+ - \* /    1 UT # On suppose que les op. élémentaires prennent 1 unité de tps

=    1 UT# On suppose affectation = 1 UT

F  1 "+" et 1 "=" 2 UT

G  1 "+" et 1 "\*" et  1 "=" 3 UT

# Prendre en compte le temps passer à transmettre des résultats intermédiaires entre unités de calcul

PE1 UT # Temps de préparation des émissions de données

T/P1 UT # Temps de propagation/transmission

R1 UT # Temps de réception

A: x=1

B: y=2

C: z=F(x)

D:w=G(z)

E: result=z+w+y

Sur 1 processeur :

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | A | B | C | C | C | D | D | D | D | E | E | E |  |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |

On se demande combien de temps cela prendrait avec deux processeurs. Il faut connaître le degré de parallélisation.

Sur 2 processeurs :

Peu optimisé

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| m2 | B |  |  |  |  |  | R | D | D | D | D | PE |  |  |  |  |  |  |
|  |  |  |  |  |  | T |  |  |  |  |  |  | T |  |  |  |  |  |
| m1 | A | C | C | C | PE |  |  |  |  |  |  |  |  | R | E | E | E |  |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

Un peu mieux optimisé

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| m2 | B | PE |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | T |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| m1 | A | C | C | C | R | D | D | D | D | E | E | E |  |  |  |  |  |  |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

Sur cet exemple, on ne parvient pas à faire mieux que l’exécution sur 1 processeur. :-(

Nouvel exemple:

A: x=1

B: y=2

C: z=F(x)

D: w=G(y)

E: resultat = z+w

→ sur une seule machine: 11 UT (Unités de temps)

Sur 1 processeur :

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| m1 | A | B | C | C | C | D | D | D | D | E | E |  |  |  |  |  |  |  |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |

Sur 2 processeurs :

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| m2 | B | D | D | D | D |  | R | E | E |  |
|  |  |  |  |  |  | T |  |  |  |  |
| m1 | A | C | C | C | PE |  |  |  |  |  |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |