**Section 1 - Instructions: Convert the following decimal numbers to binary equivalents**

1. 263

Example:

First set up the powers of 2:

20 = 1

21 = 2

22 = 4

23 = 8

24 = 16

25 = 32

26 = 64

27 = 128

28 = 256

29 = 512

210 = 1024

211 = 2048

212 = 4096

Now select the largest power of 2 in decimal form, this is your most significant bit:

MSB LSB

28

1

Now subtract its decimal equivalent from the number you are converting:

Remainder #1 = 263 – 256 = 7

Now select the next largest binary number that is less than the reminder #1

MSB LSB

28 27 26 25 24 23 22 21 20

1 0 0 0 0 0

Then next largest power of 2 number that is less than or equal to 7 is 22 = 4

Place a 1 in the 22 bit position and subtract 4 from Remainder #1

MSB LSB

28 27 26 25 24 23 22 21 20

1 0 0 0 0 0 1

Remainder #2 = 7 – 4 = 3

Then the largest power of 2 that is less than or equal to 3 is 21 = 2

Place a 1 in the 21 bit position and subtract 2 from Remainder #2

MSB LSB

28 27 26 25 24 23 22 21 20

1 0 0 0 0 0 1 1

Remainder #3 = 3 – 2 = 1

Then the largest power of 2 that is less than or equal to 1 is 20 = 1

Place a 1 in the 20 bit position and subtract 2 from the Remainder #3

MSB LSB

28 27 26 25 24 23 22 21 20

1 0 0 0 0 0 1 1 1

Remainder #4 = 1 – 1 = 0

Since the remainder is now zero we have completed our conversion:

Note: If your reminder is 0 at a higher bit position than the LSB then place “0” in all the subsequent bit positions down to the least significant Bit position 20

1. 512
2. 31,515
3. 789
4. 1024

**Section 2 – Instructions: Convert the following binary numbers to their decimal equivalent**

1. 1011

Example:

23  22 21  20

1 0 1 1

Answer:

Decimal Equivalent = 1 x 23 + 0 x 22 + 1 x 21 + 1 x 20

= 1 x 8 + 0 x 4 + 1 x 2 + 1 x 1

= 8 + 0 + 2 + 1

= 11

1. 10101010
2. 11101
3. 10101111
4. 111000