1. (20 points) How would 14 be stored in a C float variable based on 32-bit IEEE floating point number? Write the result in binary. Do not approximate 11/64 (64 is a power of 2 number).

Helps: 8 bits for exponent. 23 bit for fraction. Bias: 127.

**14 = 1110 11/64 = .001011**

**1.110001011 \* 2^3**

**3+127 = 130 = 10000010**

|  |  |  |
| --- | --- | --- |
| 0 | 10000010 | 11000101100000000000000 |

2. (40 points) Consider the following binary representation for an 32-bit IEEE floating point number. What floating point number is this in decimal?

|  |  |  |
| --- | --- | --- |
| 1 | 10111010 | 10111001000000000000000 |

**(128+32+16+8+2)-127 = 59**

**1+½ + 1/8 + 1/16 + 1/32 +1/256**

**441/256 \* -1**

**-441/256 \* 2^ 59**

**-9.9304372e17**

Helps: Bias: 127.

3. (40 points) Consider the following binary representation for an 32-bit IEEE floating point number. What floating point number is this in decimal?

|  |  |  |
| --- | --- | --- |
| 0 | 00000000 | 10111001000000000000000 |

**½ + 1/8 + 1/16 + 1/32 +1/256**

**185/256**

Helps: Bias: 127.