



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

**Coimbatore -641049**

Accredited by NAAC(Cycle-III) with 'A+' Grade  
(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 4 : Number system : Octal**



# Octal Number System

- Uses eight digits, 0,1,2,3,4,5,6,7.
- Also called base 8 number system
- Each position in an octal number represents a 0 power of the base (8).
  - Example:  $8^0$
- Last position in an octal number represents an x power of the base (8).
  - Example:  $8^x$  where x represents the last position - 1.

# Octal Number System

Example

Decimal Number –  $12570_{10}$

Calculating Octal Equivalent –

	Remainders
8   12,570	2
8   1,571	3
8   196	4
8   24	0
8   3	3

$$(12570)_{10} = (30432)_8$$

# Octal Number System

Example

Octal Number –  $12570_8$

Calculating Decimal Equivalent –

Step	Octal Number	Decimal Number
Step 1	$12570_8$	$((1 \times 8^4) + (2 \times 8^3) + (5 \times 8^2) + (7 \times 8^1) + (0 \times 8^0))_{10}$
Step 2	$12570_8$	$(4096 + 1024 + 320 + 56 + 0)_{10}$
Step 3	$12570_8$	$5496_{10}$

$$(12570)_8 = (5496)_8$$

# Assessment - Questions

1. Convert 1202 Decimal number to Octal number
2. Convert 1202.34 Decimal number to binary number



# Assessment - Questions

1. Convert 1202 Decimal number to Octal number
2. Convert 1202 Octal number to Decimal number
3. Convert 1202.34 Decimal number to octal number



1. Convert 1202 Decimal number to Octal number

		Remainders
8	1,202	2
8	150	6
8	18	2
8	2	2



$$(1202)_{10} = (2262)_8$$

## 2. Convert 1202 Octal to Decimal number

$$\begin{aligned}(1202)_8 &= (1 \times 8^3) + (2 \times 8^2) + (0 \times 8^1) + (2 \times 8^0) \\ &= 512 + 128 + 2 \\ &= (642)_{10}\end{aligned}$$

$$(1202)_8 = (642)_{10}$$





## 2. Convert 1202.34 Octal to Decimal number

$$\begin{aligned} (1202.34)_8 &= (1 \times 8^3) + (2 \times 8^2) + (0 \times 8^1) + (2 \times 8^0) + (3 \times 8^{-1}) + (4 \times 8^{-2}) \\ &= 512 + 128 + 0 + 2 + 0.375 + 0.125 \\ &= (642.5)_8 \end{aligned}$$

$$(1202.34)_8 = (642.5)_{10}$$



# References

- 1.M.Morris Mano, “Computer System Architecture” 3<sup>rd</sup> Edition, Prentice Hall of India ,2000, ISBN-10: 0131663631
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