COSC 290

Class Exercises #4

1. We are using the simple model for floating point representation which is a 14-bit format, 5 bits for the exponent with a bias of 15, a normalized mantissa of 8 bits, and a single sign bit.

Show step by step how the computer would represent the following numbers using this floating-point format

* 1. 0.9062510
     1. Convert it into a binary number 0.11101
     2. Normalize this binary number 0.11101 \* 20
     3. Fill up the fields

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |

Red is signed bit.

* 1. – 22.7510

1. Convert it into a binary number -10110.11
2. Normalize this binary number 0.1011011 \* 25
3. Fill up the fields

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 |

1. **Arithmetic Modulo 2**

Find the quotients and remainders for the following division problems using modulo 2 arithmetic operation.

* 1. 1011011102 ÷ 10112  = Q 100001 R 11

b. 11001100112 ÷ 101012 = Q 100111 R 0

c. 1111001001112 ÷ 1001012 = Q 1101000 R 11111