In-Class Assignment #2 – Running the Bases

1.) Convert 101_2 to decimal.

$(2^2)(1) + (2^0)(1) = 4 + 1 =$ **5**

2.) Convert 1010101_2 to decimal.

$(2^6)(1) + (2^4)(1) + (2^2)(1) + (2^0)(1) = 64 + 16 + 4 + 1 =$ **85**

3.) Convert 0101010_2 to decimal.

$(2^5)(1) + (2^3)(1) + (2^1)(1) = 32 + 8 + 2 =$ **42**

4.) Convert 11111111_2 to decimal.

$(2^7)(1) + (2^6)(1) + (2^5)(1) + (2^4)(1) + (2^3)(1) + (2^2)(1) + (2^1)(1) + (2^0)(1) = 128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 =$ **255**

5.) Convert 1100110011001101_2 to decimal.

$(2^{15})(1) + (2^{14})(1) + (2^{11})(1) + (2^{10})(1) + (2^7)(1) + (2^6)(1) + (2^3)(1) + (2^2)(1) + (2^0)(1) = 32768 + 16384 + 2048 + 1024 + 128 + 64 + 8 + 4 + 1 =$ **52429**

6.) Convert 11111111111111111111_2 to decimal.

$(2^{19})(1) + (2^{18})(1) + (2^{17})(1) + (2^{16})(1) + (2^{15})(1) + (2^{14})(1) + (2^{13})(1) + (2^{12})(1) + (2^{11})(1) + (2^{10})(1) + (2^9)(1) + (2^8)(1) + (2^7)(1) + (2^6)(1) + (2^5)(1) + (2^4)(1) + (2^3)(1) + (2^2)(1) + (2^1)(1) + (2^0)(1) = 524288 + 262144 + 131072 + 65536 + 32768 + 16384 + 8192 + 4096 + 2048 + 1024 + 512 + 256 + 128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 =$ **1048575**

7.) Convert 111100001111_2 to decimal.

$(2^{11})(1) + (2^{10})(1) + (2^9)(1) + (2^8)(1) + (2^3)(1) + (2^2)(1) + (2^1)(1) + (2^0)(1) = 2048 + 1024 + 512 + 256 + 8 + 4 + 2 + 1 =$ **3855**

8.) Convert 100000000000_2 to decimal.

$(2^{11})(1) =$ **2048**

9.) Convert $10101011110011011110111 1_2$ to decimal.

$(2^{23})(1) + (2^{21})(1) + (2^{19})(1) + (2^{17})(1) + (2^{16})(1) + (2^{15})(1) + (2^{14})(1) + (2^{11})(1) + (2^{10})(1) + (2^8)(1) + (2^7)(1) + (2^6)(1) + (2^5)(1) + (2^3)(1) + (2^2)(1) + (2^1)(1) + (2^0)(1) = 8388608 + 2097152 + 524288 + 131072 + 65536 + 32768 + 16384 + 2048 + 1024 + 256 + 128 + 64 + 32 + 8 + 4 + 2 + 1 =$ **11259375**

10.) Convert 5421_{10} to binary.

$5421 = 2^{12} + 2^{10} + 2^8 + 2^5 + 2^3 + 2^2 + 2^0 = 2^{12} + 0 + 2^{10} + 0 + 2^8 + 0 + 0 + 2^5 + 0 + 2^3 + 2^2 + 0 + 2^0 =$ **1010100101101_2**

11.) Convert 80_{10} to binary.

$80 = 2^6 + 2^4 = 2^6 + 0 + 2^4 + 0 + 0 + 0 + 0 =$ **1010000_2**

12.) Convert 12345_{10} to binary.

$12345 = 2^{13} + 2^{12} + 2^5 + 2^4 + 2^3 + 2^0 = 2^{13} + 2^{12} + 0 + 0 + 0 + 0 + 0 + 0 + 2^5 + 2^4 + 2^3 + 0 + 0 + 2^0 =$ **11000000111001_2**

13.) Convert 15_{10} to binary.

$15 = 2^3 + 2^2 + 2^1 + 2^0 =$ **1111_2**

14.) Convert 65535_{10} to binary.

$65535 = 2^{15} + 2^{14} + 2^{13} + 2^{12} + 2^{11} + 2^{10} + 2^9 + 2^8 + 2^7 + 2^6 + 2^5 + 2^4 + 2^3 + 2^2 + 2^1 + 2^0 =$ **1111111111111111_2**

15.) Convert 32767_{10} to binary.

$32767 = 2^{14} + 2^{13} + 2^{12} + 2^{11} + 2^{10} + 2^9 + 2^8 + 2^7 + 2^6 + 2^5 + 2^4 + 2^3 + 2^2 + 2^1 + 2^0 =$ **111111111111111_2**