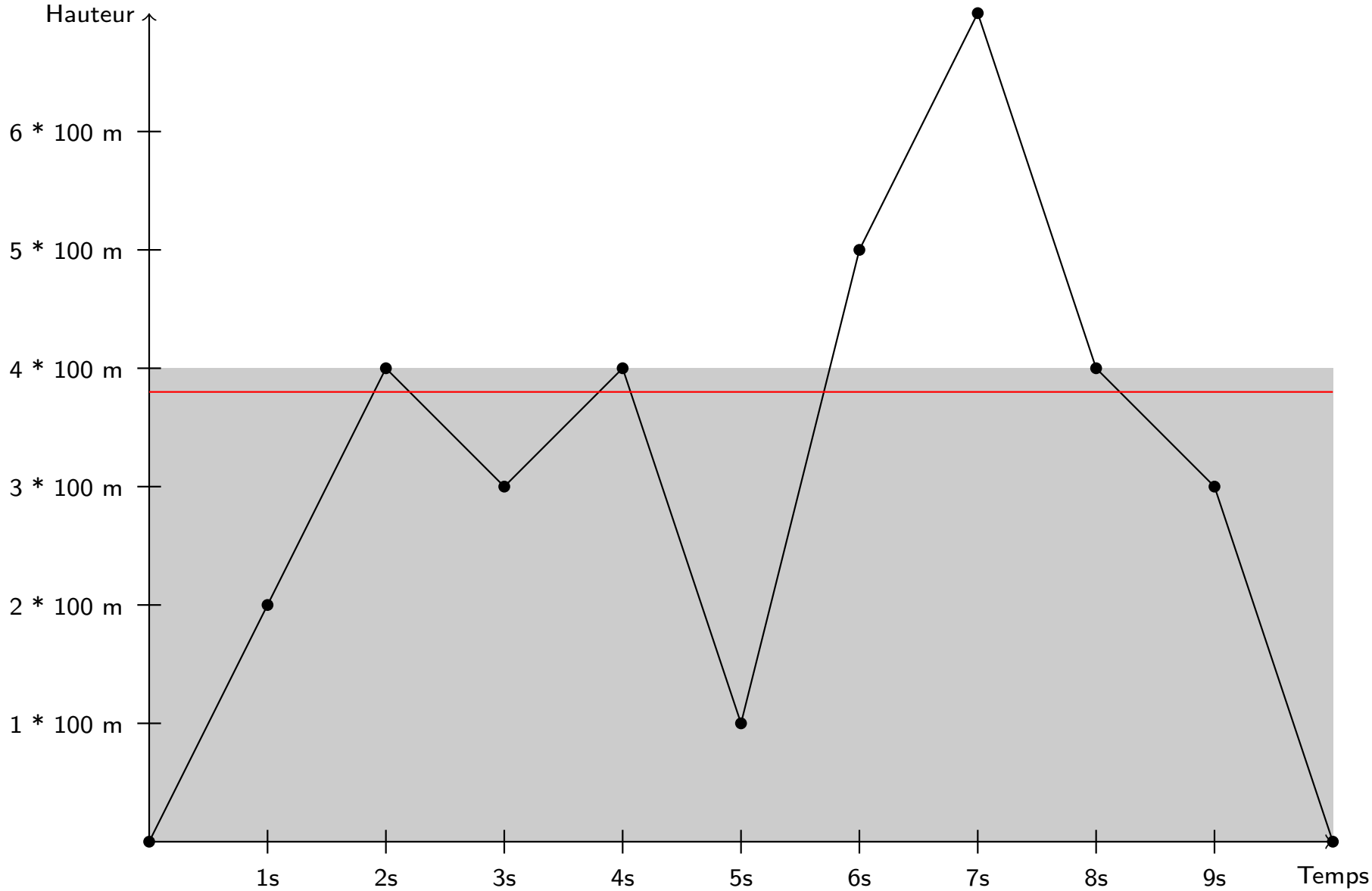
