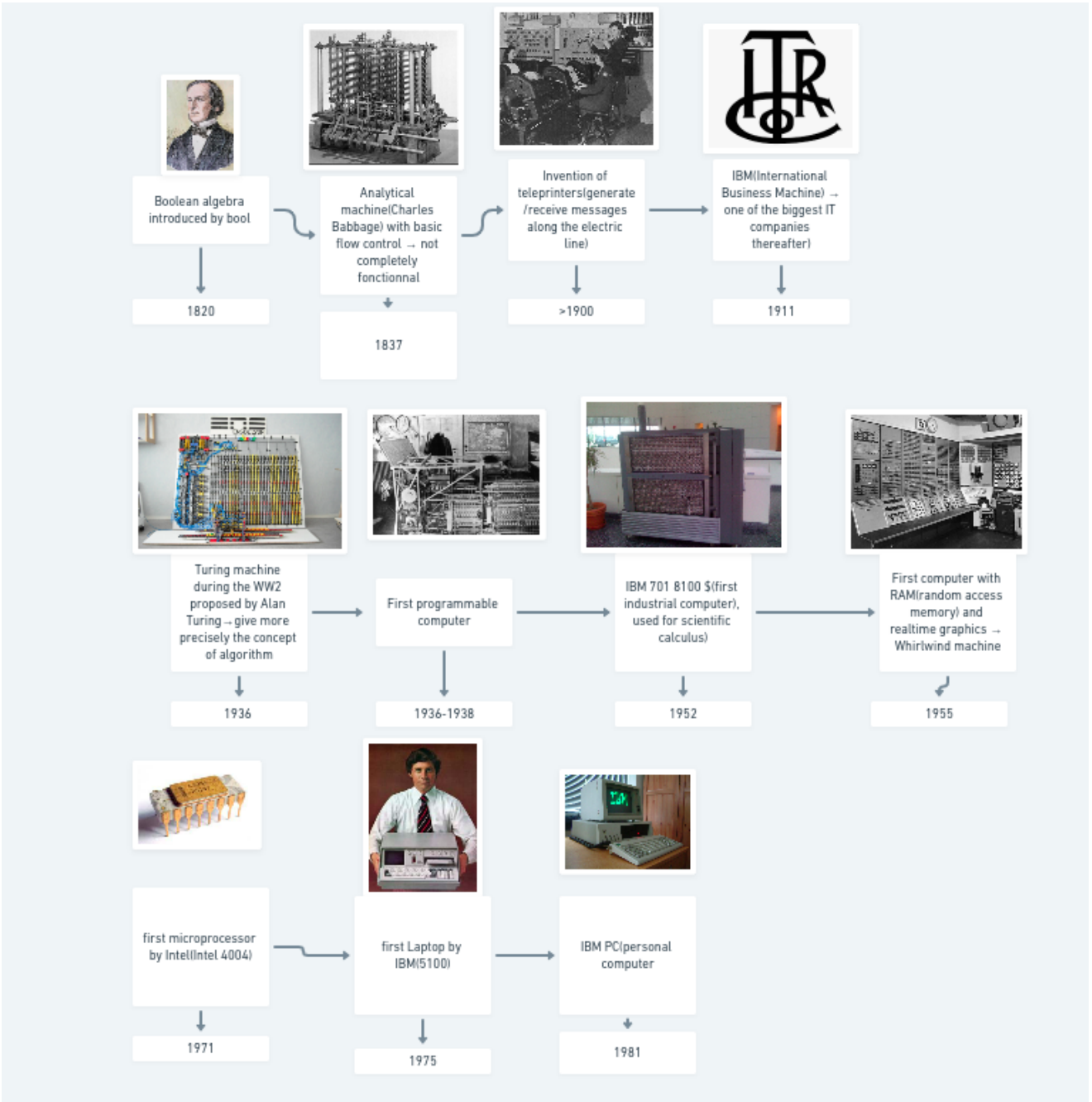
Evolution of computers

1. Why we chose it :

This topic has been chosen because it's about things that we use everyday for everything. From the 30's where the calculating machines were considered as the first programmable computers to nowadays where they've become essential. Computers marked a turning point in the era of humanity and are still growing, thanks to Moore's law. This law states that the number of transistors on a microchip doubles about every two years. A computer is by definition an electronic device for storing and processing data, in binary form nowadays, according to instructions given to it in a program.

2. Computer's history



3. The 5 milestones

a. Boolean algebra

Boolean algebra is the first milestone in computer history for several reasons.

Boolean algebra was introduced in the mid of the 18's for enrich mathematics calculus and use algebraic expressions in electronics circuits so that logic(usage of the 0 and 1) be omnipresent and writing computers programs by humans easier in the future(without this advance, computers programming and interactions with machines would never have existed). This milestone is just a mathematical representation at this time (~1954) so concretes representations was not yet present and not accessible to the general public

b. Transistors

The transistor semiconductor electronic component is the concrete representation of logic in electronics.

It takes for source the electronic tube which had the same objective: to control electric power but was not a semiconductor and took a much longer time to heat up. The absence of mechanical parts makes the time to create logical decisions very short. It also allows miniaturization(visible now in CPU). But at this time, the bipolar transistor is just a prototype.

c. Floppies disks

Floppies disks are the first way to store information for computer usages in terms of flexibility.

The floppies disks are bought by the users of the time to save basic information flexibly and at a low price with a large range of reading media in a very small device. But in terms of security and speed, that is not the best device and ended up being replaced by flash drives.

d. 64 bit processor

The first 64 bit processor is a big milestone for speed concurrency.

AMD Athlon 64 allows more memory with a better management of this resource but at the same time a gain of productivity for users even if, is more expensive.

e. 3d transistors

This new type of transistor allows more power and less power consumption by a superposition of this new component contrary to basic MOS transistors, only horizontally are allowed. With this new architecture, transistors are vertically stacked and the internal kernel may control a bigger range of transistors.

In another view, the novelty will induce more time to produce a single 3d transistor therefore a higher cost for users

4. The future invention

In recent years, Moore's law could be refuted since nanometers don't still mean so much about computer power, and multiple nanometers are used on a chip instead of only a 22nm like in 2012 with Intel's compute processing units. In addition, transistors will be unable to operate within small circuits at increasingly higher temperatures. Due to the fact that cooling the transistors will require more energy that passes through the transistor itself. Which also means less efficiency and more electric consumption. That leads us to the end of the binary system, and requires the creation of a new one : Quantum computing. It's a type of computation that instead of only having two states (0;1), has an infinite possibility of values. From bits to qubits. The firsts quantum computers were built in the 90's but stayed at an experimental level. In October 2019; Google AI, claimed to have performed a quantum computation that was infeasible on any classical computer. But this claim hasn't been validated and is still an ongoing topic.

Quantum vs classical computing nowadays :

Quantum Computing	Classical Computing
- Calculates with qubits wich can represent 0 and 1 at the same time	- Calculates with transistors which can represent 0 or 1
- Power increases exponentially in proportion to the number of qubits	- Power increases in 1:1 with the number of transistors
- High error rates and need to be kept ultracold	- Low error rates and can operate at [-200;100[°C