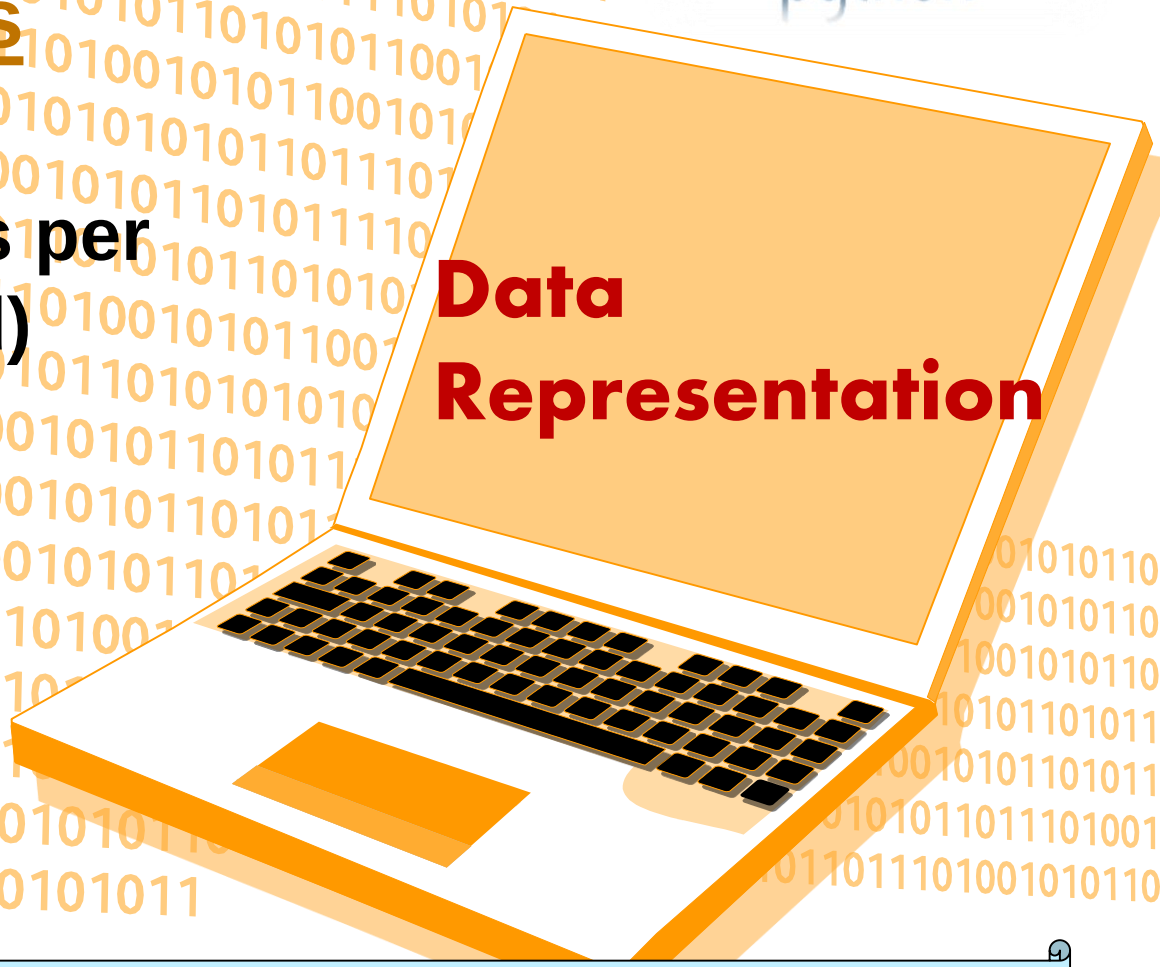
Chapter 2 :

Informatics Practices

Class XI (As per CBSE Board)

New Syllabus 2019-20



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Introduction

In general term computer represent information/data in different types of data forms i.e. number , character ,picture ,audio , video etc.

Computers are made of a series of switches/ gates. Each switch has two states: ON(1) or OFF(0).That's why computer works on the basis of binary number system(0/1).But for different purpose different number systems are used in computer world to represent information. E.g. Octal, Decimal, Hexadecimal.

NUMBER SYSTEM		
SYSTEM	BASE	DIGIT
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