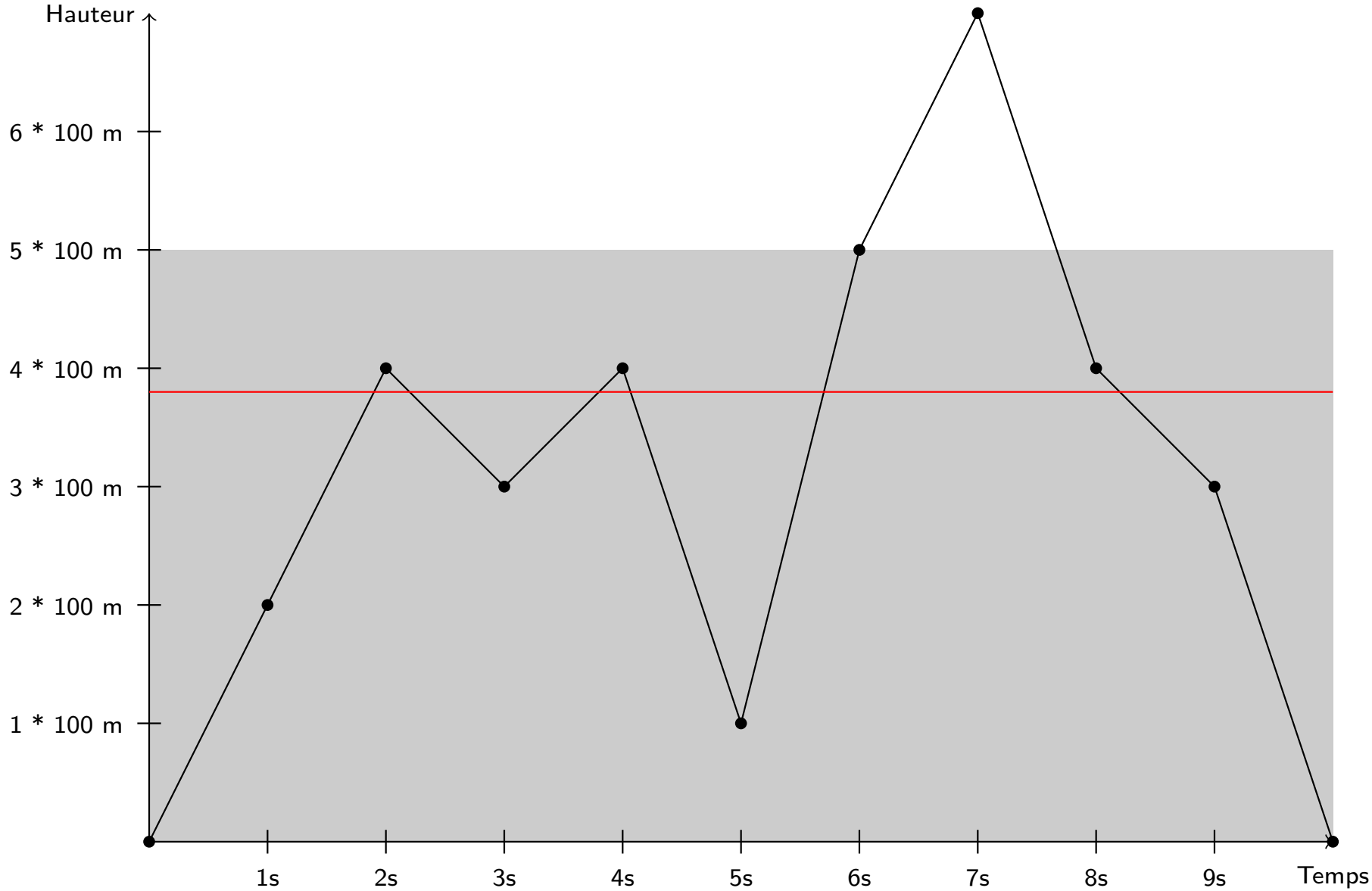
