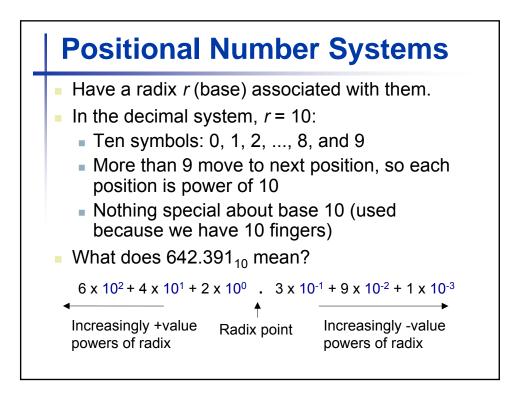
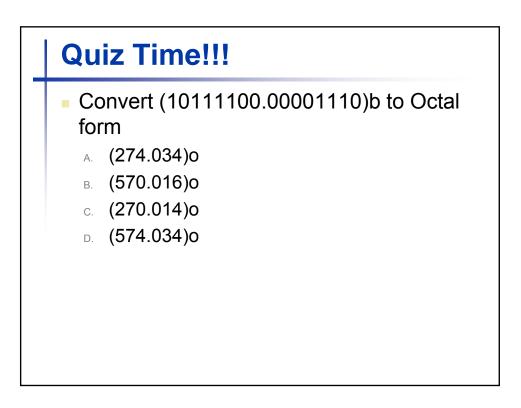


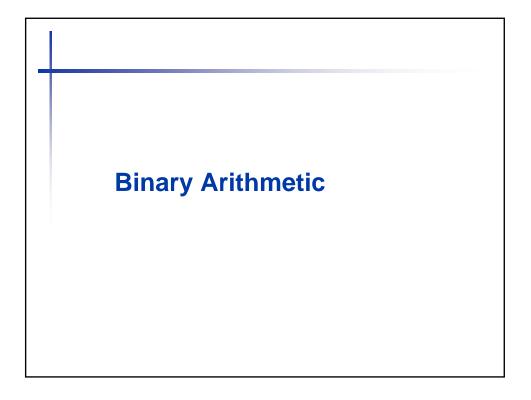
System	Why?	Remarks
Decimal	Base 10 (10 fingers)	Most used
		system
Binary	Base 2. On/Off	3 times more
	systems	digits than
		decimal
Octal	Base 8.Shorthand	3 times less
	notation for working with binary	digits than binary
Hex	Base 16	4 times less
		digits than binary

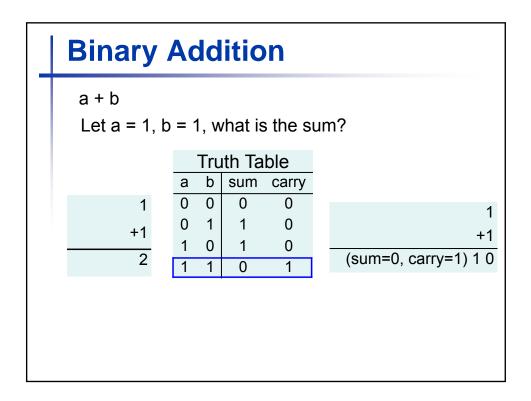


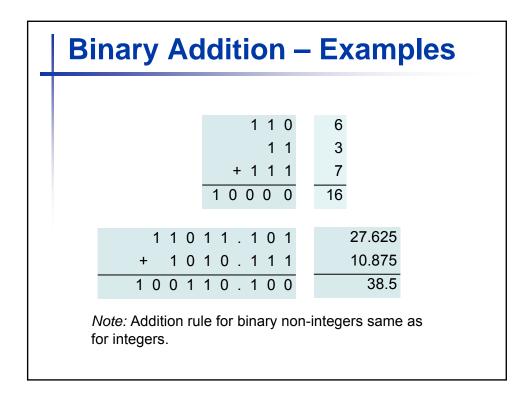
Positional Number Systems

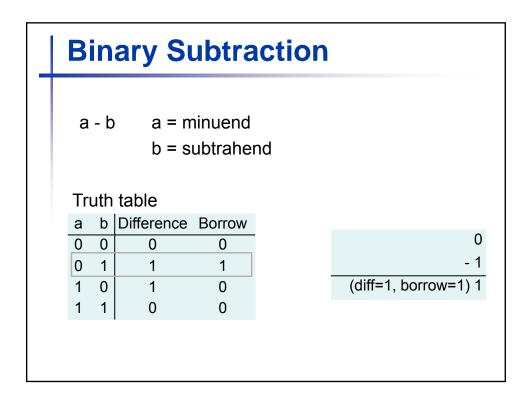
Number system	Radix	Symbols
Binary	2	{0,1}
Octal	8	{0,1,2,3,4,5,6,7}
Decimal	10	{0,1,2,3,4,5,6,7,8,9}
Hexadecimal	16	{0,1,2,3,4,5,6,7,8,9,a,b,c,d,e,f}

