Assignment-2

1. (20 marks) Given two decimal numbers ±272.6410 . Find the representations for the two

numbers with the negative decimal system.

Ans.) (+272.64)10 = 272.610 + 0.0410

= 27310 - 0.410 + 0.0410

= 27010 + 310 – 0.410 + 0.0410

= 30010 – 3010 + 310 – 0.410 + 0.0410

= 3\*(-10)2 + 3\*(-10)1 + 3\*(-10)0 + 4\*(-10)-1 + 4\*(-10)-2

= (333.44)-10

(-272.64)10  = -272.7 + 0.06

= -272 – 0.7 + 0.06

= -280 + 8 – 0.7 + 0.06

= -200 – 80 + 8 – 0.7 + 0.06

= -1000 + 800 – 80 + 8 – 0.7 + 0.06

= 1\*(-10)3  + 8\*(-10)2  + 8\*(-10)1  + 8\*(-10)0 + 7\*(-10)-1 + 6\*(-10)-2

= (1888.76)-10

2. (20 marks) Find the representations for two numbers ±7.510 with the negative binary system.

Ans.) |7.5|10 = 111.12

=> 7.510 = 111.12

= 1000.02 - 0.12

= 100002 - 10002 - 0.12

= 10000-2 + 1000-2 + 0.1-2

= (11000.1)-2

=> (-7.5)10 = (-111.1)2

= -1112 - 0.12

= -10002 + 12 - 0.12

= 1000-2 + 1-2 + 0.1-2

= (1001.1)-2

3. (20 marks) Find the representations for the two numbers ±30.62510 with the binary signed-digit

number system. At least one positive integer digit, one positive fraction digit, one negative

integer digit, and one negative fraction digit must appear in the representation.

Ans.) (+30.625)10 = (0011110.101)2 = (11110.101)BSD

Using the string property that, (111....1)n-bits = (100...)n+1 bits and that 01 = 1

= (010000. 11)BSD

Here, 1 (positive) and (negative) both are present as integer and fraction digits.

(-30.625)10 = (111110.101)2 in sign-magnitude form

= (0 . 0 )BSD

= ( 0 0 0 1 0. 1 )BSD

Here, 1 (positive) and (negative) both are present as integer and fraction digits.

4. (20 marks) Given binary signed-digit (BSD) number system with r = 2, k = 5, m = 0, and

digit set {−1, 0, 1}. Find all the representations for decimal value 1810 with this signed-digit

number system.

Ans.) (18)10 = (10010)BSD with r=2, k=5 and m=0

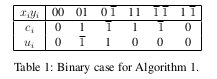
= (1010)BSD

= (110)BSD

5. (20 marks) Perform binary SD carry-free addition for A+B, and C +D, by first using Table 2.1,

and if it is not working, then use Table 2.2, where

A = 10101 2 , B = 100112 , C = 101012 and D = 110102 .

Ans.) 

A = ( 1 0 1 0 1)2 = ( 1 1 0 1 )BSD

B = ( 1 0 0 1 1)2 = ( 1 1 0 )BSD

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1 1 0 0

0 0 0 0 0

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Z = (1 1 0 0 0)BSD

C = ( 1 0 1 0 1)2 =( 1 1 1 )BSD

D = ( 1 1 0 1 0)2 = ( 1 1 1 0 )BSD

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1 1 0 0

0 0 0 0 1

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Z = ( 1 1 0 0 1 )BSD