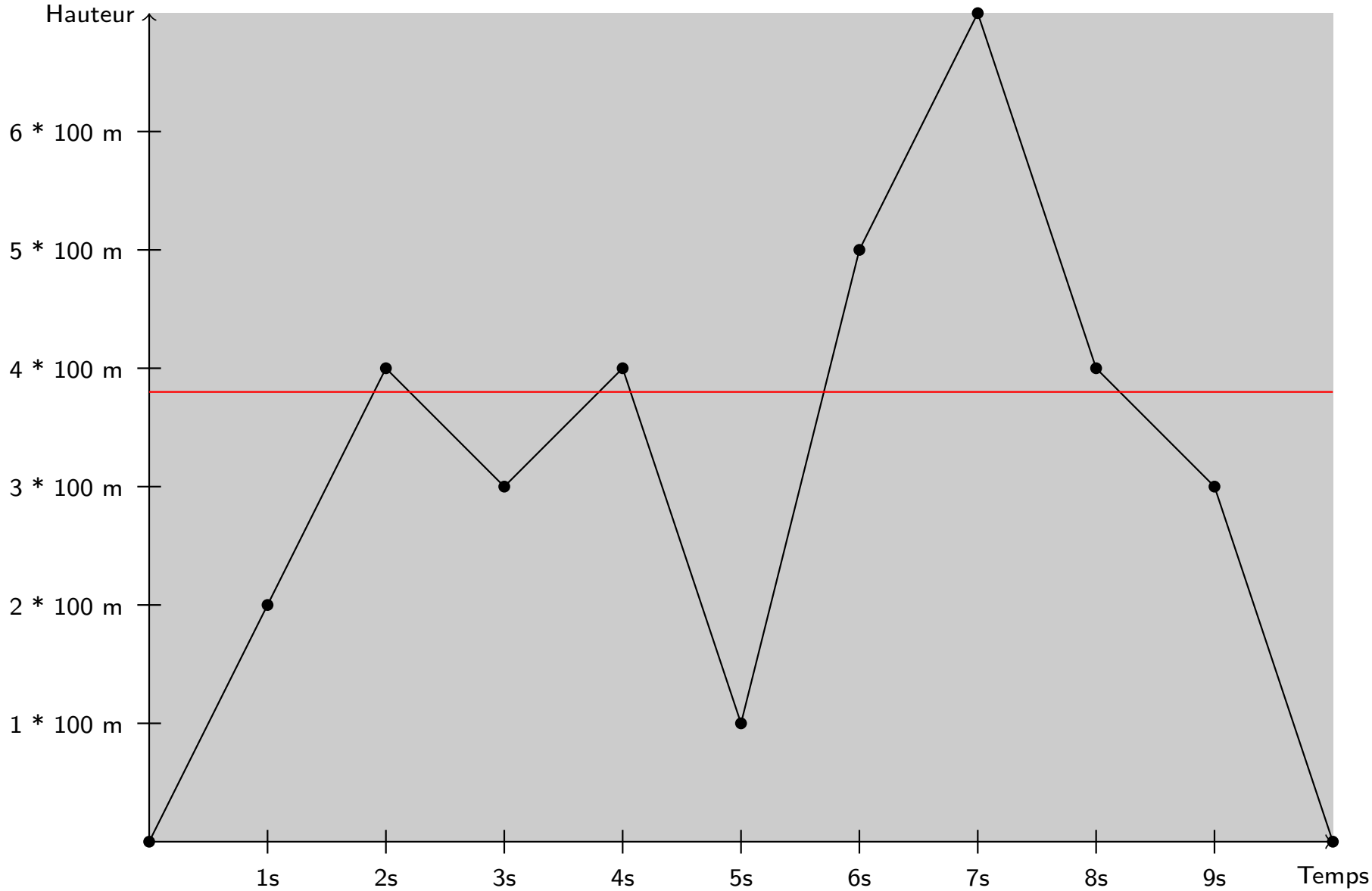
