**Practice Sheet 1**
**CSE 112 Computer Organization**

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**Q1:** Fill the following table by writing the numbers in the mention notation. Write "-" if an appropriate notation does not exist

| Decimal | Unsigned Binary | Signed Magnitude | 2's complement |
|---|---|---|---|
| **15** | | | |
| **-100** | | | |
| | | | **011001** |
| | | **11111** | |
| | **10011** | | |
| **67** | | | |
| | | | **10010** |
| | | | **01000101** |
| | | **0101001** | |
| | | | **100000000** |

**Q2:** Fill in the following by writing the numbers in the mentioned notation.
(xxx) means xxx is repeating indefinitely
*Try to write sign exponent and mantissa separately before writing the whole IEEE754 notation. In signed notation for fixed point numbers, we just add a negative sign in front of the binary to denote the sign.*

| Decimal | Signed Fixed Point | IEEE754 single precision |
|---|---|---|
| **10.5** | | |
| | **-1.0(1001)** | |
| | | **01000001100111100000000000000000** |
| | **10010.(1001)** | |
| | | **10111111111010000000000000000000** |
| **-8.4** | | |

**Q3:** Perform the following computation in 2's complement notation and verify your solution by converting the result back decimal.

a. -200 + (-200)
b. 156 - 100
c. 81 - 80
d. 99 + 32
e. 4 - 13

**Q4:** Multiply the following unsigned numbers in binary and verify the result by converting the product back to decimal.

a. 16 x 4
b. 13 x 16
c. 5 x 3
d. 8 x 6
e. 3 x 32

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## ANSWERS

**A1:**

| Decimal | Unsigned Binary | Signed Magnitude | 2's complement |
|---|---|---|---|
| **15** | 1111 | 01111 | 01111 |
| **-100** | - | 11100100 | 10011100 |
| 25 | 11001 | 011001 | **011001** |
| -15 | - | **11111** | 1110001 |
| 19 | **10011** | 010011 | 010011 |
| **67** | 1000011 | 01000011 | 01000011 |
| -14 | - | 11110 | **10010** |
| 69 | 1000101 | 01000101 | **01000101** |
| 41 | 101001 | **0101001** | 0101001 |
| -256 | - | 11_0000_0000 | **100000000** |

**A2:**

| **Decimal** | **Signed Fixed Point** | **IEEE single754 precision** |
|---|---|---|
| **10.5** | 1010.1 | 01000001001010000000000000000000 |
| -1.3 | **-1.0(1001)** | 10111111010011001100110011001100 |
| 19.75 | 10011.11 | **01000001100111100000000000000000** |
| 18.6 | **10010.(1001)** | 01000001100101001100110011001101 |
| -1.8125 | -1.1101 | **10111111111010000000000000000000** |
| **-8.4** | -1000.(0110) | 11000001000001100110011001100110 |

**A3: Verify by converting back to decimal.**
**A4: Verify by converting back to decimal.**

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