Number Sense and Numerations

Numbers

Numbers are mathematical symbol by which we express date, time, distance, position, quantity etc.
We use ten symbols (0, 1, 2, 3, 4, 5, 6, 7, 8, 9) to write any number.
Like 62232, 52155, 40034 etc.

Number System

Number system deals with the study of different types of numbers. In this chapter, we will study about the categorization of different types of numbers.

Natural Numbers

Counting starts with 1 and continue till infinite. Counting numbers are called natural numbers.
For example, 1, 2, 3, 4, 5, 6, 7 ..... etc.

Whole Numbers

When 0 is included with natural numbers, they are called whole number. In other words "Natural numbers together with zero are called whole numbers."
For example, 0, 1, 2, 3, 4, 5, 6, 7 ..... etc.

Integers

Integers are the collection of whole numbers and negative of natural numbers.
For example,
$-5, -4, -3, -2, -1, 0, +1, +2, +3, +4, +5, +6, +7$ ..... etc.

System of Numeration

Mathematical notation of numbers is called numeration. Let us know about two types of numeration.
(A) Indian system of numeration
(B) International system of numeration

Indian System of Numeration

It is a positional decimal number system. Look at the following place value chart

Period	Kharab		Arab		Crores		Lakhs		Thousands		ones		
Places	Ten Kharab (T-kh) 1000000000000	Kharab (kh) 100000000000	Ten Arab (T-A) 10000000000	Arab (A) 1000000000	Ten Crores (T-C) 100000000	Crores (C) 10000000	Ten Lakhs(T-L) 1000000	Lakhs (L) 100000	Ten thousands(T-TH) 10000	Thousands (TH) 1000	Hundreds (TH) 100	Tens (T) 10	Ones (0) 0

International System of Numeration This system is applied in whole world. The following place value chart shows the international system of numeration.

Period	Trillions	Billions	Millions	Thousands	Ones

Places	Hundred Trillions (100000000000000) Ten Trillions (10000000000000) Trillions (1000000000000)	Hundred billions (100000000000) Ten billions (10000000000) Billions (1000000000)	Hundred millions (100000000) Ten millions (10000000) Millions (1000000)	Hundred thousands (100000) Ten thousands (10000) Thousands (1000)	Hundred (100) Tens (10) Ones (0)

Place Value

Place are value of a digit in a number is the position it occupies according to the place value chart.

- **Example:**

Find the place value of 5 in the number 568232.

Solution: 500000

Face value

Face value of a number is the number itself.

- **Example:**

Find the face value of 3 in the number 453282.

Solution: 3

Successor

The number which comes just after a number is called successor of that number.

- **Example:**

Find the successor of 4444.

Solution: $4444+1=4447$

Predecessor

Predecessor of a number just comes before the number.

- **Example:**

Find the predecessor of 4444.

Solution: $4444-1=4443$

Roman Numeral

Roman numerals represent the numbers using alphabetical symbols.

The seven alphabetical symbol, which are used in Roman system of numeration, and their values are as follows:

Symbols I	**Value 1**
V	5
X	10
L	50
C	100
D	500
M	1000

Rules for Using Symbols

Rule1: When a symbol is repeated, its value is multiplied as many times as the symbol is repeated.

- **Example:**

$II=2\times1=2$

$XXX=3\times10=30$

Rule 2: The symbols I, X, C, M can be repeated in a roman numeral.

- **Example:**

$CCC = 3 \times 100 = 300$

$MM = 2 \times 1000 = 2000$

Rule 3: The symbols V, L, and D can not be repeated.

- **Example:**

$DD = 2 \times 500 = 1000$

But 1000 is represented by symbol M.

Therefore, the above expression is not correct.

Rule 4: If a symb01 of smaller value is right to the symbol of greater values are added.

- **Example:**

$LV = 50 + 5 = 55$

$DC = 500 + 100 = 600$

Rule 5: If a symbol of smaller value is left to the symbol of greater value, their difference is the resulting value.

- **Example:**

$VL = 50 - 5 = 45$

$CD = 500 - 100 = 400$

Rule 6: If a symbol of smaller value comes between two symbols of larger value, its value is subtracted from the value of the symbol, which is right to it.

- **Example:**

$XIV = 10 + 5 - 1 = 14$

$DXC = 500 + 100 - 10 = 590$

Look at the following table:

I	1	XXI	21	XLI	41	LXI	61	LXXXI	81
II	2	XXII	22	XLII	42	LXII	62	LXXXII	82
III	3	XXIII	23	XLIII	43	LXIII	63	LXXXIII	83
IV	4	XXIV	24	XLIV	44	LXIV	64	LXXXIV	84
V	5	XXV	25	XLV	45	LXV	65	LXXXV	85
VI	6	XXVI	26	XLVI	46	LXVI	66	LXXXVI	86
VII	7	XXVII	27	XLVII	47	LXVII	67	LXXXVII	87
VIII	8	XXVIII	28	XLVIII	48	LXVIII	68	LXXXVIII	88
IX	9	XXIX	29	XLIX	49	LXIX	69	LXXXIX	89
X	10	XXX	30	L	50	LXX	70	XC	90
XI	11	XXXI	31	LI	51	LXXI	71	XCI	91
XII	12	XXXII	32	LII	52	LXXII	72	XCII	92
XIII	13	XXXIII	33	LIII	53	LXXIII	73	XCIII	93
XIV	14	XXXIV	34	LIV	54	LXXIV	74	XCIV	94
XV	15	XXXV	35	LV	55	LXXV	75	XCV	95
XVI	16	XXXVI	36	LVI	56	LXXVI	76	XCVI	96
XVII	17	XXXVII	37	LVII	57	LXXVII	77	XCVII	97
XVIII	18	XXXVIII	38	LVIII	58	LXXVIII	78	XCVIII	98
XIX	19	XXXIX	39	LIX	59	LXXIX	79	XCIX	99
XX	20	XL	40	LX	60	LXXX	80	C	100
								D	500
								M	1000

Note: A symbol can not be repeated more than 3 times.