Homework Algorithmics

Ali ZAINOUL

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Recalls

We recall that the symbol

$$\sum_{k=0}^{n} 1 = 1 + 1 + ... + 1 = (n - 0 + 1) = (n + 1).$$

represents the sum for an index k varying from 0 to n. Same is applied here:

$$\sum_{k=1}^{n} k = 1 + 2 + ... + n.$$

1 Exercice 1: (10 points)

- We are interested here in the first three sums of powers. Find (and demonstrate) the closest form for the three sums of powers below:

$$S_n := \sum_{k=1}^{n} k$$

(1.5 pts)

$$T_n := \sum_{k=1}^{n} k^2$$

(1.5 pts)

$$U_n := \sum_{k=1}^{n} k^3$$

(1.5 pts)

- Write six algorithms according to the naïve method of calculating the sums and their closest forms. **(0.75 x 6 pts)**

- Comment your results. **(1 pt)**

2 Exercice 2: (10 points)

Write an algorithm using the **elif** statement in order to recognize the "generation" of a person based on their age. The figure below show, in terms of born year, the difference between the six generations.
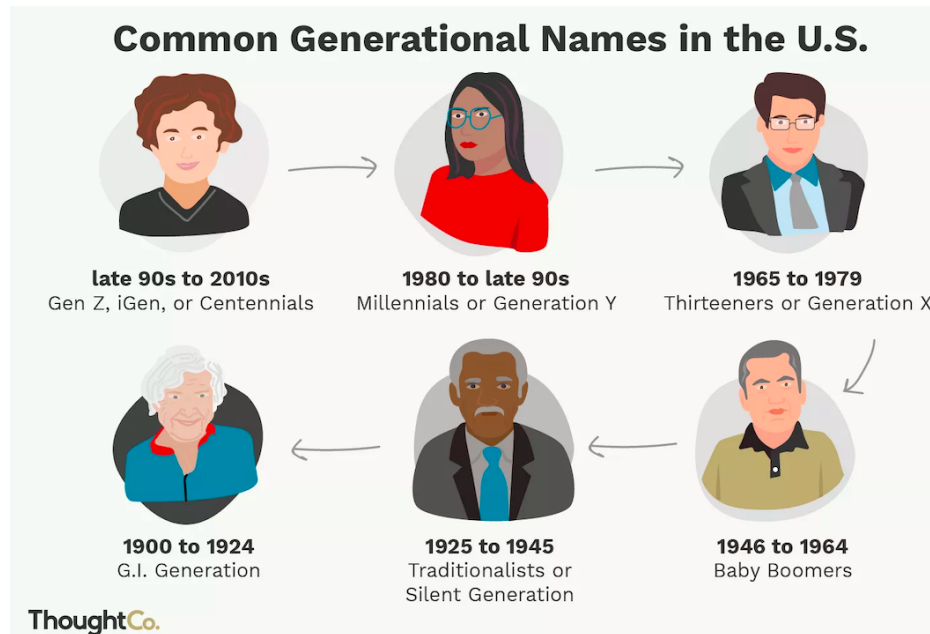

Figure 1: CGN

Template Algorithm

Algorithm my_algorithm_name
Begin
Inputs (if any): type_1 my_input_name_1 ... type_n my_input_name_n
Body: Core_statements_of_my_algorithm
Outputs (if any): **return** type_1 my_output_name_1 ... type_n my_output_name_n
End

Good luck! Aaand happy new year 2023 ♥