Practical 2

Number Representation

NOTE: Use of internet is not permitted, calculators are permitted and your answers must include worked solutions. If you require extra sheet(s) please write your name and student number at the top of each additional sheet.

Part A

Objective

Convert decimal numbers to binary showing in detail the conversion process

1. Convert the number of days in a leap year 366_{10} to $Base_2$

Xn	number count	remainder	total	Binary	total
2*8	256	110	256	1 0000 0000	1 0000 0000
2*7	128	110	256	0 1000 0000	1 0000 0000
2*6	64	46	320	0 0100 0000	1 0100 0000
2*5	32	14	352	0 0010 0000	1 0110 0000
2*4	16	14	352	0 0001 0000	1 0110 0000
2*3	8	6	360	0 0000 1000	10110 1000
2*2	4	2	364	0 0000 0100	1 0110 1100
2*1	2	0	366	0 0000 0010	1 0110 1110
2*0	0	0	366	0 0000 0001	1 0110 1110

2. Convert the number of available seats in the new Páirc Uí Chaoimh $45{,}000_{10}$ to $Base_2$

Part B

Objective

Convert numbers $base_n$ to hexadecimal showing in detail the conversion process

1. Convert the number 181336782_{10} to $Base_{16}$
2. Convert the number $C0FF.EE_{16}$ to $Base_{10}$ directly

Part C

Objective

Convert numbers $base_n$ to $base_n$ showing in detail the conversion process

1. What is the $Base_{16}$ value of 8 bit 2's complement number $1001\ 0101_2$

2*7 128 1
2*6 64 0
2*5 32 0
2*4 16 1
2*3 8 0
2*2 4 1
2*1 2 0
2*0 1 1

decimal = 149

(128*1) + (16*1)+(4*1)+(1*1) = 149*10

16n	number	count	remainder	
16*1	16	9	144	(149%16 == 9.3125 hence 9, 9*16 = 144)
16*0	1	5	0	

95*16

2. Subtract 13_{10} from 42_{10} using 8 bit 2's complement and convert to $Base_8$

13*10 = 1101
45*10 = 00101010

0000 1101
+0010 1010

Part D

Objective

Convert numbers base$_n$ to hexadecimal showing in detail the conversion process

1. Add -32_{10} to 61_{10} using 8 bit 2's complement
32*10 = 100000 -32*10 = 1100000 61*10 = 111101
2. Add -4_{10} to 46_{10} using 8 bit 2's complement

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Hand up this practical report at the end of session and ensure it has been checked

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Date	11/10/2022	**Checked**	
Group	**A / B**		