ESTRUCTURA DE DATOS 1
Código ST0245

Laboratory practice No. 1: Recursion

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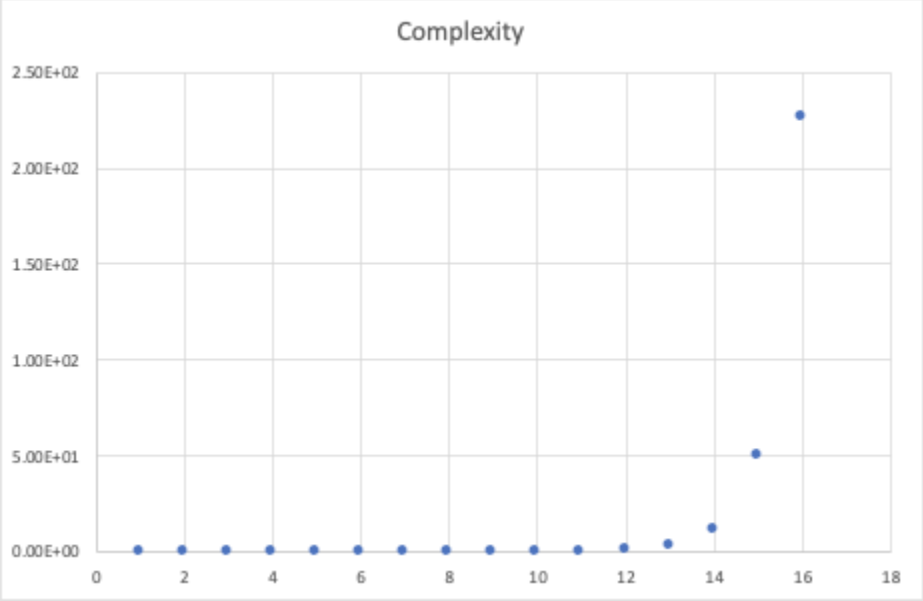
3) Practice for final project defense presentation

3.1 T(n, m) = T(n-1, m) + T(n, m-1) + T(n-1, m-1) + c
3.2 We plotted 16 points because the 16th took 5 minutes to run, but from the graph we can see that the complexity of the algorithm is exponential.



3.3 No, because the number of instructions for 3000 characters would be
123023192216111717693155881327675251464071389573683371576611802916005880061467294877536006783859345958242964925405180490851288418089823682358508248206534833123495935035584501741302332011136066692262472823975688041643447831569367501341309075720869037679329665881066294182449348845172650530371291600534674790862370267348091935393681310573662040235274477690384047788365110032240930198348836380293054048248790976348409825394072868513204440886373475427121259247177864394948668851172105156197043278074745482377680846418069710308386181218434856552274019579668262220551184551208055201031005021230231922161117176931558813276752514640713895736833715766118029160058800614672948775360067838593459582429649254051804908512884180898236823585082482065348331234959350355845017413023320111360666922624728239756880416434478315693675013413090757208690376793296658810662941824493488451726505303712916005346747908623702673480919353936813105736620402352744776903840477883651100322409301983488363802930540482487909763484098253940728685132044408863734754271212592471778643949486688511721051561970432780747454823776808464180697103083861812184348565522740195796682622205511845512080552010310050212

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558015893496459280011337454742207150136834139075427790637598338761013542351842450966700421607206294115815023712480084304471848420986103205804179922066622473287221220885136436839076703602091626536706411309369970021705006755013747239987660058275793007232534748906122501351718891748990799112915123997738721785190182299893 76, so with 300000 characters it would be even higher, which would take the computer a very long time.

3.4 GruopSum5 algorithm works similar to GroupSum that works by taking an object or not taking an object and checking at the end if they sum the amount with the added condition checking if the item is a multiple of 5 if so, we don't take the item and we also check if the next item is a multiple of 1 if so, we don't take the item.

3.5/3.6 Recursion 1:

Fibonacci: T(n) = T(n-1) + T(n-2) + c; $O(2^n)$; n= number
SumDigits: T(n) = T(n/10) + c; $O(\log_{10}(n))$; n= number
CountX: T(n) = n + T(n-1) + c; $O(n^2)$; n = size of string
CountHi: T(n) = n + T(n-2) + c; $O(n^{2)}$; n = size of string
Count11: T(n) = n + T(n-2) + c; $O(n^2)$; n = size of string

Recursion 2:

GroupNoAdj: T(n) = T(n-1) +T(n-1) + c; $O(2^n)$; n = size of array
GroupSum5: T(n) = T(n-1) +T(n-1) + c; $O(2^n)$; n = size of array
GroumSumClump: T(n) = T(n-1) +T(n-1) + c; $O(2^n)$; n = size of array
SplitArray: T(n) = T(n-1) +T(n-1) + c; $O(2^n)$; n = size of array
SplitOdd10: T(n) = T(n-1) +T(n-1) + c; $O(2^n)$; n = size of array

4) Practice for midterms

4.1

1. a
2. c
3. a

4.2

1. floodFillUtil(screen, x+1, y+1, prevC, newC, N, M)
floodFillUtil(screen, x+1, y-1, prevC, newC, N, M)
2. floodFillUtil(screen, x-1, y+1, prevC, newC, N, M)
floodFillUtil(screen, x-1, y-1, prevC, newC, N, M)
3. T(p) = p

4.3 B
4.4 lucas(n-1) + lucas(n-2)
4.4.1 c
4.5

1. A
2. b

4.6 a
4.7

1. sumaAux(n, i+2)
2. sumaAux(n, i+)

