**CS 471-571**

**Artificial Intelligence**

**Programming Assignment 2**

(300pts.)

**Name:**

**Date:** 10-2-18

**Due:** 10-11-18 by 5 pm

**Problem 1:** Using a single hidden layer feed-forward neural network (FFNN) with 2 inputs and 2,3,4,5,6,7 and 8 hidden nodes and 1 output to model the data below. Compare your results. What happens when you expand the hidden layer. Why is this important? But why might it also be bad?

0.374186 0.904727 166

0.397672 0.074281 221

0.387948 0.153990 244

0.541511 0.148609 61

**x** = 0.366906 0.760656 **y** = 190

0.389160 0.570398 131

0.892068 0.926974 164

0.507588 0.752778 216

0.316727 0.477287 134

0.727478 0.414801 146

Solve the above using sigmoid and Identity activation functions.

**Problem 2:** Using a single hidden layer feed-forward neural network (FFNN) classify the Pima Indian data set. You should have 8 input nodes, 6,7,8,9 and 10 hidden nodes and 1 and 2 output nodes.

**Data**: instances = 768, features = 8, labels = 768x1

**Header:**

1. Number of times pregnant

2. Plasma glucose concentration a 2 hours in an oral glucose tolerance test

3. Diastolic blood pressure (mm Hg)

4. Triceps skin fold thickness (mm)

5. 2-Hour serum insulin (mu U/ml)

6. Body mass index (weight in kg/(height in m)^2)

7. Diabetes pedigree function

8. Age (years)

9. Class variable (0 or 1)

6 148 72 35 0 33.6 0.627 50 1 0 1

1 85 66 29 0 26.6 0.351 31 0 1 0

8 183 64 0 0 23.3 0.672 32 1 0 1

X = 1 89 66 23 94 28.1 0.167 21 Y = 0 1 or 0

0 137 40 35 168 43.1 2.288 33 1 0 1

5 116 74 0 0 25.6 0.201 30 0 1 0

3 78 50 32 88 31.0 0.248 26 1 0 1

Solve the above using **sigmoid** and **identity** activation functions.