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SAÉ 102

S1 - 2021

Comparison Report

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2 A.I code

2.1 The First

We have created a naive algorithm that places chips on the first empty location it finds.

2.2 The Second

We have created an algorithm that places the chips randomly.

2.3 The Third (3)

We developed a strategy that resulted in a series of moves to play that the computer follows to the letter. This series of moves was stored in a table, and the computer checks for each move whether the slot is empty or not. Either it can put down its chip, or it moves on to the next slot. The strategy adopted is the following: start by placing the chips in the diagonals, then from top to bottom.

2.4 The Fourth (4)

We have created an algorithm that randomly places the first three chips, and the algorithm that for each cell, if it is empty, makes the sum of the neighbors for each color and makes a subtraction of the two sums in the following way: "sumRed - sumBlue". This difference is compared with the difference of the other cells. We keep the biggest value because it is this one that can potentially make the A.I. lose. In facts, the strategy is to fill the most sensitive cells.

3 Comparison

We chose to compare the third and the fourth algorithm.

3.1 A.I(3) against the A.I(4)

The A.I(4) have a win rate of 66 % against the A.I(3) on 100 games played.

3.2 Win rate of the A.I against humans

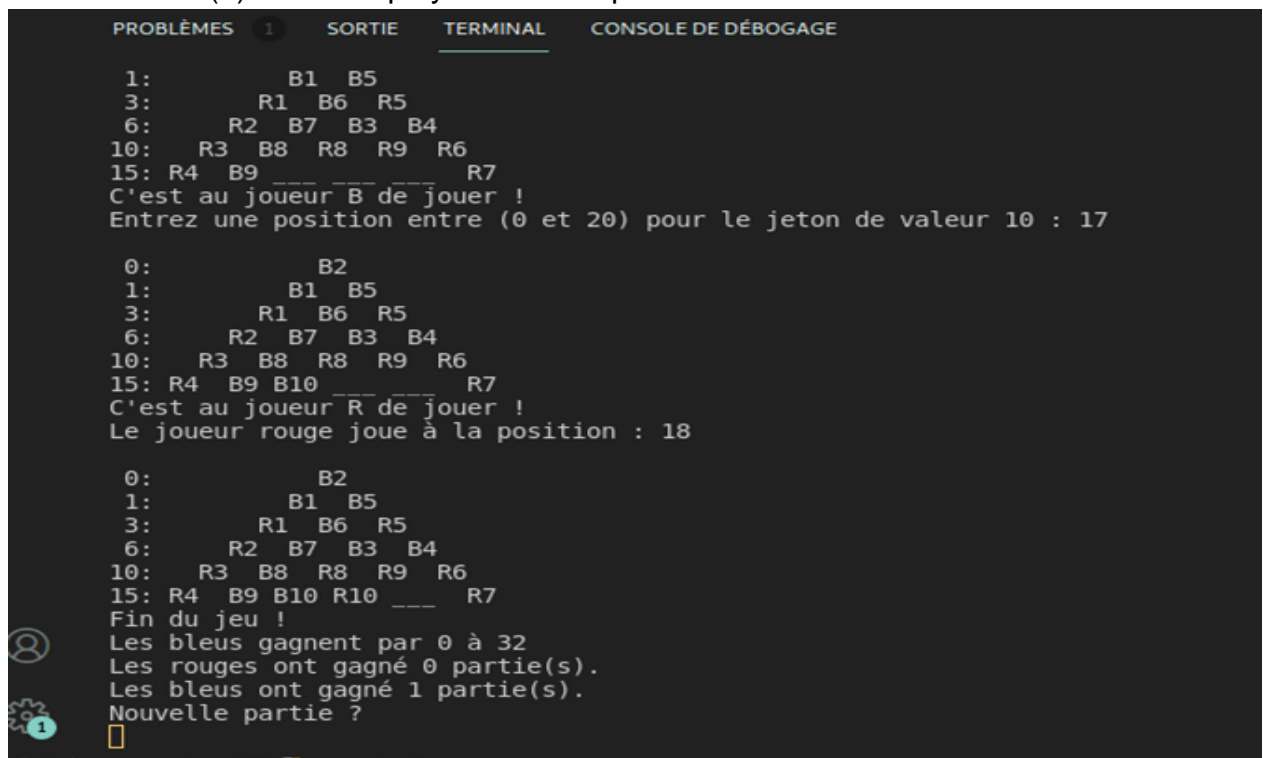
The A.I(4) have a win rate of 60 % against 40% for the A.I(3).

3.3 A.I execution time

The A.I(4) is faster in terms of execution than the third one knowing that it is the stronger of the two. approx. 10 500 nanoseconds for the A.I(3) and 9 300 nanoseconds for the A.I(4).

4 Test

The AI(3) does not play in the best place



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PROBLÈMES 1 SORTIE TERMINAL CONSOLE DE DÉBOGAGE

1:      B1  B5
3:      R1  B6  R5
6:      R2  B7  B3  B4
10:     R3  B8  R8  R9  R6
15: R4  B9  ___  ___  R7
C'est au joueur B de jouer !
Entrez une position entre (0 et 20) pour le jeton de valeur 10 : 17

0:      B2
1:      B1  B5
3:      R1  B6  R5
6:      R2  B7  B3  B4
10:     R3  B8  R8  R9  R6
15: R4  B9 B10 ___  ___  R7
C'est au joueur R de jouer !
Le joueur rouge joue à la position : 18

0:      B2
1:      B1  B5
3:      R1  B6  R5
6:      R2  B7  B3  B4
10:     R3  B8  R8  R9  R6
15: R4  B9 B10 R10 ___  R7
Fin du jeu !
Les bleus gagnent par 0 à 32
Les rouges ont gagné 0 partie(s).
Les bleus ont gagné 1 partie(s).
Nouvelle partie ?
█
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The AI(4) plays in the best place even though it loses.

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1:      B5 B4
3:      R1 ____
6:      B6 B3 ____ R9
10:     B7 B8 R4 R5 R7
15: B2 B9 R3 R2 R6 R8
C'est au joueur B de jouer !
Entrez une position entre (0 et 20) pour le jeton de valeur 10 : 4

0:      B1
1:      B5 B4
3:      R1 B10 ____
6:      B6 B3 ____ R9
10:     B7 B8 R4 R5 R7
15: B2 B9 R3 R2 R6 R8
C'est au joueur R de jouer !
Le joueur rouge joue à la position : 8

0:      B1
1:      B5 B4
3:      R1 B10 ____
6:      B6 B3 R10 ____ R9
10:     B7 B8 R4 R5 R7
15: B2 B9 R3 R2 R6 R8
Fin du jeu !
Les bleus gagnent par 14 à 19
Les rouges ont gagné 0 partie(s).
Les bleus ont gagné 1 partie(s).
Nouvelle partie ?
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5 Conclusion

We can conclude that the algorithm AI(4) we have realized is the most performant among the two most efficient ones because it is better in terms of playings and it is faster.

About the game the most efficient is the AI(4).