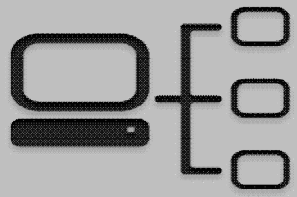
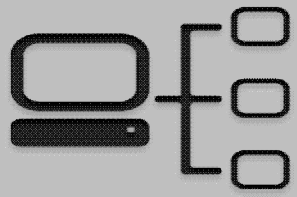
Basics of Binary Math



- **Lecture Goals**
  - Convert Binary to Decimal
  - Convert Decimal to Binary

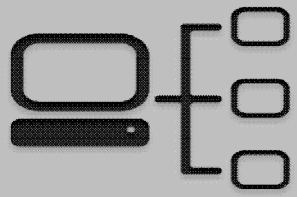
Basic of Binary Math



- **Why is it important?**
  - We need to know basic binary math to perform subnetting
- **Remember This**

  128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 = 255

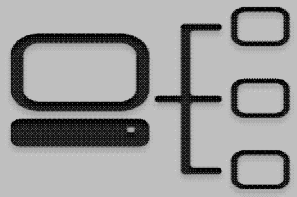
What is the binary 11111111 in decimal?



	128		64		32		16		8		4		2		1		
Binary	1		1		1		1		1		1		1		1		
Decimal	128	+	64	+	32	+	16	+	8	+	4	+	2	+	1	=	**255 Decimal**

Add the number where there is a “1”.
Add zero, when there is a “0”.

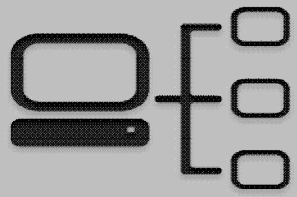
What is the binary 10101010 in decimal?



	128		64		32		16		8		4		2		1		
Binary	1		0		1		0		1		0		1		0		
Decimal	128	+	0	+	32	+	0	+	8	+	0	+	2	+	0	=	**170 Decimal**

Add the number where there is a “1”.
Add zero, when there is a “0”.

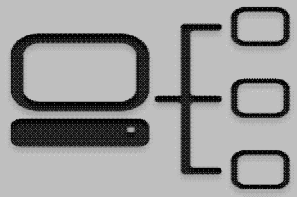
What is the binary 11100111 in decimal?



	128		64		32		16		8		4		2		1		
Binary	1		1		1		0		0		1		1		1		
Decimal	128	+	64	+	32	+	0	+	0	+	4	+	2	+	1	=	**231 Decimal**

Add the number where there is a “1”.
Add zero, when there is a “0”.

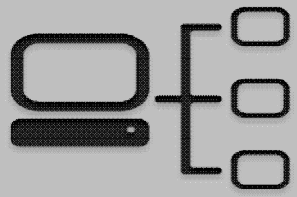
What is the binary 10000011 in decimal?



	128		64		32		16		8		4		2		1		
Binary	1		0		0		0		0		0		1		1		
Decimal	128	+	0	+	0	+	0	+	0	+	0	+	2	+	1	=	**131 Decimal**

Add the number where there is a “1”.
Add zero, when there is a “0”.

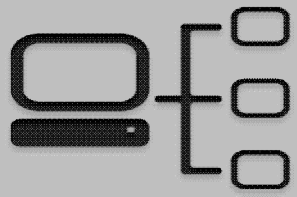
What is 192 in binary?



	128		64		32		16		8		4		2		1		
Binary	1		1		0		0		0		0		0		0	=	**11000000**
Decimal	128	+	64	+	0	+	0	+	0	+	0	+	0	+	0	=	**192 Decimal**

Start adding the numbers from left to right until you achieve the decimal amount you are looking for!

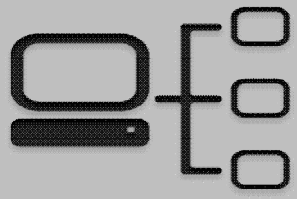
What is 202 in binary?



	128	64	32	16	8	4	2	1	
Binary	1	1	0	0	1	0	1	0	= **11001010**
Decimal	128 +	64 +	0 +	0 +	8 +	0 +	2 +	0	= **202 Decimal**

Start adding the numbers from left to right until you achieve the decimal amount you are looking for!

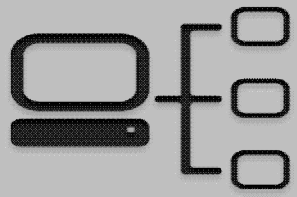
What is 54 in binary?



	128		64		32		16		8		4		2		1		
Binary	0		0		1		1		0		1		1		0	=	**00110110**
Decimal	0	+	0	+	32	+	16	+	0	+	4	+	2	+	0	=	**54 Decimal**

Start adding the numbers from left to right until you achieve the decimal amount you are looking for!

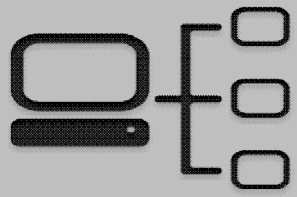
What is 76 in binary?



	128		64		32		16		8		4		2		1		
Binary	0		1		0		0		1		1		0		0	=	**01001100**
Decimal	0	+	64	+	0	+	0	+	8	+	4	+	0	+	0	=	**76 Decimal**

Start adding the numbers from left to right until you achieve the decimal amount you are looking for!

IP Address Conversion Process



192.	168.	32.	4	Dotted Decimal
11000000.	10101000.	00100000.	00000100	Binary
1st Octet	2nd Octet	3rd Octet	4th Octet	

Whether you are given an IP address in dotted decimal or binary format, follow the respective process above for each octet one-by-one until you have completed the process.

Note: Use your Windows calculator in Programmer mode to make the process faster!