Overview of Computers

Instructor – Dr. Shiv Ram Dubey

What do computers understand?

– What do computers understand?

01101000 01110100 01110100 01110000
01110011 00111010 00101111 00101111
01110111 01110111 01110111 00101110
01111001 01101111 01110101 01110100
01110101 01100010 01100101 00101110
01100011 01101111 01101101 00101111
01110111 01100001 01110100 01100011
01101000 00111111 01110110 00111101
01100100 01010001 01110111 00110100
01110111 00111001 01010111 01100111
01011000 01100011 01010001 11010101

What do computers understand?

- Binary
  - 0/1
  - True/False
  - On/Off

Decimal Notation

Decimal Notation

123

100	10	1	- Places
1	2	3	

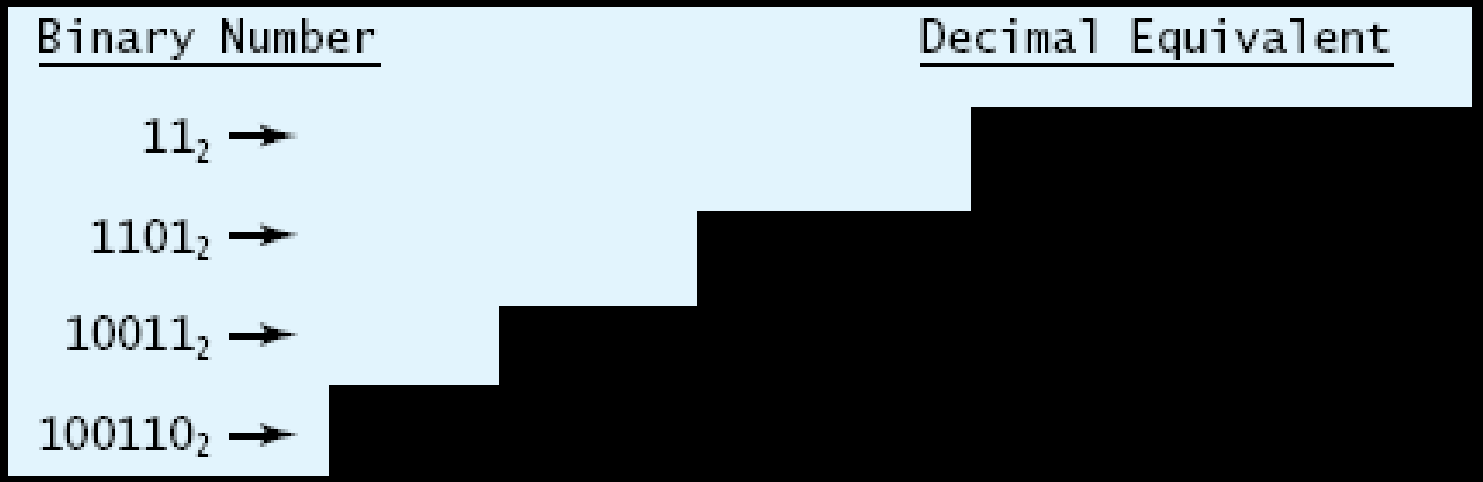
$123 = 1 \times 100 + 2 \times 10 + 3 \times 1$

Binary Notation

Binary Notation

01000011

Binary to Decimal



Binary to Decimal

Binary Number	Decimal Equivalent
$11_2 \rightarrow$	1*2 + 1*1 = 3
$1101_2 \rightarrow$	1*8 + 1*4 + 1*2 + 1*1 = 13
$10011_2 \rightarrow$	1*16 + 0*8 + 0*4 + 1*2 + 1*1 = 19
$100110_2 \rightarrow$	1*32 + 0*16 + 0*8 + 1*4 + 1*2 + 0*1 = 38

What about letters?

ASCII:

American Standard Code for Information Interchange

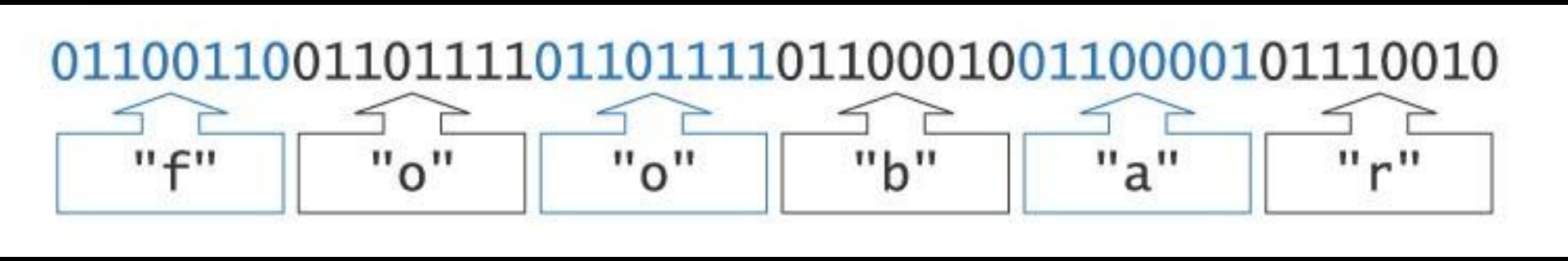
0	*NUL*	16	*DLE*	32	SPC	48	0	64	@	80	P	96	`	112	p
1	*SOH*	17	*DC1*	33	!	49	1	65	A	81	Q	97	a	113	q
2	*STX*	18	*DC2*	34	"	50	2	66	B	82	R	98	b	114	r
3	*ETX*	19	*DC3*	35	#	51	3	67	C	83	S	99	c	115	s
4	*EOT*	20	*DC4*	36	$	52	4	68	D	84	T	100	d	116	t
5	*ENQ*	21	*NAK*	37	%	53	5	69	E	85	U	101	e	117	u
6	*ACK*	22	*SYN*	38	&	54	6	70	F	86	V	102	f	118	v
7	*BEL*	23	*ETB*	39	'	55	7	71	G	87	W	103	g	119	w
8	*BS*	24	*CAN*	40	(	56	8	72	H	88	X	104	h	120	x
9	*HT*	25	*EM*	41	)	57	9	73	I	89	Y	105	i	121	y
10	*LF*	26	*SUB*	42	*	58	:	74	J	90	Z	106	j	122	z
11	*VT*	27	*ESC*	43	+	59	;	75	K	91	[	107	k	123	{
12	*FF*	28	*FS*	44	,	60	<	76	L	92	\	108	l	124	|
13	*CR*	29	*GS*	45	-	61	=	77	M	93	]	109	m	125	}
14	*SO*	30	*RS*	46	.	62	>	78	N	94	^	110	n	126	~
15	*SI*	31	*US*	47	/	63	?	79	O	95	_	111	o	127	DEL

01001000 01001001

72 73

H I

Representing Text



Representing Text

- The size of a file = number of bytes stored in the file
- 1 KB = ? bytes

Representing Text

- The size of a file = number of bytes stored in the file
- 1 KB = 1024 bytes = 2^{10} bytes

Representing Text

- The size of a file = number of bytes stored in the file

- 1 KB = 1024 bytes = 2^{10} bytes
- 1 MB = 1024 KB = 2^{20} bytes
- 1 GB = 1024 MB = 2^{30} bytes
- 1 TB = 1024 GB = 2^{40} bytes