Assignment (1): Arithmetic in Number System

Binary

(a) 10001 + 1010

```
  10001
   1010
-------
  11011
```

(b) 10001 – 1010

```
  10001
   1010
-------
  00111
```

```
 16  8  4  2  1
  1  0  0  0  1  = 17
     1  0  1  0  = 10
  0  0  1  1  1  =  7
```

(c) 10001 * 1010

```
    10001
     1010
---------
    00000
   10001
  00000
 10001
---------
 10101010
```

(d) 10001 / 1010 = 0001

```
10 | 17   1 <= Quotient
     7     <= Remainder
```

Octal

(a) 17 + 23

```
  17
  23
----
  42
```

```
7 + 3 = 10 – 8 = 2   1 <= carry bit
```

(b) 17 – 23, 23 - 17

```
   0000 0017
   0000 0023
-------------
1  7777 7774
```

```
   0000 0023
   0000 0017
-------------
   0000 0004
```

(c) $17 * 23 = 435_8$

$17_8 = 15_{10}$
$23_8 = 19_{10}$
285_{10}

```
8 | 285  5 <= Remainder
  8 | 35  3 <= Remainder
      4     <= Remainder
```

(d) $17 / 23 = 0$
$23 / 17 = 1$

Hexadecimal

(a) AED4 + FAC3

```
  A E D 4
  F A C 3
-----------
1 A 9 9 7
```

(b) AED4 – FAC3

```
  A E D 4
  F A C 3
-----------
F B 4 1 1
```

(c) AED4 * FAC3

```
      A E D 4
      F A C 3
-------------
    2 0 C 7 C
  8 3 1 F 0
6 D 4 4 8
A 3 E 6 C
-------------
A B 4 0 3 3 7 C
```

(d) AED4 / FAC3 = 0

$AED4_{16} = 44756_{10}$
$FAC3_{16} = 64195_{10}$

$44756_{10} / 64195_{10} = 0$