ITI1100 Assignment01

Name：Yiwen Liu

Student Number：8943192

1-3:

a) $(4310)_5 = 4\times5^3 + 3\times5^2 + 1\times5^1 + 0\times5^0 = 500+75+5 = 580$

b) $(198)_{12} = 1\times12^2 + 9\times12^1 + 8\times12^0 = 144+108+8 = 260$

c) $(435)_8 = 4\times8^2 + 3\times8 + 5 = 256+24+5 = 285$.

d) $(345)_6 = 3\times6^2 + 4\times6 + 5 = 108+24+5 = 137$

1-7:

64CD ① ⇒ binary ② ⇒ octal

① 64CD $\Rightarrow (0110\ 0100\ 1100\ 1101)_2$.

② $(0110\ 0100\ 1100\ 1101)_2 \Rightarrow (62315)_8$

1-9: c) d) e)

c) $(26.24)_8 = 2\times8 + 6 + 2\times8^{-1} + 4\times8^{-2} = 22.3125$.

d) $(DADA.B)_{16} = 13\times16^3 + 10\times16^2 + 13\times16^1 + 10\times16^0 + 11\times16^{-1} = 56026.6875$.

e) $(1010.1101)_2 = 1\times2^3 + 0\times2^2 + 1\times2 + 0 + 1\times2^{-1} + 1\times2^{-2} + 0\times2^{-3} + 1\times2^{-4} = 10.8125$.

1-11:

111011 ÷ 101 = ~~1011 with remainder~~ 1011 × 101 + 100

```
      1011
101 ) 111011
      101
      ----
       1001
        101
       ----
       1001
       [redacted]
        101
       ----
        100
```

1011 with reminders 100.

1-13

a) $(27.315)_{10} \Rightarrow (?)_2$.

$(27.315)_{10} = (27)_{10} + (0.315)_{10}$.

$27/2 = 13$ rem 1

$13/2 = 6$ rem 1

$6/2 = 3$ rem 0

$3/2 = 1$ rem 1

$1/2 = 0$ rem 1

$\Rightarrow (27)_{10} = (11011)_2$.

$0.315 \times 2 = 0.630$

$0.630 \times 2 = 1.260$

$0.260 \times 2 = 0.520$

$0.520 \times 2 = 1.040$

$\Rightarrow (0.315)_{10} \approx (0.0101)_2$.

$\Rightarrow (27.315)_{10} = (11011.0101)_2$

b) $(\frac{2}{3})_{10} \Rightarrow (?)_2$.

$\frac{2}{3} \times 2 = 1 + \frac{1}{3}$.

$\frac{1}{3} \times 2 = 0 + \frac{2}{3}$.

$\frac{2}{3} \times 2 = 1 + \frac{1}{3}$.

$\frac{1}{3} \times 2 = 0 + \frac{2}{3}$

$\frac{2}{3} \times 2 = 1 + \frac{1}{3}$

$\frac{1}{3} \times 2 = 0 + \frac{2}{3}$

$\frac{2}{3} \times 2 = 1 + \frac{1}{3}$.

$\frac{1}{3} \times 2 = 0 + \frac{2}{3}$.

$\Rightarrow (\frac{2}{3})_{10} = (0.10101010)_2$.

$(0.10101010)_2 \Rightarrow (?)_{10}$.

~~$1\times10^{-1} + 0\times10^{-2} + 1\times10^{-3} + 0\times10^{-4} + 1\times10^{-5} + 0\times10^{-6} + 1\times10^{-7} + 0\times10^{-8}$~~

$1\times2^{-1} + 1\times2^{-3} + 1\times2^{-5} + 1\times2^{-7} = 0.6640625$.

It's ~~not so~~ about 0.002 ~~then~~ between the results.

c). $(0.10101010)_2 \Rightarrow (?)_{16} \Rightarrow (?)_{10}$

$(0.10101010)_2 = (AA)_{16}$ $(0.AA)_{16}$

~~$(0.AA)_{16} = (0.1212)_{10}$~~

$10 \times 16^{-1} + 10 \times 16^{-2} = 0.6640625$.

So the answer is the same.

1-14.

