Laboratory practice No. 3: Linked list and dynamic vectors.

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3) Practice for final project defense presentation

3.1 Complexity of the algorithms

1. Medellin map

First of all, in this exercise, we had to clean up the database because the data format was latin-1 and it was presenting many problems when we were reading the data, so we actualice the data format to UTF-8 (a csv file) which helps to read the data easily because it is the codification format that actually Python3 works with.

Worst Case:

$$T(n,\ m) \ = C \ + \ C_8 * n \ + C_{10} * m$$

$$T(n,\ m) \ = \ C_8 * n + C_{10} * m \qquad \rightarrow \ Sum\ law\ and\ common\ factor$$

$$T(n,\ m) \ = \ n \ + \ m\underline{\hspace{6cm}} \qquad \rightarrow \ Product\ law$$

$$O(n,\ m) \ \ where\ n\ is\ the\ number\ of\ vertices\ and\ m\ is\ the\ number\ of\ arcos.$$

2. Student notes

$$C_1 = 1$$
$$C_2 = 1$$
$$C_3 = 1$$
$$C_4 = 1$$
$$C_5 = 1$$
$$C_6 = 1$$
$$C_7 = 1$$
$$C_8 = 1$$
$$C_9 = 1$$
$$C_{10} = 1$$
$$C_{11} = 1$$
$$C_{12} = 1$$

Worst Case:

$T(n) = C_1 + C_2 + C_3 + C_{3.0} * n + C_4 + C_5 + C_6 + C_{6.0} * n + C_7 + C_8 + C_9 + C_{10} + C_{11} + C_{12}$

$T(n) = (C_{3.0} + C_{6.0}) * n \quad \rightarrow \text{Sum law and common factor}$

$T(n) = n \quad \rightarrow \text{Product law}$

$O(n)$ *where n is the csv length*

3. Pivote

Worst Case:

$T(n) = C + C_5 * n + C_7 * (n - 1)$

$T(n) = C_5 * n + C_7 * (n - 1) \quad \rightarrow \text{Sum law}$

$T(n) = n + (n - 1) \quad \rightarrow \text{Product law}$

$T(n) = n \quad \rightarrow \text{Sum law}$

$O(n)$ *where n is the array's length*

4. Store of fridges

Worst Case:

$T(n, m) = C + C_{7.1} * n + C_{8.1} * m + C_{9.1} * m + C_{9.3} * m * n + C_{10.3} * m + C_{10.6} * m * n$

$T(n) = C_{7.1} * n + (C_{8.1} + C_{9.1} + C_{10.3}) * m + (C_{9.3} + C_{10.6}) * m * n \quad \rightarrow \text{Sum law and common f}$

$T(n) = n + m + n * m \quad \rightarrow \text{Product law}$

$T(n) = n * m \quad \rightarrow \text{Sum law}$

$O(n * m)$ *where m is the queue`s length with the number of requests and n is the stack's length with the number of refrigerators.*

5. DoublyLinkedList

Complexity of get an element:

$T(n) = C + C_{0.4} * n + C_{0.5} * n$

$T(n) = (C_{0.4} + C_{0.5}) * n \quad \rightarrow \text{Sum law and common factor}$

$T(n) = n \quad \rightarrow \text{Product law}$

$O(n)$ *where n is the linked list length*

Complexity of add data in a index:

$T(n) = C + C_{2.5} * n + C_{2.12} * n$

$T(n) \ = \ (C_{2.5} + C_{2.12}) * n \qquad \rightarrow \ Sum\ law\ and\ common\ factor$

$T(n) \ = \ n\underline{\hspace{5cm}} \ \rightarrow \ Product\ law$

$O(n) \ \ where\ n\ is\ the\ linked\ list\ length$

Complexity of search an element:

$T(n) \ = \ C \ + \ C_6 * n$

$T(n) \ = \ C_6 * n \qquad \rightarrow \ Sum\ law$

$T(n) \ = \ n\underline{\hspace{5cm}} \ \rightarrow \ Product\ law$

$O(n) \ \ where\ n\ is\ the\ linked\ list\ length$

Complexity of delete an element:

$T(n) \ = \ C \ + \ C_{3.13} * n + C_{3.20} * n \ + \ C_{3.26} * n$

$T(n) \ = \ (C_{3.13} + C_{3.20} + C_{3.26}) * n \qquad \rightarrow \ Sum\ law\ and\ common\ factor$

