

THE STACK, THE HEAP AND ARRAYS. POINTERS?

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Recomendaciones para Clases virtuales

Concentración

Atención es muy importante

Comodidad

Estar muy cómodos **NO**, lo necesario.

¿Quiénes somos?

A pesar de la distancia, todavía somos personas. No existe manera adecuada de decirlo, pero **POR FAVOR PRENDAN LA CÁMARA**

Ambientación

Iluminación y sonido adecuados. Evitar el celular y las distracciones innecesarias

Disfrutar

Aprender puede ser frustrante, más si estamos solos. Pero la verdad no estamos solos. Si es necesario, interrumpan y volvemos a comenzar.

An array: Characters and Strings

Source Code 1: Header and main

```
1 #include <iostream>
2 #include <string>
3
4 using namespace std;
5
6 int main(void) {
7     // What about text?
8     char BUFFER1[16];
9     string BUFFER2;
10    cout<<"Capture line (1) -> "; cin.getline(BUFFER1,16);
11    cout<<"Capture line (2) -> "; getline(cin,BUFFER2);
12    cout<<"Captured
    ↳ lines:\n\t"<<BUFFER1<<"\n\t"<<BUFFER2<<endl;
13
14    cout<<"Is there another way for BUFFER1? ";cin>>BUFFER1;
15    cout<<"Is there another way for BUFFER2? ";cin>>BUFFER2;
16    cout<<"Newly captured
    ↳ lines:\n\t"<<BUFFER1<<"\n\t"<<BUFFER2<<endl;
17
18    return 0;
19 }
```

Notice

1. `#include <string>`
2. `char BUFFER1[16];`
3. `getline(cin,BUFFER2);`
4. C-Style `cin.getline(BUFFER1,16);`
5. Check the `mydefs.h!`

Problem

1. Limited number of Characters
2. How does it do it? Is there a limit?
STREAMS

What is the Stack? The Heap? Static vs Dynamic Allocation

Static allocation in the stack. Is there a limit? YES

Source Code 2: `std::cout`, `printf`, `std::cin`, & `std::getline` ?

```
1  #include <iostream>
2  #include <fstream>
3  using namespace std;
4
5  namespace fisi2028{
6      // would this work?
7      void mean(double x_el[1000]){ }
8  }
9  int main(void) {
10     // Review the averages problem
11     double x_el[1000];
12     double y_el[1000];
13     /*
14      Read the 1k lines of file input.txt
15      and store them in 'x_el' and 'y_el'
16     */
17     return 0;
18 }
```

Notice

1. Create function `mean`
2. Create function `variance`

Problem

1. Imagine we have 1001 items...
2. What if we have 10^6 ?

Dynamic memory allocation & Pointers

Source Code 3: `std::cout`, `std::cerr`, `std::cin`, & `std::getline` ?

```
1  #include <iostream>
2  #include <fstream>
3  using namespace std;
4
5  namespace fisi2028{
6      void mean(double *x_el){ }
7  }
8  int main(void){
9      // Review the averages problem
10     double *x_el;
11     double *y_el;
12     int n_el=0;
13     cout<<"Num of elements? "; cin>>n_el;
14     x_el = new double[n_el];
15     y_el = new double[n_el];
16     delete [] x_el;
17     x_el = nullptr; // Forma segura de borrar rastro!
18     ↪ (hackers)
19     delete [] y_el;
20     y_el = nullptr;
21     return 0;
22 }
```

Notice

1. `double *x_el;`
2. `new double[n_el];`
3. `delete [] x_el;`
4. What happens to memory?

Problem

1. What happens to memory?
2. Always delete before ending (memory management)
3. Segmentation fault

Recurssion and Fibonacci

Exercises

1. Dog hotel problem!
2. Operate with pointers
3. Create matrix?