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4.8

```
if(T<0) return 0
if(T==0) return 1
return f1 + f2 + f3
```

4.8.1 The b is the closest, but the answer should be T(n) = T(n-3) + T(n-5) + T(n-7) + C

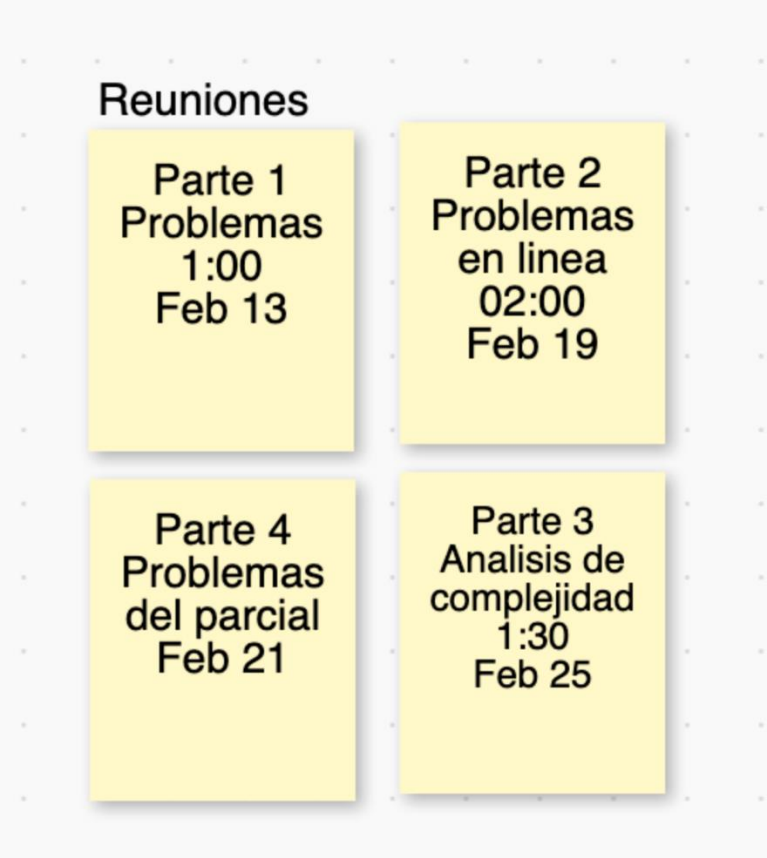
4.9 B

4.10 lucas(n-1) + lucas(n-2)

4.10.1 c

5) Teamwork and gradual progress (optional)

6.1 Meeting minutes



6.2 History of changes to the code:
https://github.com/McEwenAle/ST0245-001/blame/master/laboratorios/lab01/codigo/Rectangles.py
https://github.com/McEwenAle/ST0245-001/blame/master/laboratorios/lab01/codigo/LongestCommonSubstring.py

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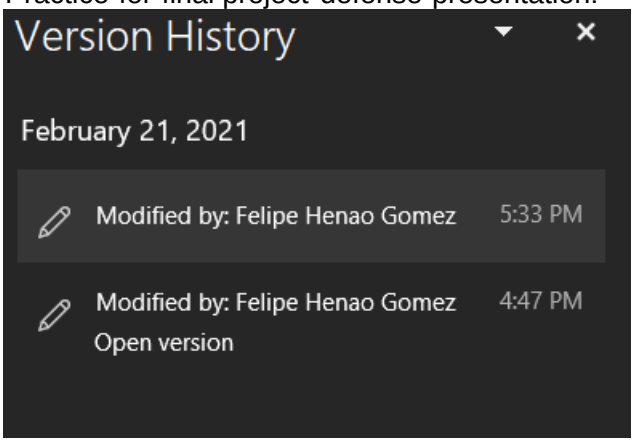
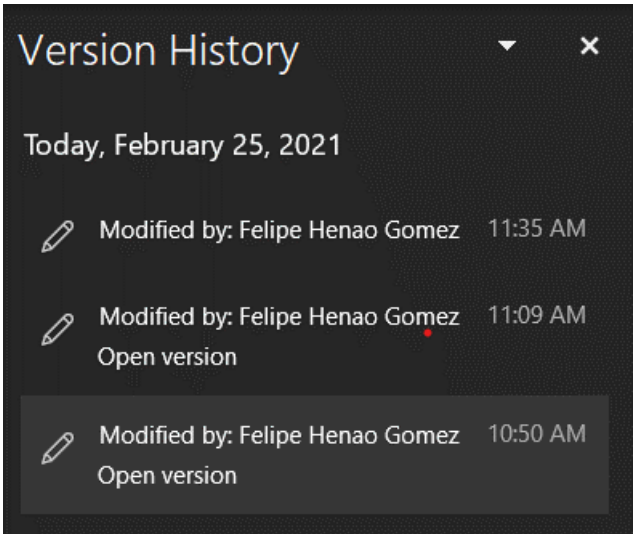
https://github.com/McEwenAle/ST0245-001/blame/master/laboratorios/lab01/ejercicioEnLinea/Recursion1.java
https://github.com/McEwenAle/ST0245-001/blob/master/laboratorios/lab01/ejercicioEnLinea/Recursion2.java
https://github.com/McEwenAle/ST0245-001/blame/master/laboratorios/lab01/ejercicioEnLinea/Recursion2.java

6.3 History of changes of the report

Practice for final project defense presentation:



Practice for midterms:



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