**Deep Learning Homework II Report**

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**Problem1**

Source Code:

import math

x\_1=2

w\_1=1

x\_2=3

w\_2=2

def manual\_com():

f\_1=x\_1\*w\_1

f\_2=math.sin(f\_1)

f\_3=f\_2\*\*2

f\_4=x\_2\*w\_2

f\_5=math.cos(f\_4)

f\_6=f\_5+f\_3

f\_7=f\_6+2

f\_8=1/f\_7

d\_8=1.00

d\_7=d\_8\*(-1/f\_7\*\*2)

d\_6=d\_7\*1

d\_5=d\_6\*1

d\_4=d\_5\*(-math.sin(f\_4))

d\_x\_2=d\_4\*w\_2

d\_w\_2=d\_4\*x\_2

d\_3=d\_5\*1

d\_2=d\_3\*2\*f\_2

d\_1=d\_2\*math.cos(f\_1)

d\_x\_1=d\_1\*w\_1

d\_w\_1=d\_1\*x\_1

print("The result of forward propagation is "+str(f\_8))

print("The gradient of x1 is %.3f"%d\_x\_1)

print("The gradient of w1 is %.3f"%d\_w\_1)

print("The gradient of x2 is %.3f"%d\_x\_2)

print("The gradient of w2 is %.3f"%d\_w\_2)

manual\_com()

Problem procedure:

At the begging of the whole program we should set up the initial value of x1, x2, w1, w2 to compute. I draw the computational graph first to calculate the final result of forward propagation. Then I analysis all the functions used in the forward propagation and calculated out the derivate function. The principle here is, upstream