***Midterm Exam***

Q1: Find the Hexadecimal Representation for each of the following Binary numbers (**16 points**)

1. 10101101 = AD

1010 1101

A D

# 2. 00100111 = 27

0010 0111

2 7

3. 01010111 = 57

0101 0111

5 7

4. 11101111 = EF

1110 1111

E F

Q2: Find the Binary Representation for each of the following Hexadecimal numbers (**16 points**)

# 8E = 1000 1110

# 8 E

# 1000 1110

1. 7C = 0111 1100

7 C

0111 1100

1. 5C = 0101 1100

5 C

0101 1100

1. AD = 1010 1101

A D

1010 1101

Q3: Find the Binary Representation for each of the following Decimal numbers (**16 points**) 1. 10 = 1010

10 ÷ 2 = 5 R = 0

5 ÷ 2 = 2 R = 1

2 ÷ 2 = 1 R = 0

1 ÷ 2 = 0 R = 1

# 2. 53 = 0011 0101

53 ÷ 2 = 26 R = 1

26 ÷ 2 = 13 R = 0

13 ÷ 2 = 6 R = 1

6 ÷ 2 = 3 R = 0

3 ÷ 2 = 1 R = 1

1 ÷ 2 = 1 R = 1

3. 85 = 0101 0101

85 ÷ 2 = 42 R = 1

42 ÷ 2 = 21 R = 0

21 ÷ 2 = 10 R = 1

10 ÷ 2 = 5 R = 0

5 ÷ 2 = 2 R = 1

2 ÷ 2 = 1 R = 0

1 ÷ 2 = 0 R = 1

1. 4.48 = 0100.0111 1010 1110

Integral part

4 = 0100

4 ÷ 2 = 2 R = 0

2 ÷ 2 = 1 R = 0

1 ÷ 2 = 0 R = 1

Decimal part

0.48 x 2 = 0.96 0

0.96 x 2 = 1.92 1

0.92 x 2 = 1.84 1

0.84 x 2 = 1.68 1

0.68 x 2 = 1.36 1

0.36 x 2 = 0.72 0

0.72 x 2 = 1.44 1

0.44 x 2 = 0.88 0

0.88 x 2 = 1.76 1

0.76 x 2 = 1.52 1

0.52 x 2 = 1.04 1

0.04 x 2 = 0.08 0

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Q4: Each of the following hexadecimal numbers can be interpreted as representing a decimal number or a pair of ASCII codes. Give both interpretations (**16 points**).

# 43 53 =17253

4 3 5 3

= 4 × 163 + 3 × 162 + 5 × 161 + 3 × 160 = 17253

Hex ASCII

43 53 = CS

2. 31 36 = 12598

3 1 3 6

= 3 × 163 + 1 × 162 + 3 × 161 + 6 × 160 = 12598

Hex ASCII

31 36 = 16

3. 48 61 = 18529

4 8 6 1

= 4 × 163 + 8 × 162 + 6 × 161 + 1 × 160 = 18529

Hex ASCII

48 61 = Ha

4. 64 25 = 25637

6 4 2 5

= 6 × 163 + 4 × 162 + 2 × 161 + 5 × 160 = 25637

Hex ASCII

64 25 = d%

Q5: Find the binary double word-length 2’s complement representation of each of the following decimal numbers (16 points)

# 1. -7 = 1111 1111 1111 1111 1111 1111 1111 1001

7 ÷ 2 = 3 R = 1

3 ÷ 2 = 1 R = 1

1 ÷ 2 = 0 R = 1

7 = 0000 0000 0000 0000 0000 0000 0000 0111

0000 0000 0000 0000 0000 0000 0000 0111

1111 1111 1111 1111 1111 1111 1111 1000

+ 1

1111 1111 1111 1111 1111 1111 1111 1001

2. -38 = 1111 1111 1111 1111 1111 1111 1101 1010

38 ÷ 2 = 19 R = 0

19 ÷ 2 = 9 R = 1

9 ÷ 2 = 4 R = 1

4 ÷ 2 = 2 R = 0

2 ÷ 2 = 1 R = 0

1 ÷ 2 = 0 R = 1

38 = 0000 0000 0000 0000 0000 0000 0010 0110

0000 0000 0000 0000 0000 0000 0010 0110

1111 1111 1111 1111 1111 1111 1101 1001

+ 1

1111 1111 1111 1111 1111 1111 1101 1010

3. -100 = 1111 1111 1111 1111 1111 1111 1001 1100

100 ÷ 2 = 50 R = 0

50 ÷ 2 = 25 R = 0

25 ÷ 2 = 12 R = 1

12 ÷ 2 = 6 R = 0

6 ÷ 2 = 3 R = 0

3 ÷ 2 = 1 R = 1

1 ÷ 2 = 0 R = 1

100 = 0000 0000 0000 0000 0000 0000 0110 0100

0000 0000 0000 0000 0000 0000 0110 0100

1111 1111 1111 1111 1111 1111 1001 1011

+ 1

1111 1111 1111 1111 1111 1111 1001 1100

4. -25 = 1111 1111 1111 1111 1111 1111 1110 0111

25 ÷ 2 = 12 R = 1

12 ÷ 2 = 6 R = 0

6 ÷ 2 = 3 R = 0

3 ÷ 2 = 1 R = 1

1 ÷ 2 = 0 R = 1

25 = 0000 0000 0000 0000 0000 0000 0001 1001

0000 0000 0000 0000 0000 0000 0001 1001

1111 1111 1111 1111 1111 1111 1110 0110

+ 1

1111 1111 1111 1111 1111 1111 1110 0111

Q6: Assume that EBX and ECX have the following values:(**40 POINTS**) EBX: FF FF FF 75

ECX: 00 00 01 A2

Find the Values in EBX and ECX after the execution of each instruction individually

* 1. ADD EBX, ECX

1 11 11 11

FF FF FF 75

+ 00 00 01 A2

1 00 00 01 17

EBX: 00 00 01 17

ECX: 00 00 01 A2

* 1. MOV EBX, ECX

ECX: 00 00 01 A2

EBX: 00 00 01 A2

* 1. XCHG EBX, ECX

Swap EBX, ECX

EBX: 00 00 01 A2

ECX: FF FF FF 75

* 1. SUB EBX, ECX

EBX: FF FF FF 75

ECX 00 00 01 A2

FF FF FF 75

* 00 00 01 A2

FF FF FD D3

ECX : 00 00 01 A2

EBX : FFFF FDD3

* 1. INC EBX

FF FF FF 75

+ 1

FF FF FF 76

ECX : 00 00 01 A2

EBX : FF FF FF 76

Q7 Programming question (**40 points**)

Write an assembly program (Data and Code) that uses loop to read 10 numbers and output the largest of those two numbers, you can assume any length for those numbers.

Q8 Programming question (**40 points**)

Write an assembly program (Data and Code) that read and swap two numbers, and output them after swapping, you can assume any length for those numbers.