



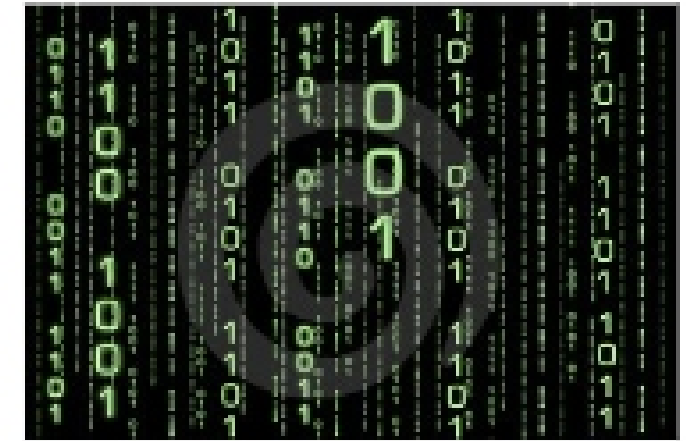
# Seek and Ye shall Find

The continuum of computer “intelligence”

COS 116: 2/21/2008

Sanjeev Arora

# Recap: Binary Representation



Powers of 2

$2^0$	$2^1$	$2^2$	$2^3$	$2^4$	$2^5$	$2^6$	$2^7$	$2^8$	$2^9$	$2^{10}$
1	2	4	8	16	32	64	128	256	512	1024

$$2^{10} = 1024 \approx 10^3$$


**Fact:** Every integer can be uniquely represented as a sum of powers of 2.

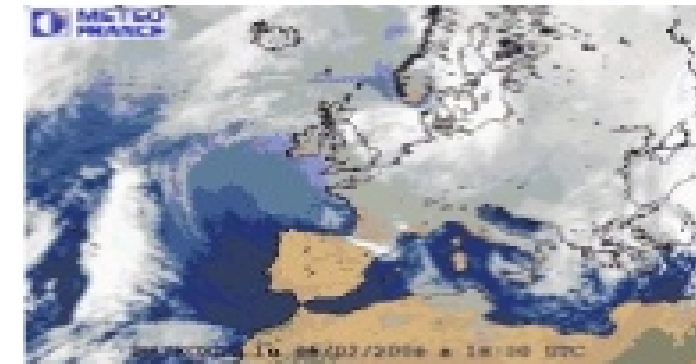
**Ex:**  $25 = 16 + 8 + 1$   
 $= 1 \S 2^4 + 1 \S 2^3 + 0 \S 2^2 + 0 \S 2^1 + 1 \S 2^0$   
 $[25]_2 = 11001$

# Misconceptions about Computers

Just a calculator  
on steroids



Weather Forecast



Just maintains large  
amount of data



Airline Reservation System



Just does what the  
programmer tells it



Yes, but ...