Recursive Divide and Conquer algorithm:
(Note for the sake of space we assume that we already know that anything times 1 is 1, anything times 0 is 0 and anything times 2 we shift to the left once)
46 * 71
46 to eight bit: 00101110
71 to eight bit: 01000111
Divide binary number half and assign as the following:
00101110
A: 0010 B:1110

01000111
C:0100 D:0111

We apply the following formula where n is the number of digits of the original multiplicand:
A * C * 10^n + (A * D + B * C) * 10(n/2) + B * D

0010 * 0100 * 2^8 + (0010 * 0111 + 1110 * 0100) * 2^4 + 1110 * 0111

We apply the formula recursively for each multiplicand.

0010 * 0100 * 2^8 + (0010 * 0111 + 1110 * 0100) * 2^4 + 1110 * 0111

N=4
0010
A: 00 B:10

0100
C: 01 D:00

00 * 1 * 10^4 + (00*00 + 10 * 01) * 2^2 + 10 * 00

Simplify
0 + (10)*2^2 + 0,
1000

We return to the original equation but replacing it with our result
1000 * 2^8 + (0010 * 0111 + 1110 * 0100) * 2^4 + 1110 * 0111
We shift 1000 by eight and apply the formula:
A * C * 2^n + (A * D + B * C) * 2(n/2) + B * D
1000 0000 0000 + (0010 * 0111 + 1110 * 0100) * 2^4 + 1110 * 0111

N=4
0010

A: 00 B:10
0111
C:01 D:11

00 * 01 * 2^4 + (00 * 11 + 10 * 01) * 2^2 + 10 * 11
We can simplify this as:
0 +(0+ 10) *2^2 + 110,
1000 + 110
1110

We return to our problem but replacing it with our result.
1000 0000 0000 + (1110 + 1110 * 0100) * 2^4 + 1110 * 0111

We recursively apply the formula to 1110 * 0100:
A * C * 2^n + (A * D + B * C) * 2(n/2) + B * D

N=4
1110
A: 11 B:10

0100
C:01 D:00

11 * 01 * 2^4 + (11 * 00 + 10 * 01) * 2^2 + 10 * 00
We simplify
11 * 2^4 + (00 + 10) * 2^2 + 00,
110000 + 1000
111000

We return to our problem but replacing the computation with our result.
1000 0000 0000 + (1110 + 111000) * 2^4 + 1110 * 0111

We recursively apply the formula to 1110 * 0111:
A * C * 2^n + (A * D + B * C) * 2(n/2) + B * D

N=4
1110
A:11 B:10

0111
C:01 D:11

11 * 01 * 2^4 + (11 * 11 + 10* 01) * 2^2 + 10 * 11

We recursively apply the formula to 11 * 11:
A * C * 2^n + (A * D + B * C) * 2(n/2) + B * D
N=2
11
A: 1   B: 1

11
C: 1   D: 1

1* 1 *2^2 + (1 * 1 + 1* 1) * 2 + 1 * 1,
We simplify
1 * 2^2 + (1 + 1)* 2 + 1
100 + 100 + 1
1001

We return to our problem but replacing the computation with our result.
11 * 01 * 2^4 + (1001 + 10* 01) * 2^2 + 10 * 11
We simplify
11*2^4 + (1001 + 10) * 2^2 + 110,
110000 + (1011) * 2^2 + 110,
110000 + 101100 + 110,
1100010

We return to our problem but replacing the computation with our result.
100000000000 + (1110 + 111000) * 2^4 + 1100010
We now simplify
1000 0000 0000 + (1000110) * 2^4 + 1100010,
1000 0000 0000 + 100 0110 0000 + 110 0010

We get 1100 1100 0010, which converted to decimal is 3266.