Dr. SNS RAJALAKSHMI COLLEGE OF ARTS & SCIENCE (Autonomous)

Coimbatore -641049

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(Recognized by UGC, Approved by AICTE, New Delhi and
Affiliated to Bharathiar University, Coimbatore)

DEPARTMENT OF GRAPHIC & CREATIVE DESIGN AND DATA ANALYTICS

COURSE NAME : COMPUTER SYSTEM ARCHITECTURE (23UCU402)

I YEAR /I SEMESTER

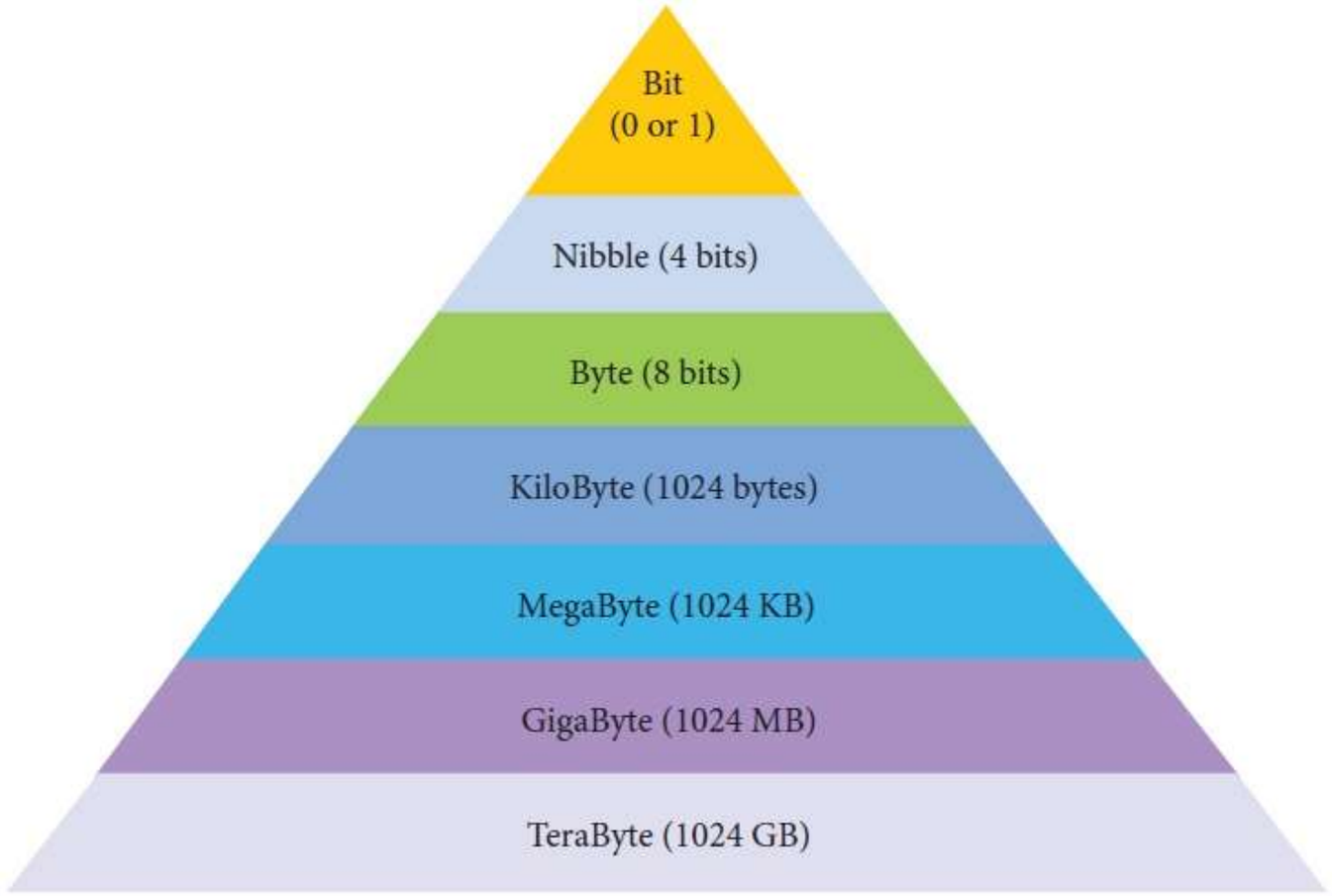
Unit I- Data Representation

Topic 1: Data types

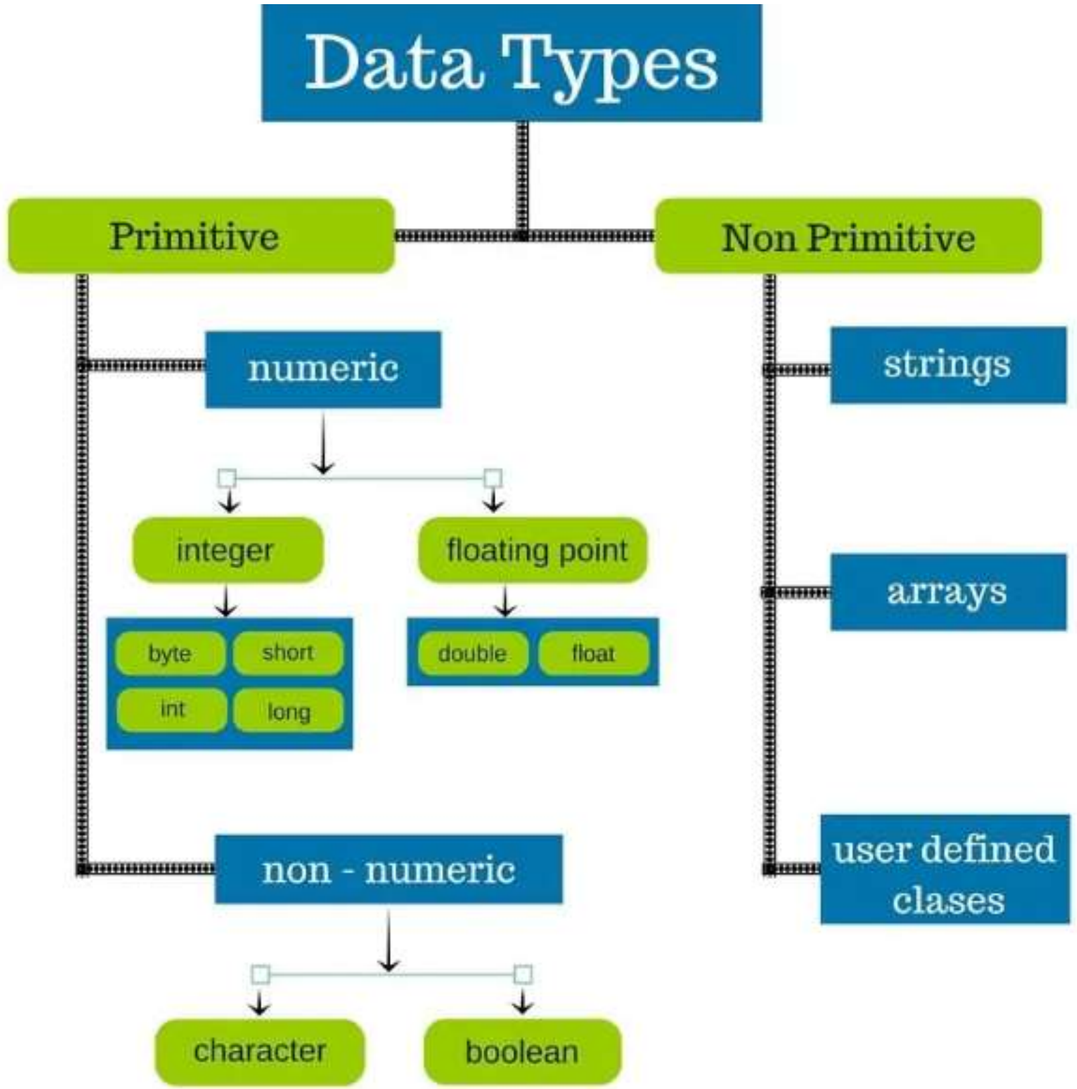
Data Types

- Modern computers are built up with transistors.
- Whenever an electric current pass into the transistors either an **ON** or **OFF** status will be established.
- Therefore the computer can only recognize two numbers, **0** for OFF, and **1** for ON, which can be referred to as **BIT**.

Data Representation



Data Types


Data Types
Primitive
Non Primitive
numeric
integer
floating point
byte
short
int
long
double
float
non - numeric
character
boolean
strings
arrays
user defined clases

Data Types

- Hence computers can be said to be discrete machines.
- The number system consists only of two numbers is called **Binary System**.
- And to distinguish the different numbering systems, the numbers human use, ie 1,2,3,4..., will be called **Decimals** (since they are based 10 numbers)

CSS Box Model

Decimal	Binary
0	0000 0000
1	
2	
3	
4	
5	
6	
7	
8	
9	

2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
512	256	128	64	32	16	8	4	2	1

Binary to decimal

Convert 110101 Binary to decimal