$T(n) \ = \ n\underline{\hspace{5cm}} \qquad \rightarrow \ Product\ law$

$O(n) \ \ where\ n\ is\ the\ linked\ list\ length$

6. Attention in a cashier

Worst Case:

$T(n,\ m) \ = \ C \ + \ n \ + \ m$

$T(n, m) \ = \ n + m \qquad \rightarrow \ Sum\ law$

$O(p) \ \ where\ p\ is\ n\ +\ m\ ,\ m\ \ is\ the\ queue's\ length\ and\ n\ is\ the\ most\ large\ file`s\ length$

3.2 Broken keyboard

To develop this exercise we implement a deque to store the characters of the string that we will return at the end. To store them we go through the string that is given to us and evaluate some cases. In the first place we evaluate if the character in a certain position is not the strat key or end key and we add it to an auxiliary string. In the second place, we evaluate if the character is the start key and then if the acc variable (which indicates to us if we should add at the start or the end of the deque) is 0 we append the auxiliary string at the end, if not at the start and change it to 1. In the third place, we evaluate if the character is the end key and then if the acc variable is 1 we insert the auxiliary string at the start of the deque, if not we insert it at the end and change acc to be 0. In the end, we fill a string with the characters in the deque and we return it as they ask in the exercise.

3.3 1. Broken keyboard

Worst Case:

$$T(n) \ = \ C \ + \ C_{23} * m \ \ + \ C_{3.0} * n$$

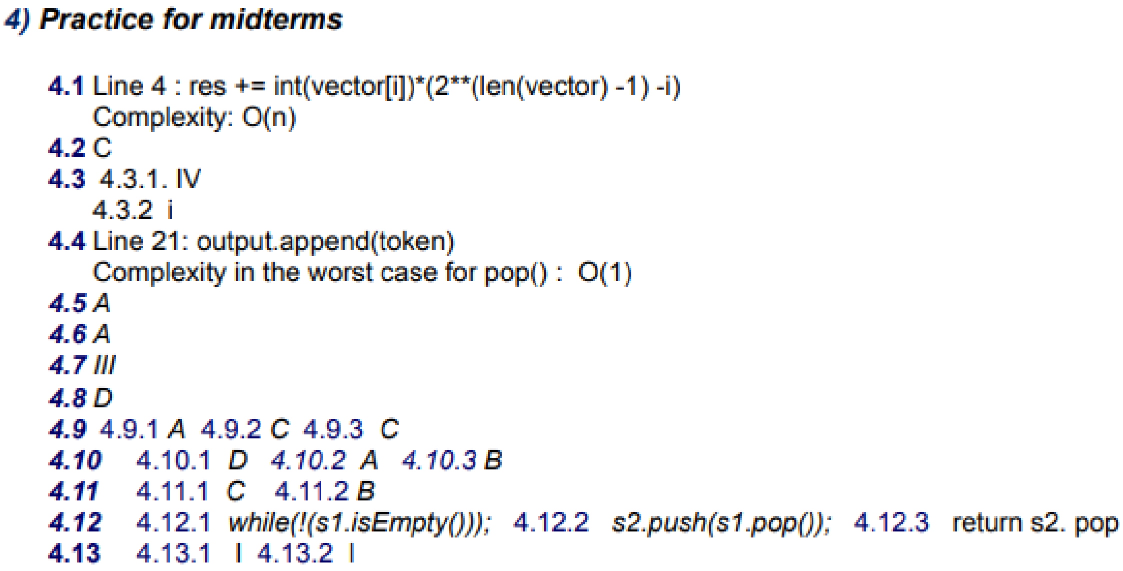
$$T(n) \ = C_{23} * m \ \ + C_{3.0} * n \qquad \rightarrow Sum\ law, \ \ where\ n \ = \ m$$

$$\rightarrow \ n \ = \ m\ because\ the\ string's\ length\ will\ be\ as\ long\ as\ the\ LinkedList's\ length$$

$$T(n) \ = \ (C_{23} \ + \ C_{3.0}) \ * \ n\underline{\qquad\qquad} \qquad \rightarrow Common\ factor\ law$$

$$T(n) \ = \ n \qquad \rightarrow Product\ law$$

$$O(n) \ \ where\ n\ is\ the\ string\acute{}s\ length\ and\ m\ is\ the\ List\acute{}s\ length$$

