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Data and instructions

- Instructions include the commands which you send usually using user programs to your PC using your keyboard and mouse and also called program code.

- Instructions are binary code which the CPU can understands. For example when you write a program by programming language, these language translated into machine code(compiled) contains instructions that CPU can understand.
- Data is user data. for example that email you are writing involve text and letters is user data but when you send that data you send a program code to processor.
- The x86 instructions set is common to all PC's. There are two types of x86 instructions:
    1. CISC : is stands for Complex Instruction Set Computer, the individual instructions vary in length from (8 to 120 bits).

2. RISC : is stands for Reduced Instruction Set Computer, RISC can all have the same length (32 bits).

- To keep compatibility with the older Windows understand CISC instructions. They are converted to shorter more RISC like, that operation called micro-ops.
- Instructions have to be decoded in the CPU by using pipelines, instructions are sent from the software and are broken down into micro-ops in the CPU.
- Many problems occur of having more pipelines, one problem it is not possible to feed a large number of pipelines with data.
- Pipelines include execution units:

    1. ALU (Arithmetic and Logic Unit)
    2. FPU (Floating Point Unit)

- Intel expects to be able to scale up the design to work at clock frequencies of up to 5-10 GHz.