

Binary to Decimal

| | | | | | | | |
|-----|----|----|----|---|---|---|---|
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| | | | | | | | |

Put the binary digits in the boxes from right to left. Add together any #'s that have 1's in them.

Example:

Convert 1101001 to Decimal

| | | | | | | | |
|-----|----|----|----|---|---|---|---|
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| | 1 | 1 | 0 | 1 | 0 | 0 | 1 |

So we would add 64, 32, 8, and 1 and get 105

Convert from Decimal to Binary

Take the table and start subtracting the 1st number that is lower. If you can subtract the #, put a one in that spot. If you cannot, put a 0. Keep going until you get a 0 result.

Example:

Convert 175 to binary

Step 1. Since 128 is less than 175, subtract 128 from 175, and get 47. Now put a 1 in the 128 column.

| | | | | | | | |
|-----|----|----|----|---|---|---|---|
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 1 | | | | | | | |

Step 2. Since 64 is not less than 47, put a 0 in the 64 column

| | | | | | | | |
|-----|----|----|----|---|---|---|---|
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 1 | 0 | | | | | | |

Step 3. Since 32 is less than 47, subtract 32 from 47 to get 15. Now put a 1 in the 32 column

| | | | | | | | |
|-----|----|----|----|---|---|---|---|
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 1 | 0 | 1 | | | | | |

Step 4. Since 16 is NOT less than 15, put a 0 in the 16's column

| | | | | | | | |
|-----|----|----|----|---|---|---|---|
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 1 | 0 | 1 | 0 | | | | |

Step 5. Since 8 is less than 15, subtract 8 and get 7. Put a 1 in the 8's.

| | | | | | | | |
|-----|----|----|----|---|---|---|---|
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 1 | 0 | 1 | 0 | 1 | | | |

Since 4 is less than 7, subtract 4 and get 3, and put a 1 in the 4's

| | | | | | | | |
|-----|----|----|----|---|---|---|---|
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 1 | 0 | 1 | 0 | 1 | 1 | | |

Continue following this process until you get to 0. The table will look like:

| | | | | | | | |
|-----|----|----|----|---|---|---|---|
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 |

Our binary # is: 10101111

Convert Hexadecimal to Decimal

| | | | |
|------|-----|----|---|
| 4096 | 256 | 16 | 1 |
| | | | |

A = 10, B = 11, C = 12, D = 13, E = 14, F = 15

Put the #'s in the boxes from right to left.

Then convert any alphabetic to digits

Multiply whatever is in the 4096 by 4096, the 256s by 256, the 16s by 16 and the 1's by 1 and then add together.

Example:

Convert A2B to Decimal

Put the #'s in the table

| | | | |
|------|-----|----|---|
| 4096 | 256 | 16 | 1 |
| | A | 2 | B |

Convert the alphabetic items to decimal

| | | | |
|------|-----|----|----|
| 4096 | 256 | 16 | 1 |
| | 10 | 2 | 11 |

Now multiply:

$$256 * 10 + 16 * 2 + 11 * 1$$

$$2560 + 32 + 11$$

$$2592 + 11$$

2603 – Our answer

Convert decimal to hexadecimal

Divide the decimal # by 4096, get a # and save the remainder

Divide the remainder by 256, get a # and save the remainder

Divide the remainder by 16, get a # and a remainder

Now convert the #s and the last remainder into Alphabetic. 0-9 do not convert, 10-15 do convert. Put the #s together in order.

Example

Convert 2620 to hexadecimal

Divide 2620 by 4096 and get 0 remainder 2620

Divide the remainder (2620) by 256 and get 10 remainder 60

Divide the remainder (60) by 16 and get 3 remainder 12.

Convert 10 to A and 12 to C

Our number is A3C