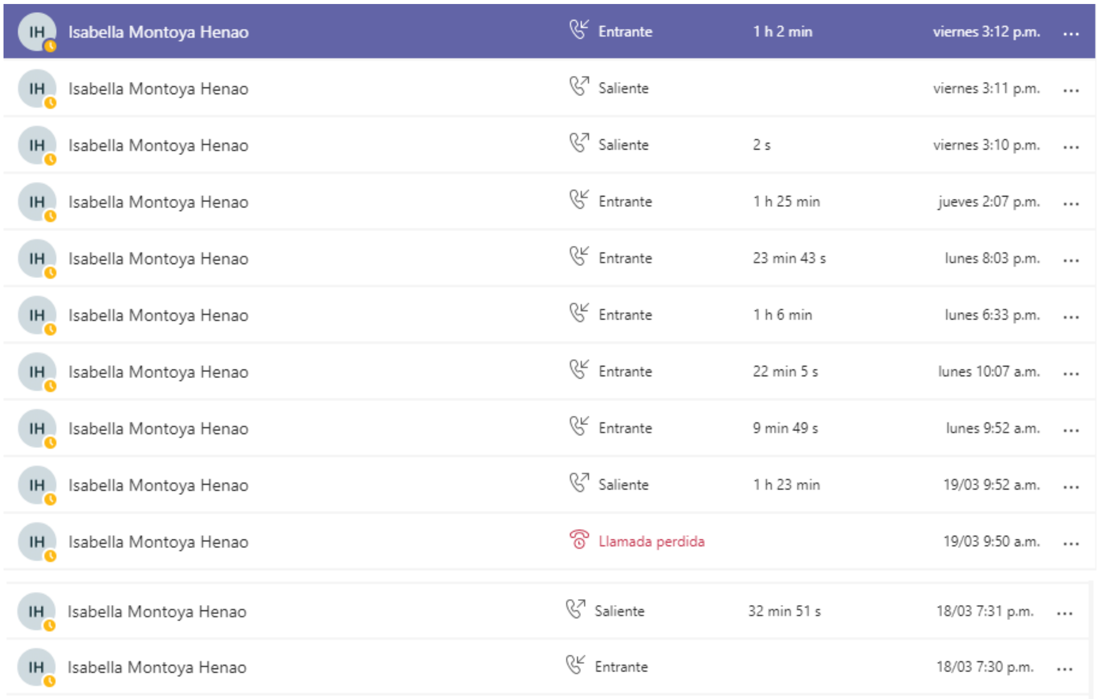


4) Practice for midterms

4.1 Line 4 : res += int(vector[i])*(2**(len(vector) -1) -i)
Complexity: O(n)
4.2 C
4.3 4.3.1. IV
4.3.2 i
4.4 Line 21: output.append(token)
Complexity in the worst case for pop() : O(1)
4.5 *A*
4.6 *A*
4.7 *III*
4.8 *D*
4.9 4.9.1 *A* 4.9.2 *C* 4.9.3 *C*
4.10 4.10.1 *D* *4.10.2* *A* *4.10.3* *B*
4.11 4.11.1 *C* 4.11.2 *B*
4.12 4.12.1 *while(!(s1.isEmpty()));* 4.12.2 *s2.push(s1.pop());* 4.12.3 return s2. pop
4.13 4.13.1 I 4.13.2 I

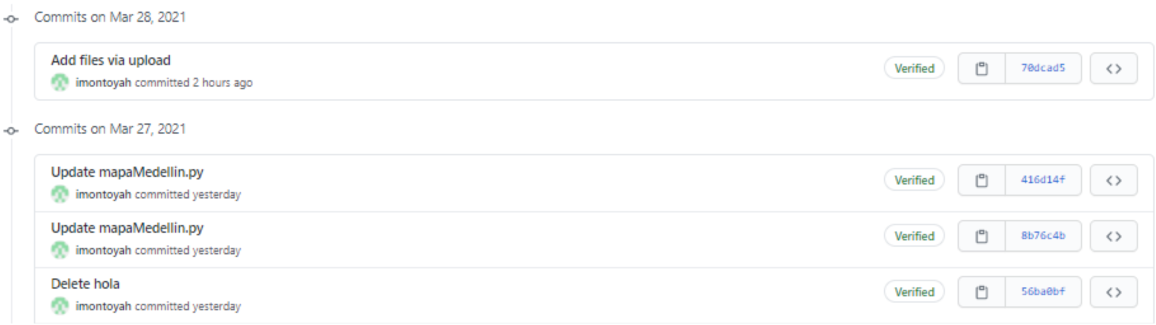
6) Teamwork and gradual progress (optional)

