

MORE ON DATA CONVERSION

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Data Conversion

- Decimal is the most human-friendly base for presenting numbers
 - ▣ Example: 8163
- Convert decimal to binary (machine-friendly)
 - ▣ Through a series of divisions
 - ▣ Example: 1111111100011

Find the binary representation of 8163 through a series of divisions by 2.

Quotient	4081	2040	1020	510	255	127	63	31	15	7	3	1	0
Remainder	1	1	0	0	0	1	1	1	1	1	1	1	1



Answer: 1111111100011_{bin}

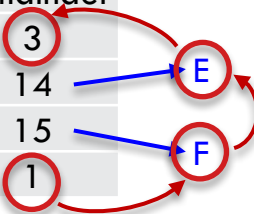
Data Conversion

□ Decimal to Hexadecimal

▣ Example: 8163

Find the hexadecimal representation of 8163 through a series of divisions by 16.

Quotient	Remainder
510	3
31	14
1	15
0	1



Value	Hex Digit
0	0
..	...
9	9
10	A
11	B
12	C
13	D
14	E
15	F

Answer: 1FE3_{hex}


Data Conversion

□ Decimal to Octal

■ Example: 8163

Find the hexadecimal representation of 8163 through a series of divisions by 8.

Quotient	Remainder
1020	3
127	4
15	7
1	7
0	1



Answer: 17743_{oct}

Conversion To Decimal

- From Binary (111111100011)

- ▣ $1 \times 2^0 + 1 \times 2^1 + 0 \times 2^2 + 0 \times 2^3 + 0 \times 2^4 + 1 \times 2^5 + 1 \times 2^6 + 1 \times 2^7 + 1 \times 2^8 + 1 \times 2^9 + 1 \times 2^{10} + 1 \times 2^{11} + 1 \times 2^{12} = 8163$

- From Hexadecimal (1FE3)

- ▣ $3 \times 16^0 + \text{E} \times 16^1 + \text{F} \times 16^2 + 1 \times 16^3 = 3 \times 16^0 + 14 \times 16^1 + 15 \times 16^2 + 1 \times 16^3 = 8163$

- From Octal (17743)

- ▣ $3 \times 8^0 + 4 \times 8^1 + 7 \times 8^2 + 7 \times 8^3 + 1 \times 8^4 = 8163$