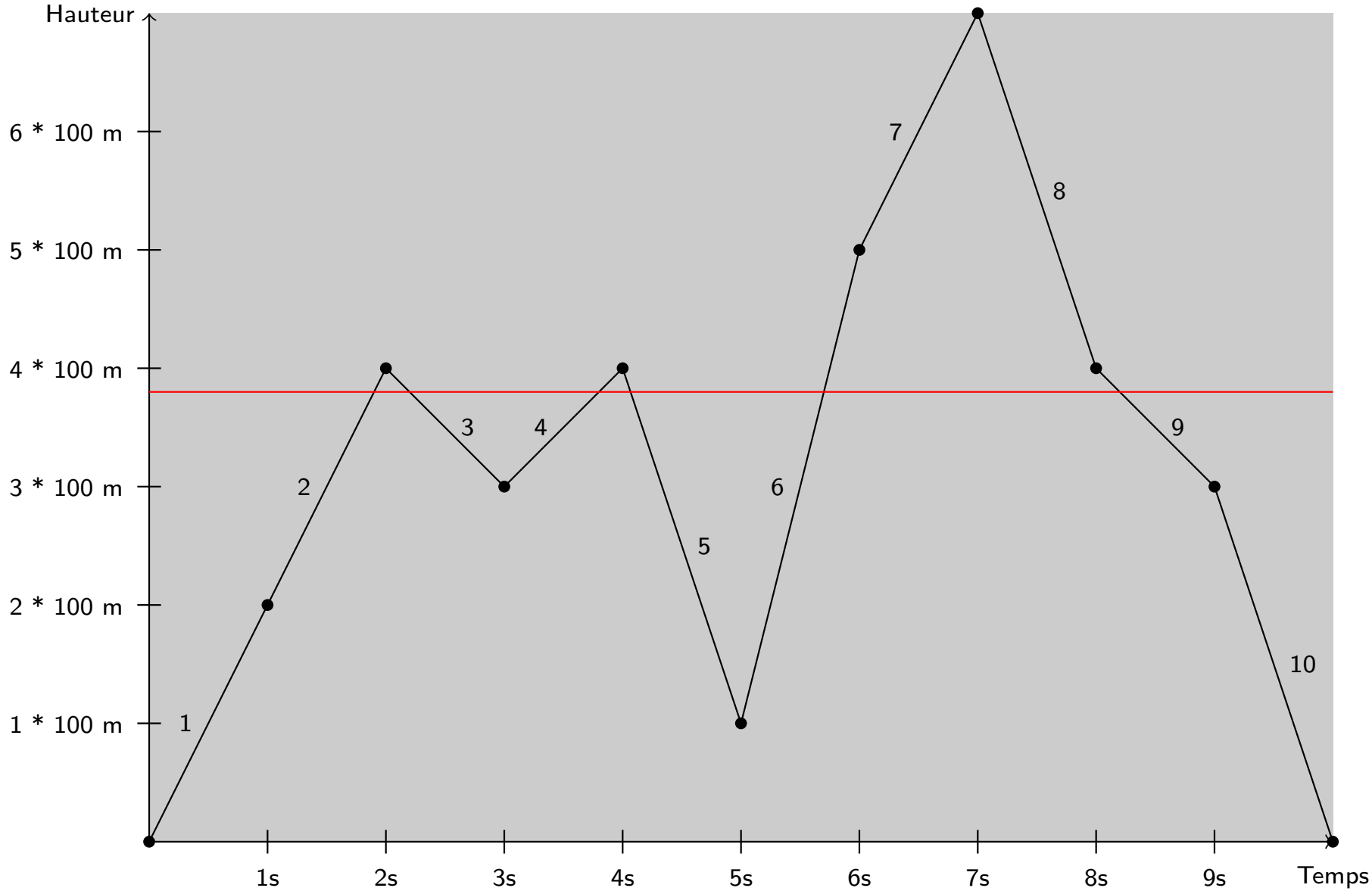
5s
6s
7s
8s
9s
Temps