6.1 Meeting minutes



IH	Isabella Montoya Henao	Entrante	1 h 2 min	viernes 3:12 p.m.
IH	Isabella Montoya Henao	Saliente		viernes 3:11 p.m.
IH	Isabella Montoya Henao	Saliente	2 s	viernes 3:10 p.m.
IH	Isabella Montoya Henao	Entrante	1 h 25 min	jueves 2:07 p.m.
IH	Isabella Montoya Henao	Entrante	23 min 43 s	lunes 8:03 p.m.
IH	Isabella Montoya Henao	Entrante	1 h 6 min	lunes 6:33 p.m.
IH	Isabella Montoya Henao	Entrante	22 min 5 s	lunes 10:07 a.m.
IH	Isabella Montoya Henao	Entrante	9 min 49 s	lunes 9:52 a.m.
IH	Isabella Montoya Henao	Saliente	1 h 23 min	19/03 9:52 a.m.
IH	Isabella Montoya Henao	Llamada perdida		19/03 9:50 a.m.
IH	Isabella Montoya Henao	Saliente	32 min 51 s	18/03 7:31 p.m.
IH	Isabella Montoya Henao	Entrante		18/03 7:30 p.m.

6.2 History of changes of the code



Commits on Mar 28, 2021

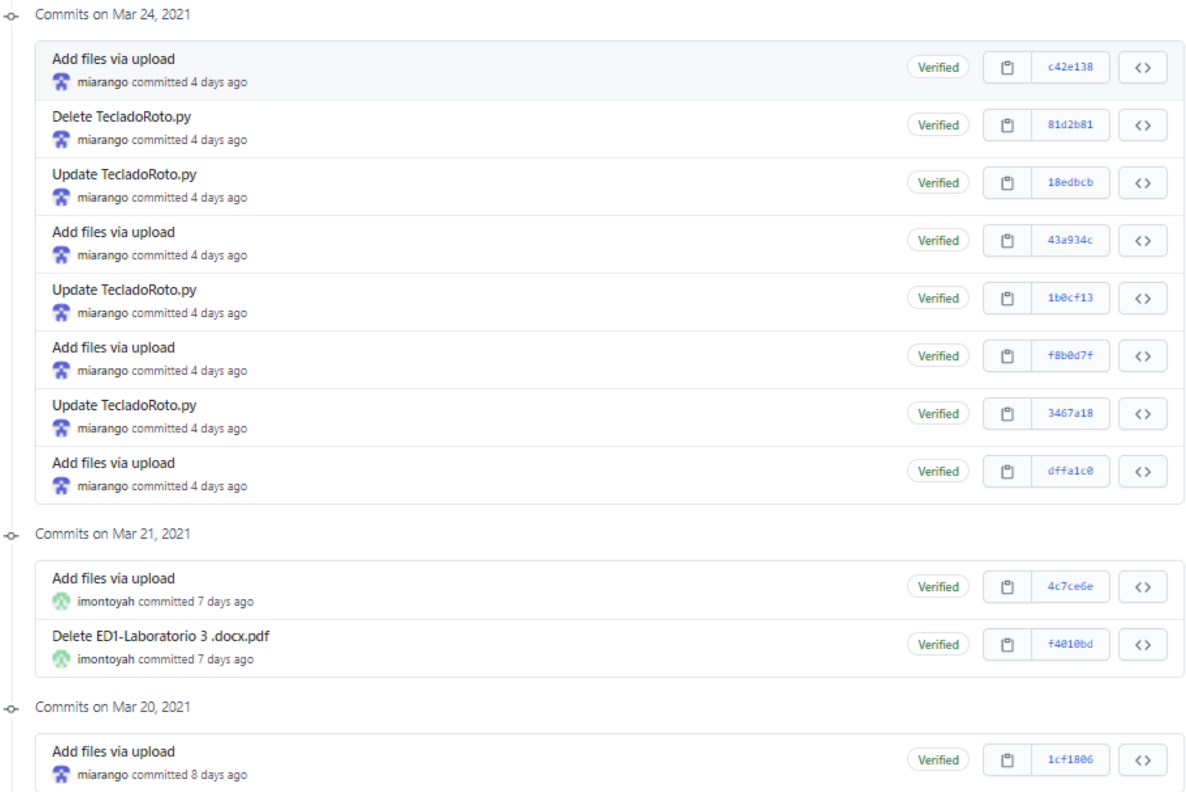
Add files via upload
imontoyah committed 2 hours ago — Verified — 70dcad5

