RUTGERS

CS211 Computer Architecture
Fall 2020

Recitation 5

Today

- Decimals   binary
- Binary   decimal
- Decimal   octal
- Decimal   hex
- Signed magnitude
  – One's complement
  – Two's complement

Conversions

Decimal	Binary	Octal	Hexa-decimal
0	0	0	0
1	1	1	1
2	10	2	2
3	11	3	3
4	100	4	4
5	101	5	5
6	110	6	6
7	111	7	7

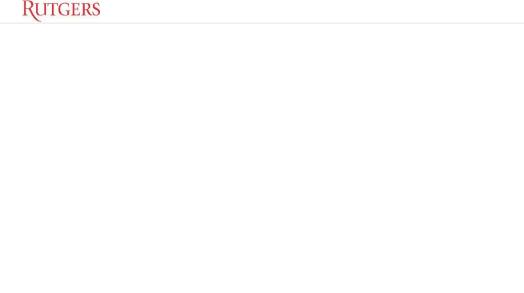| Decimal	Binary	Octal	Hexa-decimal
8	1000	10	8
9	1001	11	9
10	1010	12	A
11	1011	13	B
12	1100	14	C
13	1101	15	D
14	1110	16	E
15	1111	17	F

Binary and Hexadecimal

- Decimal digits: [0 9]
- Binary digits: [0 1]
- Octal digits: [0 7]
- Hex digits: [0 F]

2's Comp Review

- Represents signed numbers
  - MSB determines sign – should be 1 for negative
- Why not 1's comp?
  - 1's comp has 2 values for 0: *because of this*
    - -0 = 11111; +0 = 00000 obviously there is only one 0
- 2's = 1's + 1
- Range of 2's Complement values   *will review next week*
  - For n bits, you can represent the following range of values in 2's comp
  - $[-2n-1, +2n-1 – 1]$
- 2's comp of a positive number is just the positive value in binary + 0

Future

- Will review floating point representation next week!