Hauteur
6 * 100 m
5 * 100 m
4 * 100 m
3 * 100 m
2 * 100 m
1 * 100 m
1s
2s
3s
4s
5s
6s
7s
8s
9s
Temps


Hauteur
6 * 100 m
5 * 100 m
4 * 100 m
3 * 100 m
2 * 100 m
1 * 100 m
1s
2s
3s
4s
5s
6s
7s
8s
9s
Temps


Hauteur
6 * 100 m
5 * 100 m
4 * 100 m
3 * 100 m
2 * 100 m
1 * 100 m
1s
2s
3s
4s
5s
6s
7s
8s
9s
Temps


Hauteur
6 * 100 m
5 * 100 m
4 * 100 m
3 * 100 m
2 * 100 m
1 * 100 m
1
2
3
4
5
6
7
8
9
10
1s
2s
3s
4s
5s
6s
7s
8s
9s
Temps

1. (0,0) ——— (1,2)
2. (1,2) ——— (2,4)
3. (2,4) ——— (3,3)
4. (3,3) ——— (4,4)
5. (4,4) ——— (5,1)
6. (5,1) ——— (6,5)
7. (6,5) ——— (7,7)
8. (7,7) ——— (8,4)
9. (8,4) ——— (9,3)
10. (9,3) ——— (10,0)

1. (0,0) ——— (1,2)
2. (1,2) ——— (2,4)
3. (2,4) ——— (3,3)
4. (3,3) ——— (4,4)
5. (4,4) ——— (5,1)
6. (5,1) ——— (6,5)
7. (6,5) ——— (7,7)
8. (7,7) ——— (8,4)
9. (8,4) ——— (9,3)
10. (9,3) ——— (10,0)

1.	(0,0)	(1,2)
2.	(1,2)	(2,4)
3.	(2,4)	(3,3)
4.	(3,3)	(4,4)
5.	(4,4)	(5,1)
6.	(5,1)	(6,5)
7.	(6,5)	(7,7)
8.	(7,7)	(8,4)
9.	(8,4)	(9,3)
10.	(9,3)	(10,0)

(0,0)	(1,2)
(1,2)	(2,4)
(2,4)	(3,3)
(3,3)	(4,4)
(4,4)	(5,1)
(5,1)	(6,5)
(6,5)	(7,7)
(7,7)	(8,4)
(8,4)	(9,3)
(9,3)	(10,0)

(0,0) (10,0)

(5,1) (5,1)

(1,2) (1,2)

(9,3) (3,3) (3,3) (9,3)

(2,4) (2,4) (4,4) (4,4) (8,4) (8,4)

(6,5) (6,5)

(7,7) (7,7)

(0,0)	(10,0)				
(5,1)	(5,1)				
(1,2)	(1,2)				
(9,3)	(3,3)	(3,3)	(9,3)		
(2,4)	(2,4)	(4,4)	(4,4)	(8,4)	(8,4)
(6,5)	(6,5)				
(7,7)	(7,7)				

cpt = 1

max = 1

(0,0)	(10,0)				
(5,1)	(5,1)				
(1,2)	(1,2)				
(9,3)	(3,3)	(3,3)	(9,3)		
(2,4)	(2,4)	(4,4)	(4,4)	(8,4)	(8,4)
(6,5)	(6,5)				
(7,7)	(7,7)				

cpt $= 2$

max $= 2$

(0,0) (10,0)

(5,1) (5,1)

(1,2) (1,2)

(9,3) (3,3) (3,3) (9,3)

(2,4) (2,4) (4,4) (4,4) (8,4) (8,4)

(6,5) (6,5)

(7,7) (7,7)

cpt = 3

max = 3

(0,0)	(10,0)				
(5,1)	(5,1)				
(1,2)	(1,2)				
(9,3)	(3,3)	(3,3)	(9,3)		
(2,4)	(2,4)	(4,4)	(4,4)	(8,4)	(8,4)
(6,5)	(6,5)				
(7,7)	(7,7)				

$\text{cpt} = 4$

$\text{max} = 4$

(0,0) (10,0)

(5,1) (5,1)

(1,2) (1,2)

(9,3) (3,3) (3,3) (9,3)

(2,4) (2,4) (4,4) (4,4) (8,4) (8,4)

(6,5) (6,5)

(7,7) (7,7)

