

# CPSC 231 - Lab

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## BASE REPRESENTATIONS

# What is a String?

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A sequence of chars



# What is a char?

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A datatype with size 1 byte

- Large enough to contain any ASCII or UTF-8 unit



# What is a byte?

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A unit of data that consists of 8 bits

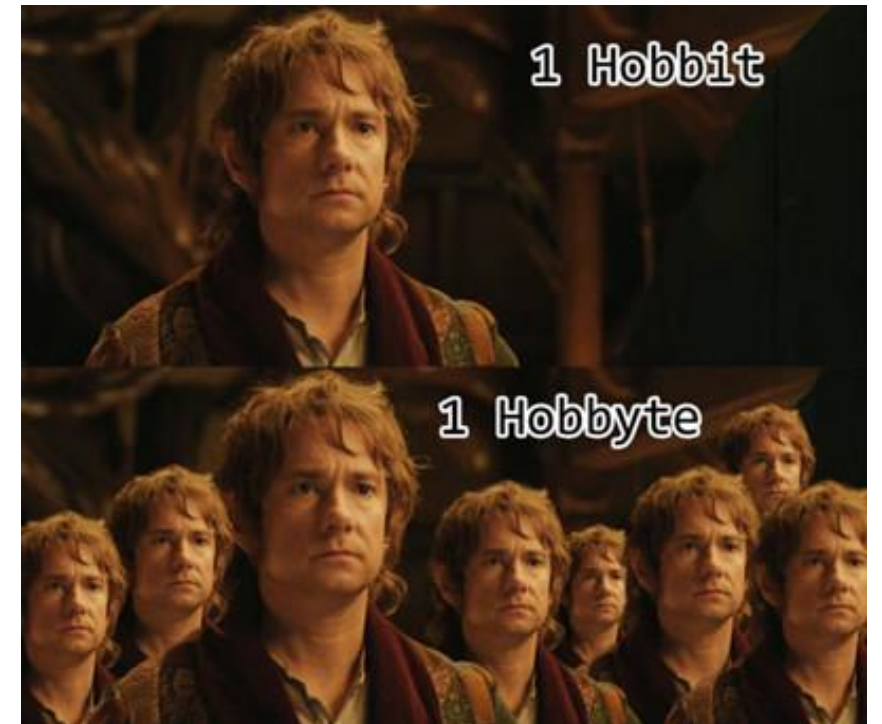


# What is a bits?

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A binary digit – the basic unit of information

In computing



# What is a binary?

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A positional number system that uses a base Of 2



A decimal number {0,1,2,3,4,5,6,7,8,9}



100s



10s



1s

$$2 \times 100 + 5 \times 10 + 6 \times 1 = 256$$

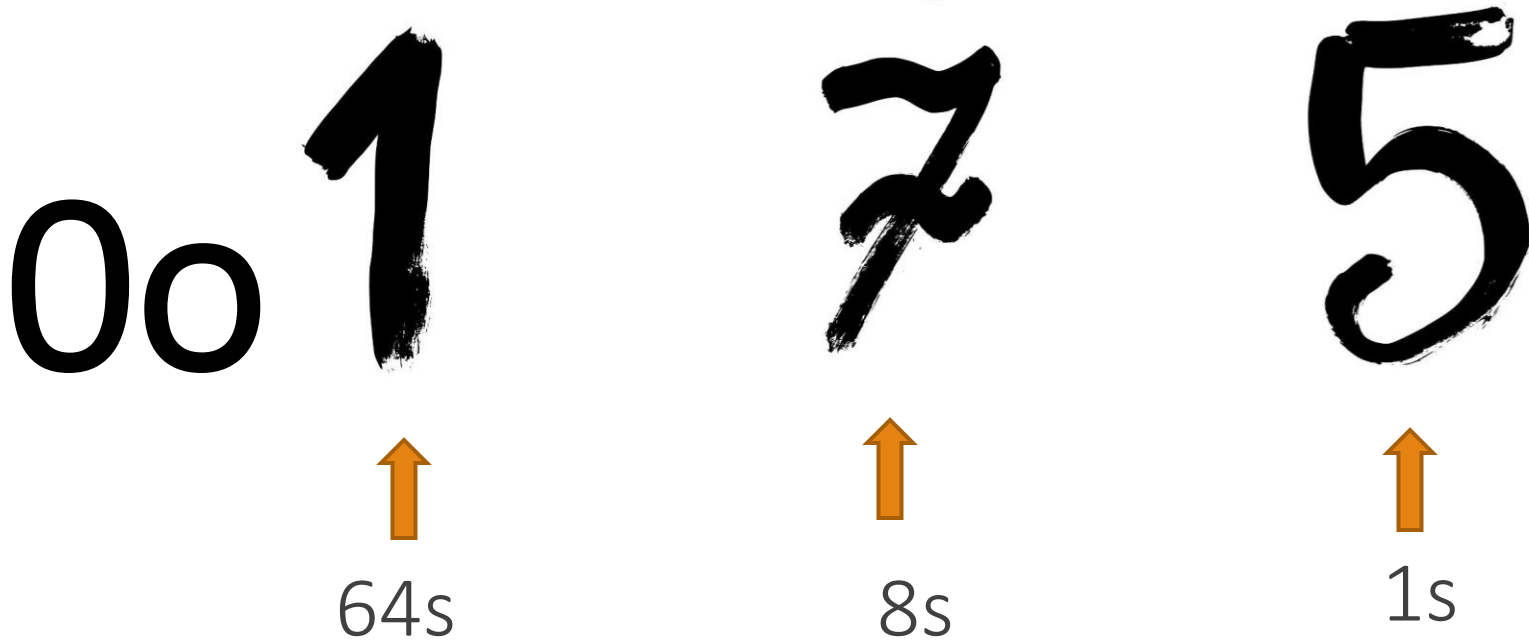
A binary number {0,1}



$$1 \times 2^3 + 0 \times 2^2 + 1 \times 2^1 + 1 \times 2^0 = 11$$



An Octal number {0,1,2,3,4,5,6,7}



$$1 \times 8^2 + 7 \times 8^1 + 5 \times 8^0 = 125$$

A Hexadecimal number {0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F}

0x 1 B E

↑            ↑            ↑

256s        16s            1s

$$1 \times 16^2 + 11 \times 16^1 + 14 \times 16^0 = 446$$

# **There are 11 types of people**

01- Those who understand binary

10- Those who don't

11- those who write bad jokes on binary

# How to use base representation in python?

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```
decimalNumber = 256
```

```
binaryNumber = 0b100010010
```

```
octalNumber = 0o407
```

```
hexadecimalNumber = 0x1a0
```

# Ascii Table

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sp	!	"	#	\$	%	&	'	(	)	*	+	,	-	.	/
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
p	q	r	s	t	u	v	w	x	y	z	{		}	~	DEL
112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127

Ryan Henry

# Ascii Table

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Example: English  $\mapsto$  ASCII hex

Hello, World!



0x48 0x65 0x6c 0x6c 0x6f 0x2c 0x20 0x57 0x6f 0x72 0x6c 0x64 0x21

Ryan Henry