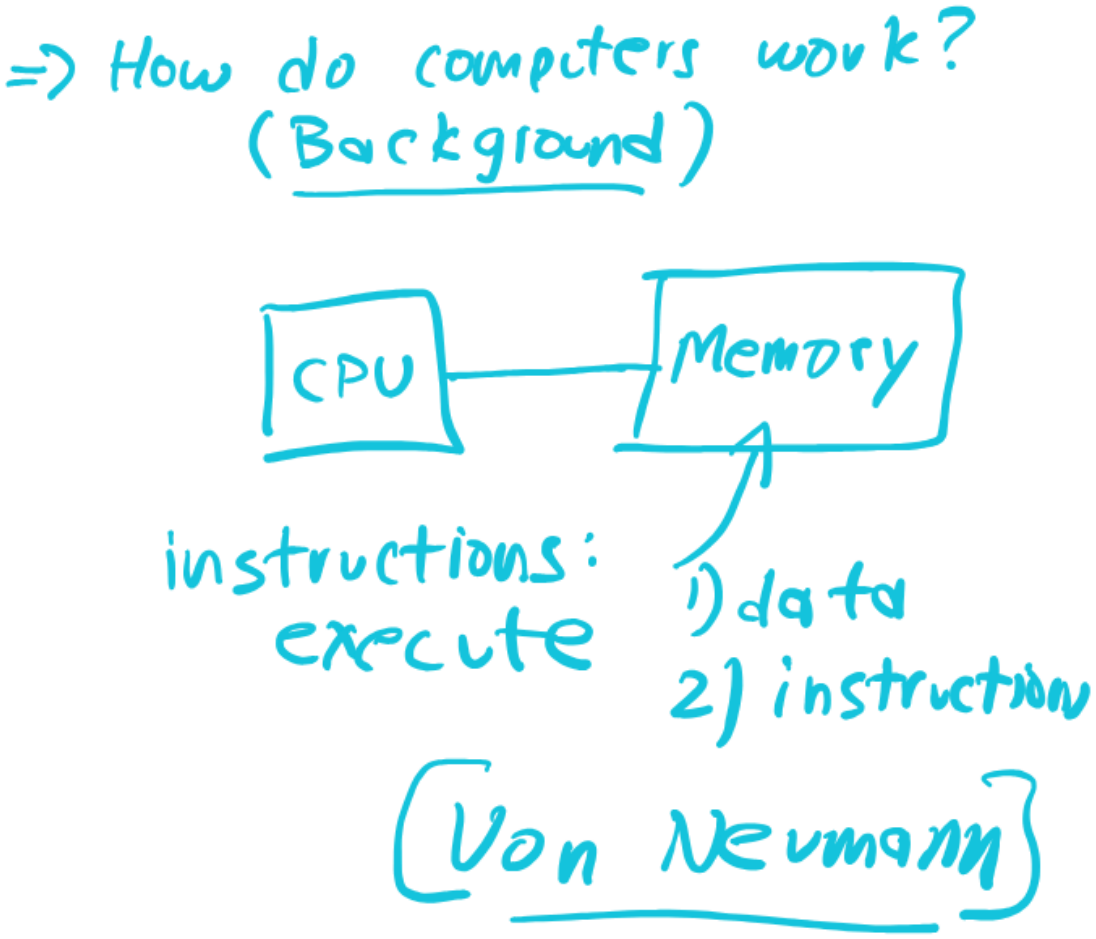
Today

1. How do computers work?
2. What is an OS?
3. How does this class work?
4. Final words

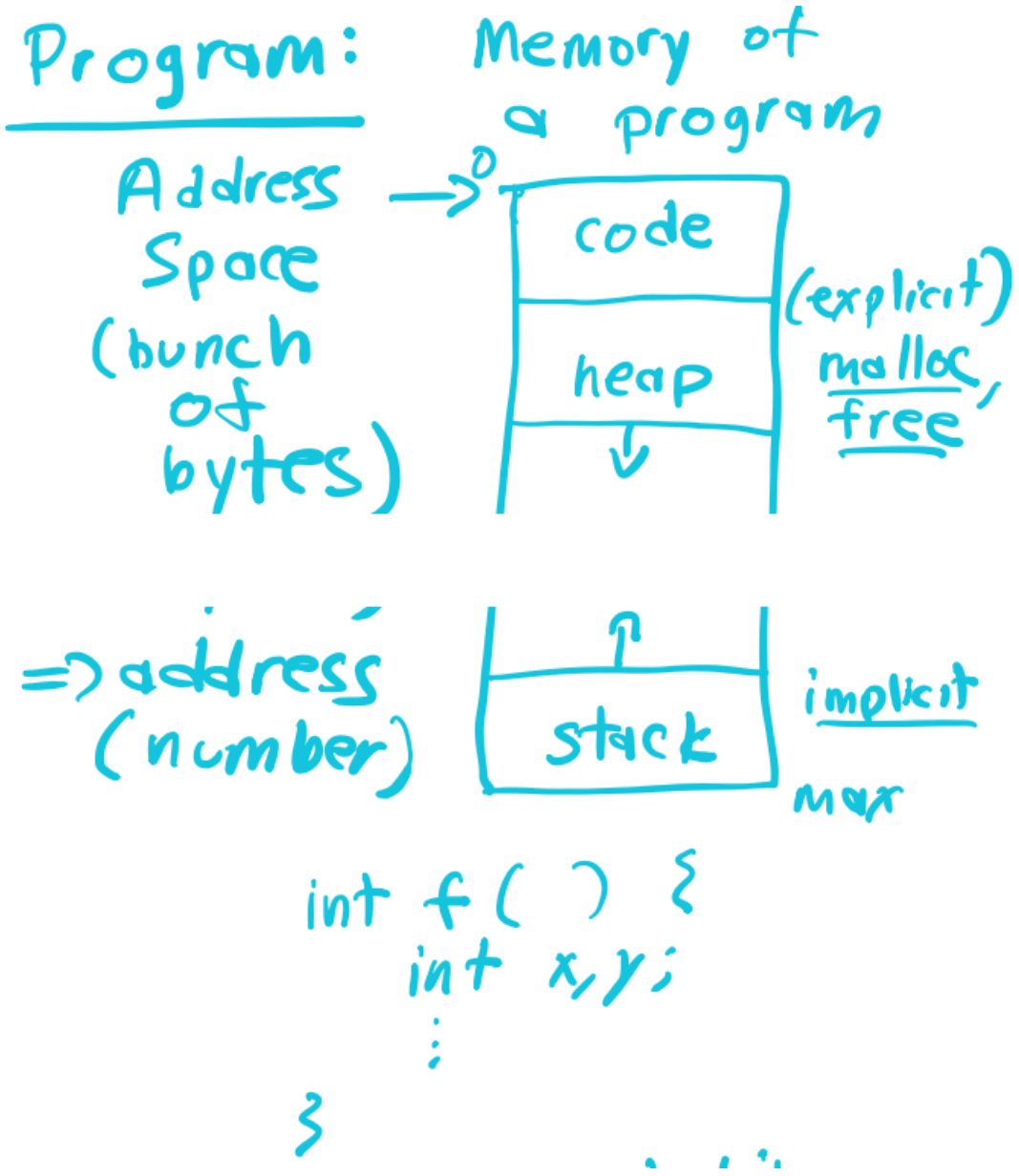
How do computers work?

How do programs run?
CPU => Central Processing Unit, that's where all interesting stuff happens, instructions are executed.
Inside the memory there is Data that we are gonna operate on and Instruction. the cpu takes instructions out of the memory and it figures out what to do and they operate on data, update the data etc…..
Some instructions on data like Read and write, Loading and storing, branching etc….



modern processors execute like billions of instructions in just seconds

let's think now from program prospective
program have a structured view of memory
When the program runs, it has data and memory that you can access and we call that it,s address space.
But what is an address space ?
it’s just a bunch of bites and we address it by number just like for example when you’re referring to a byte you just refer it by it`s address which is just a number.
modern address spaces are very big, we have 32 bit address spaces more modern systems 64 bit address spaces
There are a few things in this address space like the code and the data.
and the data is structured in different ways.
the heap and the stack are dynamically sized , they change as we go.
for example, the heap in c program, dynamic memory allocation which is done by calling malloc and free they allow us to get some space in heap and sometimes heap has to grow to accommodate that space.
We put in the heap all the DS you want.
heap is explicit.
stack allocation is a bit different.
stack is implicit because thing get allocated on the stack when we call a function.
when we return from that function all the things are automatically deallocated so thats why it’s implicit.
some people call it it’s automatic memory bec it,s automatically allocate and deallocate as we go .
thats,s how a program runs.



a more realistic model, We have CPU,memory and we have also other devices in the system like disk.
A disk is often represented by a cylinder when it's a hard drive.
modern systems have different types of disks which are just persistent memory devices.
sometimes people call the disk (non volatile)
memory is volatile
memory tends to be made by technology called DRAM
a disk can be many different things like a hard drive, SSD.
hard drive is the cheapest way to store bytes presently.