



## Lesson 18 Octal

As we learned, the **decimal system** is **base 10** and all the decimal numbers are made by combining digits ranging from **0** to **9**.

### For example:

- **1,000,000** : only two digits ( **0** and **1** ) are used.

- **123** : only three digits ( **1** , **2** and **3** ) are used.

A computer uses only two states (on and off states) represented as **0's** and **1's**. So, the **binary system** is **base 2**.

### Is there a base-30 system?

- yes, but we'll need 30 symbols to represent the digits.

### In this lesson, we'll discuss the base-8 system:

The **octal system** uses **8** as a base and the numbers range from **0** to **7**.

**Base-eight numerals: 0,1,2,3,4,5,6,7**

System:	Base:	Digits:
Binary	2	1,2
Octal	8	0,1,2,3,4,5,6,7
Decimal	10	0,1,2,3,4,5,6,7,8,9



## Converting octal into decimal:

### Example: 15

$$\begin{array}{rcl} 5 * 8^0 = 5 & \nearrow & \\ & + & \\ 1 * 8^1 = 8 & \nwarrow & \\ & \rightarrow & 13 \end{array}$$

- 15 is the octal equivalent of the decimal number 13.

## How to print an octal number:

```
int x = 13;
```

```
printf("%o", x);
```