Commits on Mar 27, 2021

Update mapaMedellin.py
imontoyah committed yesterday — Verified — 416d14f

Update mapaMedellin.py
imontoyah committed yesterday — Verified — 8b76c4b

Delete hola
imontoyah committed yesterday — Verified — 56ba0bf



Commits on Mar 24, 2021

Add files via upload
miarango committed 4 days ago — Verified — c42e138

Delete TecladoRoto.py
miarango committed 4 days ago — Verified — 81d2b81

Update TecladoRoto.py
miarango committed 4 days ago — Verified — 18edbcb

Add files via upload
miarango committed 4 days ago — Verified — 43a934c

Update TecladoRoto.py
miarango committed 4 days ago — Verified — 1b0cf13

Add files via upload
miarango committed 4 days ago — Verified — f8b0d7f

Update TecladoRoto.py
miarango committed 4 days ago — Verified — 3467a18

Add files via upload
miarango committed 4 days ago — Verified — dffa1c0

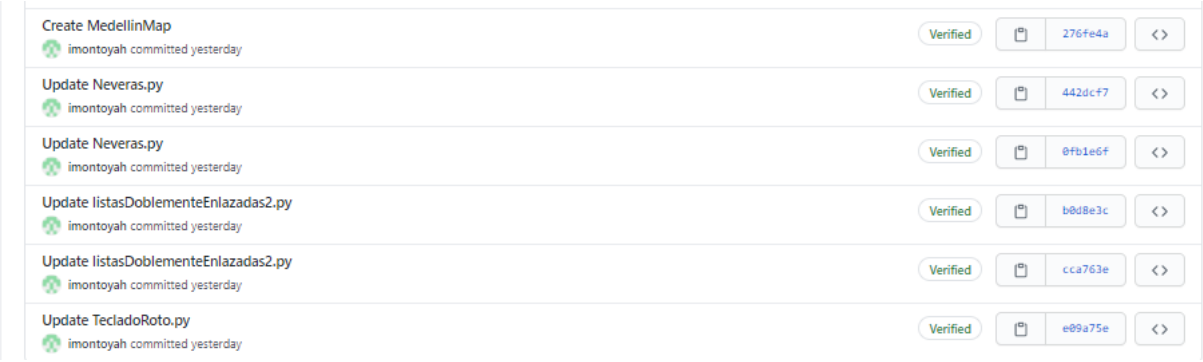
Commits on Mar 21, 2021

Add files via upload
imontoyah committed 7 days ago — Verified — 4c7ce6e

Delete ED1-Laboratorio 3 .docx.pdf
imontoyah committed 7 days ago — Verified — f4010bd

Commits on Mar 20, 2021

Add files via upload
miarango committed 8 days ago — Verified — 1cf1806



Create MedellinMap
imontoyah committed yesterday — Verified — 276fe4a

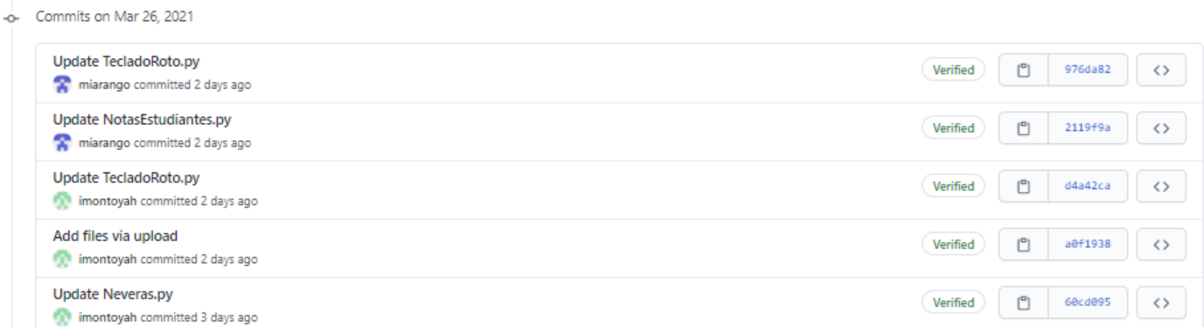
Update Neveras.py
imontoyah committed yesterday — Verified — 442dcf7

