

# Assignment 6

## Question 1

32 bits      sign 1      exponent 8 bits      mantissa 23 bits

1)  $+4.2 \times 10^8$

First  $+4.2 = 0.110100100$   
 $00000100$   
 $\rightarrow 4$

$0.2 \times 2 = 0.4$	0
$0.4 \times 2 = 0.8$	0
$0.8 \times 2 = 1.6$	1
$0.6 \times 2 = 1.2$	1
$0.2 \times 2 = 0.4$	0
$0.4 \times 2 = 0.8$	0
$0.8 \times 2 = 1.6$	1

$4.2 \times 10^8 = 1.0101 \times 10^{28}$   
 $\rightarrow$  mantissa

$+4.2$  hence sign = 0

Exponent =  $127 + 28$   
 $= 155$

00 1100 1100 11...

$\rightarrow 10011011$

Thus  $4.2 \times 10^8 \rightarrow 0 \ 10011011 \ 101010000 \dots$   $\rightarrow$  till 23 bits

2) 1 0111011 1000...

mantissa = 0.5

exponent =  $1 + 2 + 8 + 16 + 32 + 64$   
 $= 123$

$= 6/8 \times 10^{123-127} = -4$

ANSWER:  $-0.5 \times 2^{-4}$

## Question 2

f0	aF	a4	a3	20
1. 11110000	10011111	10100100	10010011	00100000
3d	20	f0	a9f	a8
00111101	00100000	11110000	10011111	10011000
8e				
10001110				



Space  
↑

2. 1111 0000 1001111 1010 0100 10010011 00100000  
 4 byte  
001111 01 00100000 11110000 1001111 10011000  
 Space  
10001110

1. 0000 1111 10 01 0001 0011  
 0 f 9 1 3

U-0f913 : (CJK compatibility)  
 IDEOGRAPH-FA13

2. 20 → Space : U-0020

3. 3d : U-003d : "=" 4. 20 → Space : U-0020

5. 0000 0001 1111 0110 0000 1110  
 0 1 f 6 0 e

U-01f60e :

FINAL : =

### Question 3

1. Person → name (String)  
 age (Int)  
 status (Bool)

ANSWER : ~~Person~~ ~~String~~ ~~Int~~ ~~Bool~~

data Person = Person String Int Bool

2. ANSWER :

data Boolean = Trues | Falses

instance Show Boolean where

show Trues = "is a student"

show Falses = "is not a student"

data Person a = Person String a Boolean

Kept it as a instead of Int as difference in data type

instance Show a => Show (Person a) where

show (Person x y z) = [ "++ show x ++ "is" ++ show y ++ "years old and "  
 ++ show z ++ "]"



3. newAge :: Person a → a → Person a

newAge (Person name — Status) newAgeValue = Person name newAgeValue  
Status

In ghci

let person = Person "Alice" 21 True

newAge person 21

↓

["alice" is 21 years old and is a student]