# Week 1 Tutorial & Practical

## Intro to Computer Systems

1. 15

240

3840

61440

983040

15728640

Total: FF FFFF / 16777215

1. D
2. 107/2 = 1

53/2 = 1

26/2 = 0

13/2 = 1

6/2 = 0

3/2 = 1

½ = 1

BINARY

Result 107 in base 10 = 1101011

OCTAL

1 101 011 = 1 5 3 in base 8

HEXADECIMAL

110 1011 = 6 B in base 16

1. OCTAL

11 111 011 110 = 3 7 3 6 in base 8

DECIMAL

1 + 2 \* 0 = 1

1 + 2 \* 1 = 3

1 + 2 \* 3 = 7

1 + 2 \* 7 = 15

1 + 2 \* 15 = 31

0 + 2 \* 31 = 62

1 + 2 \* 62 = 125

1 + 2 \* 125 = 251

1 + 2 \* 251 = 503

1 + 2 \* 503 = 1007

0 + 2 \* 1007 = 2014

210 29 28 27 26 25 24 23 22 21 20

1024 512 256 128 64 32 16 8 4 2 1

1 1 1 1 1 0 1 1 1 1 0

1024 + 512 + 256 + 128 + 64 + 16 + 8 + 4 + 2 = 2014

Total = 2014

1. 9A9

Into BINARY

1001 1010 1001

Into DECIMAL

211 210 29 28 27 26 25 24 23 22 21 20

2048 1024 512 256 128 64 32 16 8 4 2 1

1 0 0 1 1 0 1 0 1 0 0 1

2048 + 256 + 128 + 32 + 8 + 1 =

Total = 2473

9 \* 162 + 10 \* 16 + 9 \* 1

2304 + 160 + 9

Total = 2473

DEAD

Into DECIMAL

13 \* 163 + 14 \* 162 + 10 \* 16 + 13 \* 1

53248 + 3584 + 160 + 13

Total = 57005

**QUESTION 1**

1. 117

BINARY

117/2 = 1

58/2 = 0

29/2 = 1

14/2 = 0

7/2 = 1

3/2 = 1

½ = 1

Result = 111 0101

HEXADECIMAL

0111 0101

7 5

Result = 75

1. 127

BINARY

127/2 = 1

63/2 = 1

31/2 = 1

15/2 = 1

7/2 = 1

3/2 = 1

½ = 1

Result = 111 1111

HEXADECIMAL

0111 1111

7 F

Result = 7F

1. 128

BINARY

128/2 = 0

64/2 = 0

32/2 = 0

16/2 = 0

8/2 = 0

4/2 = 0

2/2 = 0

½ = 1

Result = 1000 0000

HEXADECIMAL

1000 0000

8 0

Result = 80

1. 255

BINARY

255/2 = 1

127/2 = 1

63/2 = 1

31/2 = 1

15/2 = 1

7/2 = 1

3/2 = 1

½ = 1

Result = 1111 1111

HEXADECIMAL

1111 1111

F F

Result = FF

**QUESTION 2**

1. 1101 base 2

1 + 2 \* 0 = 1

1 + 2 \* 1 = 3

0 + 2 \* 3 = 6

1 + 2 \* 6 = 13

Total = 13

1. 7014 base 8

7 \* 83  + 0 \* 82 + 1 \* 81 + 4 \* 80

7 \* 512 + 0 \* 64 + 1 \* 8 + 4 \* 1

3584 + 0 + 8 + 4

Total = 3596

OR

CONVERT TO BINARY (EASIER WITHOUT CALCULATOR)

7 0 1 4

111 000 001 100

BINARY = 1110 0000 1100

1 + 2 \* 0 = 1

1 + 2 \* 1 = 3

1 + 2 \* 3 = 7

0 + 2 \* 7 = 14

0 + 2 \* 14 = 28

0 + 2 \* 28 = 56

0 + 2 \* 56 = 112

0 + 2 \* 112 = 224

1 + 2 \* 224 = 449

1 + 2 \* 449 = 899

0 + 2 \* 899 = 1798

0 + 2 \* 1798 = 3596

Total = 3596

1. 7DE base 16

Into BINARY first (no calculator)

7 D E

0111 1101 1110

BINARY to DECIMAL

0 + 2 \* 0 = 0

1 + 2 \* 0 = 1

1 + 2 \* 1 = 3

1 + 2 \* 3 = 7

1 + 2 \* 7 = 15

1 + 2 \* 15 = 31

0 + 2 \* 31 = 62

1 + 2 \* 62 = 125

1 + 2 \* 125 = 251

1 + 2 \* 251 = 503

1 + 2 \* 503 = 1007

0 + 2 \* 1007 = 2014

Total = 2014

**QUESTION 3**