Update Neveras.py
imontoyah committed yesterday — Verified — 0fb1e6f

Update listasDoblementeEnlazadas2.py
imontoyah committed yesterday — Verified — b0d8e3c

Update listasDoblementeEnlazadas2.py
imontoyah committed yesterday — Verified — cca763e

Update TecladoRoto.py
imontoyah committed yesterday — Verified — e09a75e



Commits on Mar 26, 2021

Update TecladoRoto.py
miarango committed 2 days ago — Verified — 976da82

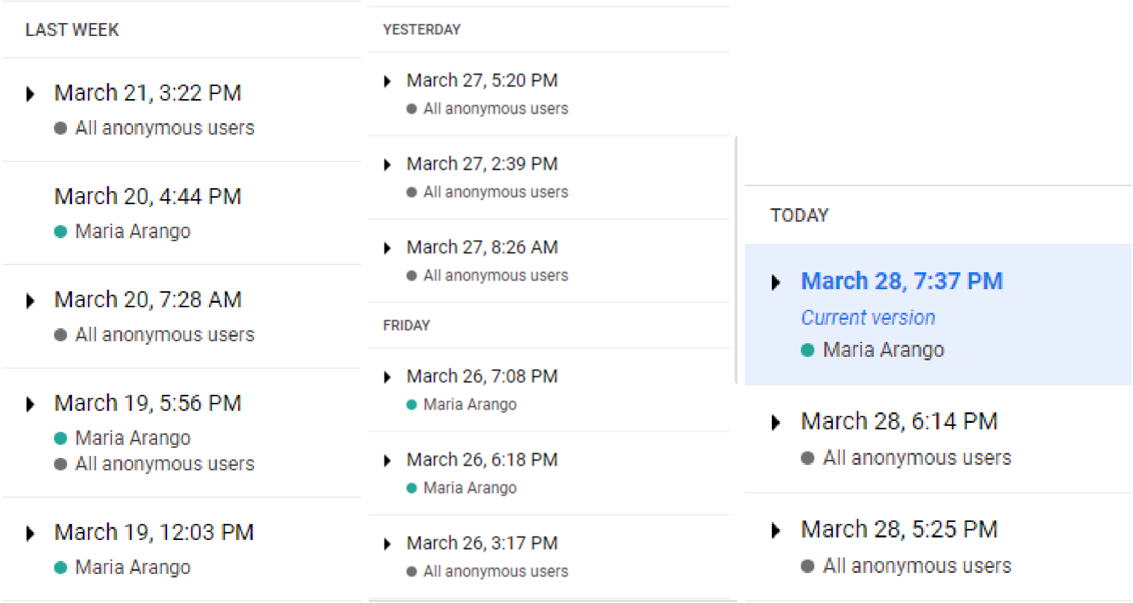
Update NotasEstudiantes.py
miarango committed 2 days ago — Verified — 2119f9a

Update TecladoRoto.py
imontoyah committed 2 days ago — Verified — d4a42ca

Add files via upload
imontoyah committed 2 days ago — Verified — a0f1938

Update Neveras.py
imontoyah committed 3 days ago — Verified — 60cd095

6.3 History of changes of the report



LAST WEEK

- March 21, 3:22 PM
  ● All anonymous users
- March 20, 4:44 PM
  ● Maria Arango
- March 20, 7:28 AM
  ● All anonymous users
- March 19, 5:56 PM
  ● Maria Arango
  ● All anonymous users
- March 19, 12:03 PM
  ● Maria Arango

YESTERDAY

- March 27, 5:20 PM
  ● All anonymous users
- March 27, 2:39 PM
  ● All anonymous users
- March 27, 8:26 AM
  ● All anonymous users

FRIDAY

- March 26, 7:08 PM
  ● Maria Arango
- March 26, 6:18 PM
  ● Maria Arango
- March 26, 3:17 PM
  ● All anonymous users

TODAY

- March 28, 7:37 PM
  Current version
  ● Maria Arango
- March 28, 6:14 PM
  ● All anonymous users
- March 28, 5:25 PM
  ● All anonymous users