NUMBER SYSTEM CONVERSION AND ARITHMETIC

Convert the following numbers in decimal to binary, octal, and hexadecimal: 156, 1024, 255.

1. 156 :

Decimal To Binary :

2	156	
2	78	**0**
2	39	**0**
2	19	**1**
2	9	**1**
2	4	**1**
2	2	**0**
	1	**0**

$(156)_{10} = (10011100)_2$

Decimal To Octal

8	156	
8	19	**4**
	2	**3**

$(156)_{10} = (234)_8$

Decimal To Hexa Decimal

16	156	
	8	**12**

=> 12 = C

$(156)_{10} = (8C)_{16}$

2. 1024

Decimal To Binary

2	1024	
2	512	**0**
2	256	**0**
2	128	**0**

2	64	**0**
2	32	**0**
2	16	**0**
2	8	**0**
2	4	**0**
2	2	**0**
	1	**0**

$(1024)_{10} = (10000000000)_2$

Decimal To Octal

8	1024	
8	128	**0**
8	16	**0**
	2	**0**

$(1024)_{10} = (2000)_8$

Decimal To Hexa Decimal

16	1024	
16	64	**0**
16	4	**0**

$(1024)_{10} = (400)_{16}$

3. 255

Decimal To Binary

2	255	
2	127	**1**
2	63	**1**
2	31	**1**
2	15	**1**
2	7	**1**
2	3	**1**
	1	**1**

$(255)_{10} = (11111111)_2$

Decimal To Octal

8	255	
8	31	**7**
8	3	**7**

$(255)_{10} = (377)_8$

Decimal To Hexadecimal

16	255	
8	15	**15**

=> 15 = F

$(255)_{10} = (FF)_{16}$

Convert the following into Octal $(124)_{10}$, $(A78E)_{16}$

1. $(124)_{10}$

8	124	
8	15	**4**
	1	**7**

$(124)_{10} = (174)_8$

2. $(A78E)_{16}$

$(A78E)_{16}$

$= (A \times 16^3) + (7 \times 16^2) + (8 \times 16^1) + (E \times 16^0)$

We know that A = 10 And E = 14

$= (10 \times 16^3) + (7 \times 16^2) + (8 \times 16^1) + (14 \times 16^0)$

$= 40960 + 1792 + 128 + 14$

$= (42894)_{10}$

8	42894	
8	5361	**6**
8	670	**1**
8	83	**6**
8	10	**3**
8	1	**2**

$(A78E)_{16} = (123616)_8$

Convert the following into Hexadecimal $(784)_{10}$, $(372)_8$.

1. $(784)_{10}$

16	784	
16	49	**0**
	3	**1**

$(784)_{10} = (310)_{16}$

2. $(372)_8$

$= (3 \times 8^2) + (7 \times 8^1) + (2 \times 8^0)$

$= 192 + 56 + 2$

$= (250)_{10}$

16	250	
16	15	**10**

We Know That 15 = F And 10 = A

$(372)_8 = (FA)_{16}$

Convert the following into Binary $(235)_8$, $(276)_{10}$, $(C13E)_{16}$

1. $(235)_8$

$= (2 \times 8^2) + (3 \times 8^1) + (5 \times 8^0)$

$= 128 + 24 + 5$

$= (157)_{10}$

2	157	
2	78	**1**
2	63	**1**
2	31	**1**
2	15	**1**
2	7	**1**
2	3	**1**
	1	**1**

$(235)_8 = (11111111)_2$

2. $(276)_{10}$

2	276	
2	138	**0**
2	69	**0**
2	34	**1**
2	17	**0**
2	8	**1**
2	4	**0**
2	2	**0**
	1	**0**

$(276)_{10} = (100010100)_2$

3. $(C13E)_{16}$

$= (C \times 16^3) + (1 \times 16^2) + (3 \times 16^1) + (E \times 16^0)$

We Know That C = 12 And E = 14

$= (12 \times 16^3) + (1 \times 16^2) + (3 \times 16^1) + (14 \times 16^0)$

$= 49152 + 256 + 48 + 14$

$= (49470)_{10}$

2	49470	
2	24735	**0**
2	12367	**1**
2	6183	**1**
2	3091	**1**
2	1545	**1**
2	772	**1**
2	386	**0**

2	193	**0**
2	96	**1**
2	48	**0**
2	24	**0**
2	12	**0**
2	6	**0**
2	3	**0**
2	1	**1**

$(C13E)_{16} = (1100001001111110)_2$