Binary Number

Characteristics

- Two symbols
- 0 1

Positional

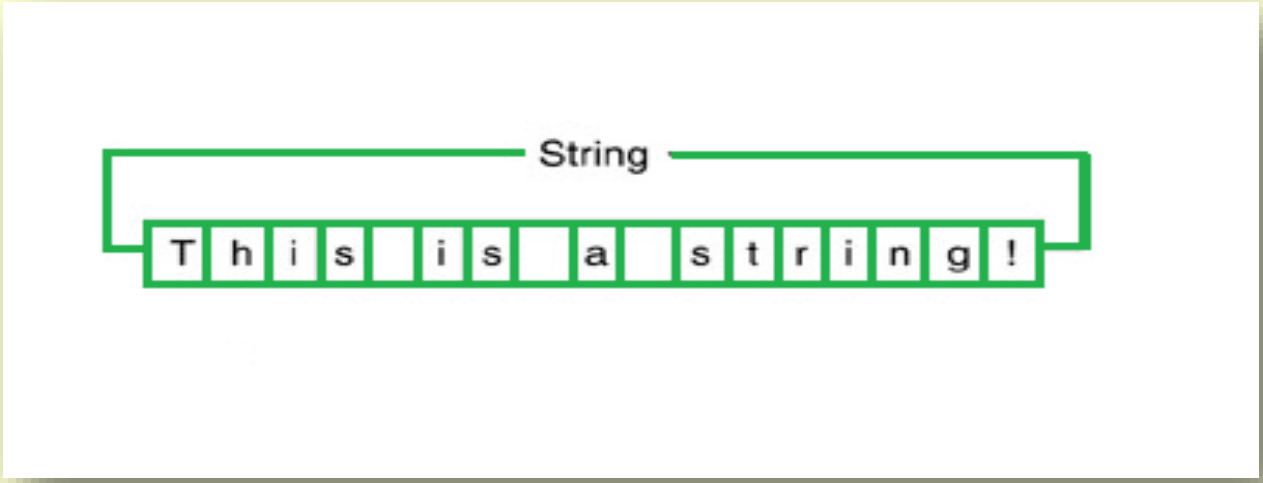
- Positional
- $1010_2 \neq 1100_2$

Most (digital) computers use the binary number system Why?

Computers are made of a series of switches/ gates. Each switch has two states: ON(1) or OFF(0).That's why computer works on the basis of binary number system(0/1).

String representation

String is any finite sequence of characters.Any string includes etters, numerals, symbols and punctuation marks.



Computers are designed to work internally with numbers. In order to handle characters, we need to choose a number for each character. There are many ways to do this

String representation

Following are some form of character set

- **ASCII**
- **UNICODE**

String representation

ASCII

It is most common coding system (Pronounced *ass-key).
ASCII = American National Standard Code for Information Interchange
It is Defined in ANSI document X3.4-1977. It is a 7-bit code.Its 8th bit is unused (or used for a parity bit)

$$2^7 = 128 \text{ codes}$$

Two general types of codes:

95 are “Graphic” codes (displayable on a console)
33 are “Control” codes (control features of the console or communications channel)

String representation

ASCII

	000	001	010	011	100	101	110	111
0000	NULL	DLE		0	@	P	`	p
0001	SOH	DC1	!	1	A	Q	a	q
0010	STX	DC2	"	2	B	R	b	r
0011	ETX	DC3	#	3	C	S	c	s
0100	EDT	DC4	$	4	D	T	d	t
0101	ENQ	NAK	%	5	E	U	e	u
0110	ACK	SYN	&	6	F	V	f	v
0111	BEL	ETB	'	7	G	W	g	w
1000	BS	CAN	(	8	H	X	h	x
1001	HT	EM	)	9	I	Y	i	y
1010	LF	SUB	*	:	J	Z	j	z
1011	VT	ESC	+	;	K	[	k	{
1100	FF	FS	,	<	L	\	l	|
1101	CR	GS	-	=	M	]	m	}
1110	SO	RS	.	>	N	^	n	~
1111	SI	US	/	?	O	_	o	DEL

String representation

MOST SIGNIFICANT BIT

ASCII CHART

	000	001	010	011	100	101	110	111
0000	NULL	DLE		0	@	P	`	p
0001	SOH	DC1	!	1	A	Q	a	q
0010	STX	DC2	"	2	B	R	b	r
0011	ETX	DC3	#	3	C	S	c	s
0100	EDT	DC4	$	4	D	T	d	t
0101	ENQ	NAK	%	5	E	U	e	u
0110	ACK	SYN	&	6	F	V	f	v
0111	BEL	ETB	'	7	G	W	g	w
1000	BS	CAN	(	8	H	X	h	x
1001	HT	EM	)	9	I	Y	i	y
1010	LF	SUB	*	:	J	Z	j	z
1011	VT	ESC	+	;	K	[	k	{
1100	FF	FS	,	<	L	\	l	|
1101	CR	GS	-	=	M	]	m	}
1110	SO	RS	.	>	N	^	n	~
1111	SI	US	/	?	O	_	o	DEL

LEAST SIGNIFICANT BIT

String representation

ASCII

“Hello, world” Example

	Binary	Hexadecimal	Decimal
H	01001000	48	72
e	01100101	65	101
l	01101100	6C	108
l	01101100	6C	108
o	01101111	6F	111
,	00101100	2C	44
	00100000	20	32
w	01110111	77	119
o	01100111	67	103
r	01110010	72	114
l	01101100	6C	108
d	01100100	64	100

LEAST SIGNIFICANT BIT

String representation

UNICODE

It is a worldwide character-encoding standard .Its main objective is to enable a single, unique character set that is capable of supporting all characters from all scripts, as well as symbols, that are commonly utilized for computer processing throughout the world.

String representation

VARIOUS UNICODE ENCODING

Name	UTF-8	UTF-16	UTF-32
Smallest code point	0000	0000	0000
Largest code point	10FFFF	10FFFF	10FFFF
Code unit size	8 bits	16 bits	32 bits
Byte order	N/A	<BOM>	<BOM>
Fewest bytes per character	1	2	4
Most bytes per character	4	4	4

LEAST SIGNIFICANT BIT