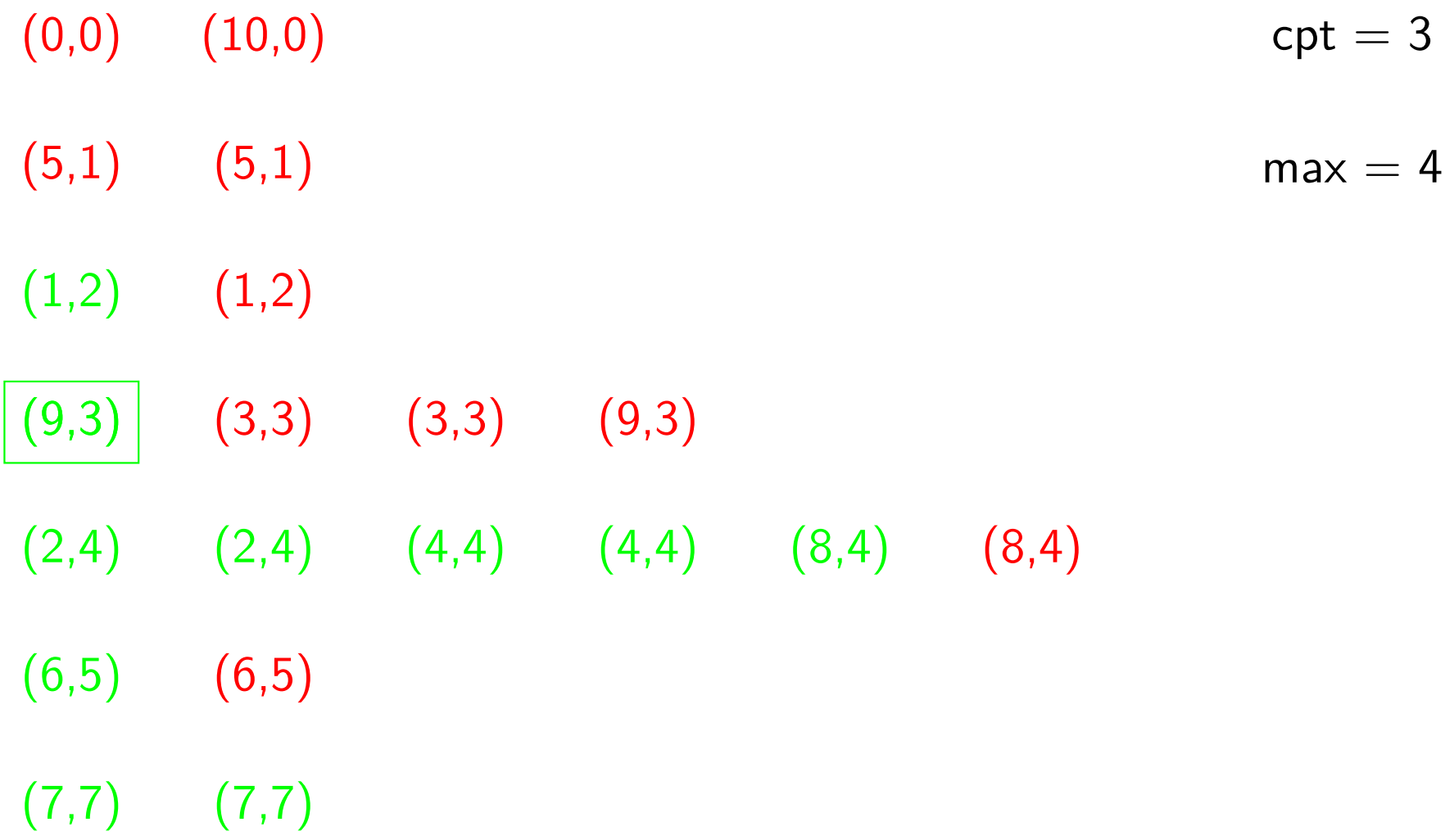
cpt = 3

max = 4

(0,0)	(10,0)				
(5,1)	(5,1)				
(1,2)	(1,2)				
(9,3)	(3,3)	(3,3)	(9,3)		
(2,4)	(2,4)	(4,4)	(4,4)	(8,4)	(8,4)
(6,5)	(6,5)				
(7,7)	(7,7)				

$\mathsf{cpt} = 4$

$\mathsf{max} = 4$


(0,0)
(10,0)
cpt = 3
(5,1)
(5,1)
max = 4
(1,2)
(1,2)
(9,3)
(3,3)
(3,3)
(9,3)
(2,4)
(2,4)
(4,4)
(4,4)
(8,4)
(8,4)
(6,5)
(6,5)
(7,7)
(7,7)

(0,0) (10,0)

(5,1) (5,1)

(1,2) (1,2)

(9,3) (3,3) (3,3) (9,3)

(2,4) (2,4) (4,4) (4,4) (8,4) (8,4)

(6,5) (6,5)

(7,7) (7,7)

cpt = 4

max = 4

(0,0) (10,0)

(5,1) (5,1)

(1,2) (1,2)

