What are those bits in memory ???

- (You have now seen that) there are **2 types** of information stored in the computer memory:

    1. **Variables** (generated by variable definition clauses in a program)

        - Memory locations reserved to hold variables are **mutable** - i.e., we must be allowed to modify the values stored in these memory locations

    2. **Computer instructions** (generated by program statements in a program)
        - Program instruction locations - on the other hand - are used to hold commands/instructions (like add, subtract) and they **do not** usually change.

- How can we tell what value is stored in a specific location in memory ???

    Example:

    - Suppose you see the following **bit pattern** stored in a **meory cell (byte)** at **address 2000**:

        ```
        Address     Memory content
        ---------------------------
          2000:        01000001
        ```

    64,000 question:

    - What **value** does this **bit pattern** *encode* ???

        ○ You **cannot** tell by simply looking at the address or the content of the memory location:

            - An address is an address is an address... it won't tell you anything more than an address.

            - All that you can see in the content of the memory is a sequence of bits.

                Since you are **not** told what *encoding* method was used, you **cannot tell** what **value** is represented by these bits.
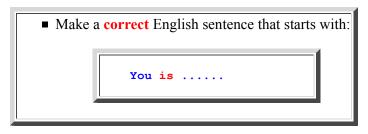
        In other words:

            - If the **encode method** used as **ASCII**, *then*:

                ```
                01000001    ---- (meaning) --->   The letter A
                ```

- On the other hand, *if* the **encoding method** was **2's complement** (for signed values), *then*:

  ```
  01000001    ---- (meaning) --->   The positive value 65
  ```

  - **So**: You need one more piece of information to tell **what *kind*** of data is stored at a certain location in memory:

    - the **kind** information is the **type** of the data

- **Summary**: Remember that **two** pieces of information is necessary to find the **value** of a variable:

  - the **address** of the variable

  - the **type** of the variable (**type information** give the **context** of interpretation)

- **Illustration**

  - **Question:**

    - Make a **correct** English sentence that starts with:

      ```
      You is ......
      ```

    You (as a human) is **so conditioned** to use **"you"** in the **context** of a *personal pronounce* (the "me"-generation !), that you don't even **think** about the fact tha:

    - The word **"you"** can *also* be used in **another *context***

  Example:

  ```
  You is an English word
  ```

  I'll tell you a joke about Millie and her teaching with the word "I".