(b). $(00000000)_2$

1's : $= (11111111)_2$

2's : $= (00000000)_2$.

(c). $(1101\ 1010)_2$.

1's : $= (00100101)_2$.

2's : $= (00100110)_2$.

(e) $(10000101)_2$.

1's : $= (01111010)_2$

2's : $= (01111011)_2$.

(f). $(1111\ 1111)_2$

1's : $= (0000\ 0000)_2$.

2's : $= (00000001)_2$

1-16.

(a) $10000 - C3DF = 3C21$

(b) $(C3DF)_{16} \Rightarrow (?)_2$.

$= (1100\ 0011\ 1101\ 1111)_2$.

(c). 2's : $(0011\ 1100\ 0010\ 0001)_2$

(d) $(0011\ 1100\ 0010\ 0001)_2 \Rightarrow (?)_{16}$

$= (3\ C\ 2\ 1)_{16}$.

It's the same as the result in (a).

1-17.

(a) $[2579] = 10^4 - (2579)_{10} = (7421)_{10}$.

$(4637)_{10} + (7421)_{10} = (12058)_{10}$.

(b) $[1800] = 10^4 - (1800)_{10} = (8200)_{10}$.

~~$(125)_{10} + (8325)_{10}$~~

$(125)_{10} + (8200)_{10} = (8325)_{10}$.

$[8325] = 10^4 - (8325)_{10} = (1675)_{10}$

$(125)_{10} - (1800)_{10} = (-1675)_{10}$.

(c) $[4361] = 10^4 - (4361)_{10}$

$= (5639)_{10}$.

$(2043)_{10} + (5639)_{10} = (7682)_{10}$.

$[7682] = 10^4 - (7682)_{10} = (2318)_{10}$.

$(2043)_{10} - (4361)_{10} = (-2318)_{10}$

(d) $[0745] = 10^4 - (0745)_{10} = (9255)_{10}$

$(1631)_{10} + (9255)_{10} =$ ~~$(10886)_{10}$~~.

~~$(886)_{10}$~~.

1-18

a) ~~[-10010]~~

A = 10011 B = 10010.

A-B = A+[B] = (10011) + (01110) = (00001).

```
  10011
+ 01110
-------
 100001
```

(b) A = 100010 B = 100110.

A-B = A+[B] = (100010) + (011010) = $(111100)_2$

```
  100010
+ 011010
--------
  111100
```

~~(000100)~~

$= (-000100)_2$

(c) A = 10011 B = 110101

A-B = A+[B] = $(001001)_2$ + $(001011)_2$ = ~~(01100)~~

~~10011~~ 001001

~~+ 01011~~ + 001011

~~10100~~ 010100

~~$= (-01100)_2$~~

$= (-101100)_2$

(d), A = 101000 B = 10101.

A-B = A+[B] = (101000) + (101011)

= (011011).

```
  101000
+ 101011
--------
 1011011
```

10

1-20.

$(49)_{10} = (110001)_2$.

$49/2 = 24$ rem 1.
$24/2 = 12$ rem 0.
$12/2 = 6$ rem 0
$6/2 = 3$ rem 0.
$3/2 = 1$ rem 1.
$1/2 = 0$ rem 1.

$(29)_{10} = (011101)_2$.

$29/2 = 14$ rem 1
$14/2 = 7$ rem 0
$7/2 = 3$ rem 1
$3/2 = 1$ rem 1
$1/2 = 0$ rem 1.

$(+49)_{10} = (00110001)_2$, $(+29)_{10} = (00011101)_2$

$(-49)_{10} = (10001111)_2$ $(-29)_{10} = (11000111)_2$

$(+29)_{10} + (-49)_{10} = (00011101)_2 +$ ~~$(11000111)_2$~~
$(10001111)_2$.

$= (11101100)_2 = (-20)_{10}$.

$(-29)_{10} + (+49)_{10} = (11000111)_2 + (00110001)_2$

$= (00010100)_2 = (20)_{10}$

$(-29)_{10} + (-49)_{10} = (11100011)_2 + (11001111)_2$.

$= (10110010)_2 = (-78)_{10}$.

1-29

Steve Jobs.