2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
512	256	128	64	32	16	8	4	2	1
				1	1	0	1	0	1
				32 +	16+		4+		1
									53

1. Convert 110101 binary number to Decimal number

$(110101)_2 = (1 \times 2^5) + (1 \times 2^4) + (0 \times 2^3) + (1 \times 2^2) + (0 \times 2^1) + (1 \times 2^0)$

$= 32 + 16 + 4 + 1$

$= (53)_{10}$

$(110101)_2 = (53)_{10}$

Assessment - Questions

1. Convert 110110110 binary number to Decimal number

2. Convert 110110110.110 binary number to Decimal number

Assessment - Answer

1. Convert 110110110 binary number to Decimal number

2^9	2^8	2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
512	256	128	64	32	16	8	4	2	1
	1	1	0	1	1	0	1	1	0
	256+	128+		32+	16+		4+	2	
									438

Assessment - Answer

2.Convert 110110110.110 binary number to Decimal number

$$(110110110.110)_2 = (1 \times 2^8) + (1 \times 2^7) + (0 \times 2^6) + (1 \times 2^5) + (1 \times 2^4) + (0 \times 2^3)$$
$$+ (1 \times 2^2) + (1 \times 2^1) + (0 \times 2^0) + (1 \times 2^{-1}) + (1 \times 2^{-2}) + (0 \times 2^{-3})$$
$$= 256256 + 128128 + 3232 + 1616 + 44 + 22 + 1221 + 1441$$
$$= (438.75)_{10}$$

References

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2. V.K. Puri, —DIGITAL ELECTRONICS CIRCUITS AND SYSTEMS” McGraw Hill Education (1 July 2017). ISBN-10: 9780074633175 , ISBN-13: 978-0074633175

3.William Stallings, “Computer Organization and Architecture, Designing for Performance” PHI/ Pearson Education North Asia Ltd., 10th Edition 2016, ISBN 978-0- 13-410161-3 — ISBN 0-13-410161-8.

Thank You