
Positional value representation systems

- Best known positional system is **decimal number system**
- Value of a digit depends on its position in number:
 - There are **10** digits in use: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9
 - Value of digits increase by **10** for each position
 - Hence it is called the **decimal** (10) number system

Example:

```

679
      6 is in hundreds position (600)
      7 is in tens position (70)
      9 is in ones position (9)

679
^^^
| | |
| | |
| | +--- value at 1: 9 x 1 = 9
| +---- value at 10: 7 x 10 = 70
+----- value at 100: 6 x 100 = 600 +
                                     -----
represented value = 679

```

- The computer uses the **binary number system**:
- Value of a digit depends on its position in number:
 - There are **2** digits in use: 0, 1
 - Value of digits increase by **2** for each position
 - Hence it is called the **binary** (2) number system

Example 1:

```

1011
^^^^
| | | |
| | | +-- value at 1: 1 x 1 = 1
| | +--- value at 2: 1 x 2 = 2
| +---- value at 4: 0 x 4 = 0
+----- value at 8: 1 x 8 = 8 +
                                     -----
represented value = 11 (decimal)

```

Example 2:

```

11001
^^^^^
| | | | |
| | | | +-- value at 1: 1 x 1 = 1
| | | +--- value at 2: 0 x 2 = 0
| | +---- value at 4: 0 x 4 = 0

```

```
|+----- value at 8: 1 x 8 = 8
+----- value at 16: 1 x 16 = 16 +
                               -----
represented value = 25 (decimal)
```
