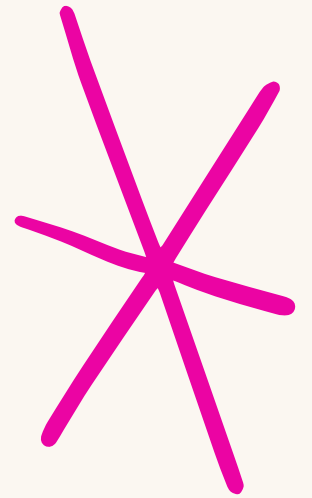
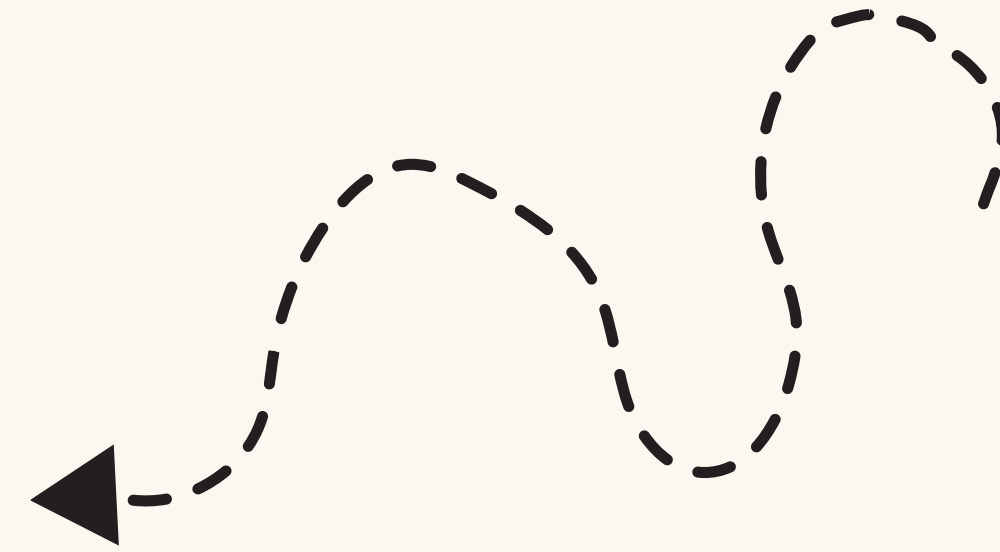


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Numerical



REPRESENTATIONS



QUESTION 1

On a machine with 16-bit ints, the C expression $(30000 + 30000)$ yields a negative result.

Why the negative result? How can you make it produce the correct result?

Assume the following hexadecimal values are 16-bit twos-compliment. Convert each to the corresponding decimal value.

0x0013

0xffff

0x0444

0x8000

0x1234

0xabcd

Question 2

Give a representation for each of the following decimal values in 16-bit two's-complement bit-strings. Show the value in binary, octal and hexadecimal.

1

100000

Question 3

100

-5

10000

-100

What decimal numbers do the following
single-precision IEEE 754-encoded bit-
strings represent?

0 00000000 000000000000000000000000

0 01111110 111111111111111111111111

1 00000000 000000000000000000000000

0 10000000 011000000000000000000000

0 01111111 100000000000000000000000

0 10010100 100000000000000000000000

0 01111110 000000000000000000000000

0 01101110 10100000101000001010000

Question
4

Convert the following decimal numbers into
IEEE 754-encoded bit-strings

2.5

0.375

Question 5

27.0

100.0



QUESTION 6

Write a C function, `six_middle_bits`, which, given a `uint32_t`, extracts and returns the middle six bits