# Operations on Number Systems

# Binary Addition

- 0 + 0 = 0
- 0 + 1 = 1
- 1 + 0 = 1
- 1 + 1 = 0 carry over 1

# Binary Subtraction

- **1 – 1 = 0**
- **1 – 0 = 1**
- **0 – 0 = 0**

If there’re values next column/s,

- **0 – 1 = 1** borrow from next column. If no, then the answer is -1.

# Octal Addition

- Always remember the range of Octal, it's 0 to 7.
- If the sum is greater than 7 we will subtract it to our base number 8 and we will carry over 1.

Example:

$$\begin{array}{rl} & {\scriptstyle 1} \\ & 13_8 \\ + & 25_8 \\ \hline & \mathbf{40_8} \end{array}$$

3 + 5 = 8 – 8 = 0 carry over 1

1+ 1 + 2 = 4

# Octal Subtraction

- Always remember the range of Octal, it's 0 to 7.
- Octal is a base 8 that's why whenever we borrow, it always equivalent to 8. Then you will add the 8 to the number who is a borrower then subtract it.
- For example,

$$
\begin{array}{r}
{\scriptstyle 3\ +8} \\
45_8 \\
-17_8 \\
\hline
27_8
\end{array}
$$

# Hexadecimal Addition

- Always remember the range of hexadecimal.
  - 0 to 9, A to F. A = 10, B = 11, C = 12, D = 13, E = 14, & F = 16.
- If the sum is greater than 16 we will subtract it to our base number 16 and we will carry over 1.

# Hexadecimal Subtraction

- Always remember the range of hexadecimal.
  - 0 to 9, A to F. A = 10, B = 11, C = 12, D = 13, E = 14, & F = 16.
- Hexadecimal is a base 16 that's why whenever we borrow, it always equivalent to 16. Then you will add the 16 to the number who borrower then subtract it.