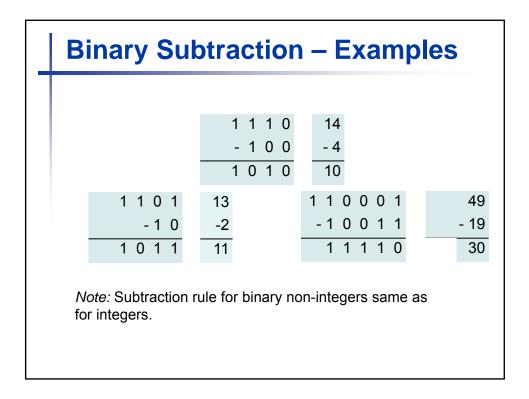


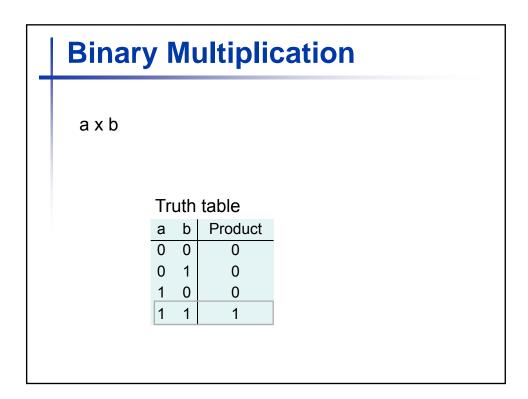


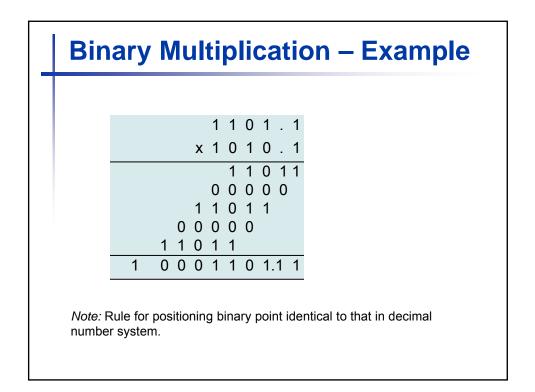


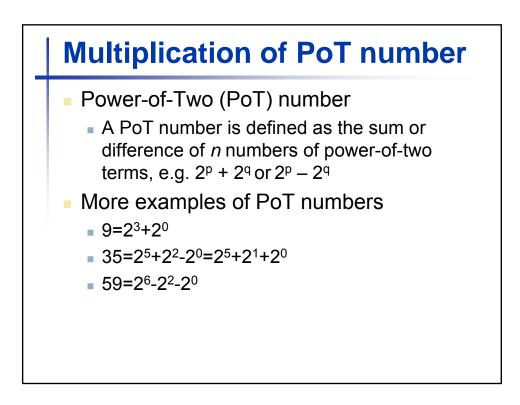


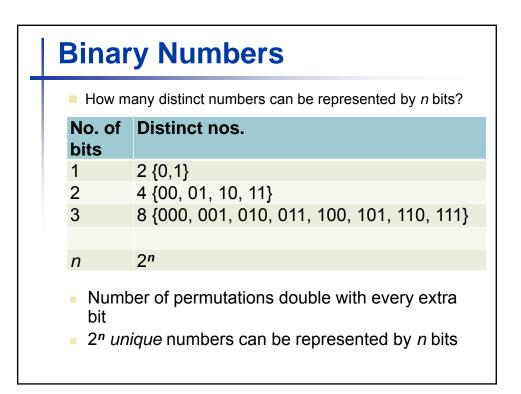


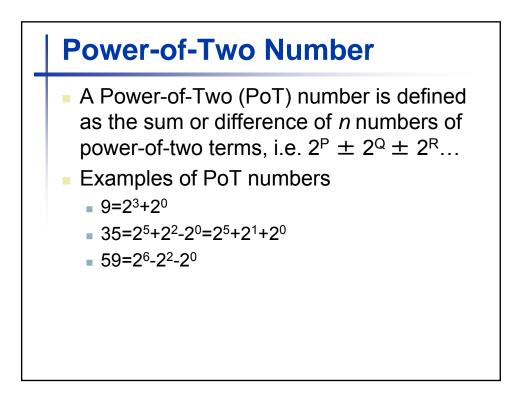








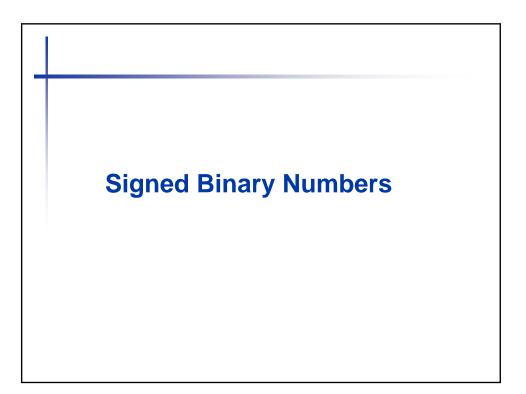


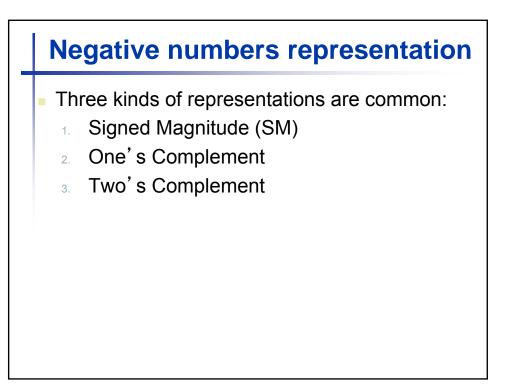


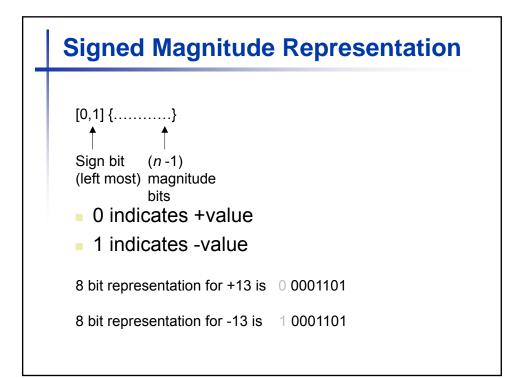


- Assume A is a PoT number, A= 2^P + 2^Q (P>Q>0), and B is a *N*-bit number.
 - A*B=(2^p + 2^q)*B

No full multiplier is needed in A*B.





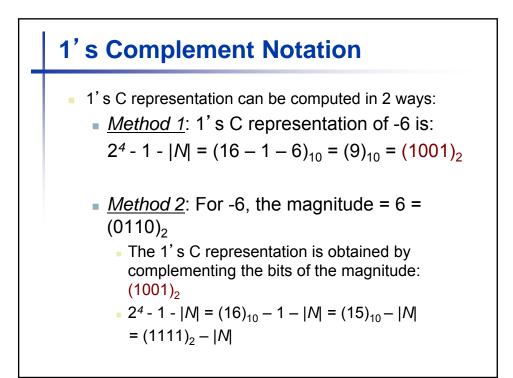


1's Complement Notation

Let *N* be an *n*-bit number and $\tilde{N}(1)$ be the 1's Complement of the number. Then,

$$\tilde{N}(1) = 2^n - 1 - N$$

- The idea is to leave positive numbers as is, but to represent negative numbers by the 1's Complement of their magnitude.
- Example: Let n = 4. What is the 1's Complement representation for +6 and -6?
 - +6 is represented as 0110 (as usual in binary)
 - -6 is represented by 1's complement of its magnitude (6)



2's Complement Notation Let N be an n bit number and Ñ(2) be the 2's C of the number. Then, Ñ(2) = 2ⁿ - N Again, the idea is to leave positive numbers as is, but to represent negative numbers by the 2's C of their magnitude. Example: Let n = 5. What is the 2' s C representation for +11 and -13? +11 is represented as 01011 (as usual in binary) -13 is represented by 2's complement of its magnitude (13)