(9,3) (3,3) (3,3) (9,3)

(2,4) (2,4) (4,4) (4,4) (8,4) (8,4)

(6,5) (6,5)

(7,7) (7,7)

cpt = 5

max = 5

(0,0)	(10,0)				
(5,1)	(5,1)				
(1,2)	(1,2)				
(9,3)	(3,3)	(3,3)	(9,3)		
(2,4)	(2,4)	(4,4)	(4,4)	(8,4)	(8,4)
(6,5)	(6,5)				
(7,7)	(7,7)				

cpt = 6

max = 6

(0,0) (10,0)

(5,1) (5,1)

(1,2) (1,2)

(9,3) (3,3) (3,3) (9,3)

(2,4) (2,4) (4,4) (4,4) (8,4) (8,4)

(6,5) (6,5)

(7,7) (7,7)

cpt = 5

max = 6

(0,0)	(10,0)				
(5,1)	(5,1)				
(1,2)	(1,2)				
(9,3)	(3,3)	(3,3)	(9,3)		
(2,4)	(2,4)	(4,4)	(4,4)	(8,4)	(8,4)
(6,5)	(6,5)				
(7,7)	(7,7)				

$\text{cpt} = 4$

$\text{max} = 6$

(0,0) (10,0)

(5,1) (5,1)

(1,2) (1,2)

(9,3) (3,3) (3,3) (9,3)

(2,4) (2,4) (4,4) (4,4) (8,4) (8,4)

(6,5) (6,5)

(7,7) (7,7)

cpt = 3

max = 6

(0,0)	(10,0)				
(5,1)	(5,1)				
(1,2)	(1,2)				
(9,3)	(3,3)	(3,3)	(9,3)		
(2,4)	(2,4)	(4,4)	(4,4)	(8,4)	(8,4)
(6,5)	(6,5)				
(7,7)	(7,7)				

cpt = 2

max = 6

(0,0) (10,0)

(5,1) (5,1)

(1,2) (1,2)

(9,3) (3,3) (3,3) (9,3)

(2,4) (2,4) (4,4) (4,4) (8,4) (8,4)

(6,5) (6,5)

(7,7) (7,7)

cpt = 1

max = 6

(0,0) (10,0)

(5,1) (5,1)

(1,2) (1,2)

(9,3) (3,3) (3,3) (9,3)

(2,4) (2,4) (4,4) (4,4) (8,4) (8,4)

(6,5) (6,5)

(7,7) (7,7)

cpt = 2

max = 6

(0,0) (10,0)

(5,1) (5,1)

(1,2) (1,2)

(9,3) (3,3) (3,3) (9,3)

(2,4) (2,4) (4,4) (4,4) (8,4) (8,4)

(6,5) (6,5)

(7,7) (7,7)

cpt = 1

max = 6

(0,0)	(10,0)				
(5,1)	(5,1)				
(1,2)	(1,2)				
(9,3)	(3,3)	(3,3)	(9,3)		
(2,4)	(2,4)	(4,4)	(4,4)	(8,4)	(8,4)
(6,5)	(6,5)				
(7,7)	(7,7)				

cpt = 2

max = 6

(0,0) (10,0)

(5,1) (5,1)

(1,2) (1,2)

(9,3) (3,3) (3,3) (9,3)

(2,4) (2,4) (4,4) (4,4) (8,4) (8,4)

(6,5) (6,5)

(7,7) (7,7)

cpt = 1

max = 6

(0,0)	(10,0)				
(5,1)	(5,1)				
(1,2)	(1,2)				
(9,3)	(3,3)	(3,3)	(9,3)		
(2,4)	(2,4)	(4,4)	(4,4)	(8,4)	(8,4)
(6,5)	(6,5)				
(7,7)	(7,7)				

cpt = 0

max = 6

L'algorithme n'était pas correct. Il faut tenir compte d'un dernier point !

(0,0)	(10,0)				
(5,1)	(5,1)				
(1,2)	(1,2)				
(9,3)	(3,3)	(3,3)	(9,3)		
(2,4)	(2,4)	(4,4)	(4,4)	(8,4)	(8,4)
(6,5)	(6,5)				
(7,7)	(7,7)	(7,7)			

cpt $= 1$

max $= 6$