CMPE442 ASSIGNMENT #3

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2)

a.) I have found that we can increase learining rate up to even 10 and keep iteration number as low as 200. But I don't think keeping the learning that high is good.
So I have settled on **learning rate = 0.6** and **iteration number = 1000**.

Note that 0,1,2 and 3 are for inputs 00,01,10 and finally 11.
Here are the predictions.

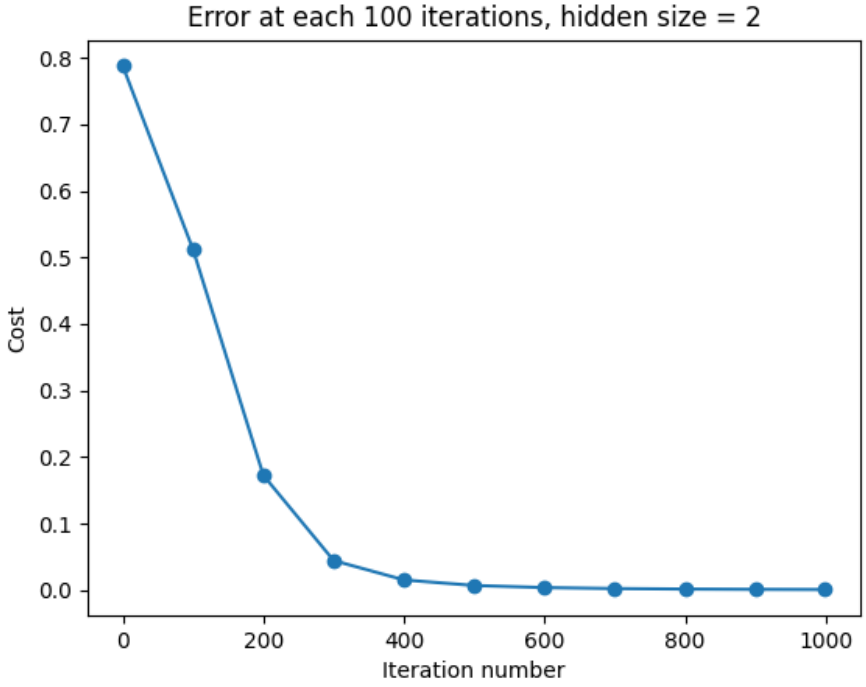
```
y_pred = 0  y_pred: [3.07876193e-04 8.59256372e-03 8.41898481e-03 9.72596769e-01]

if i == iterNo-1:
    y_pred = self.predict(X)
    print("Final prediction is", y_pred)
```

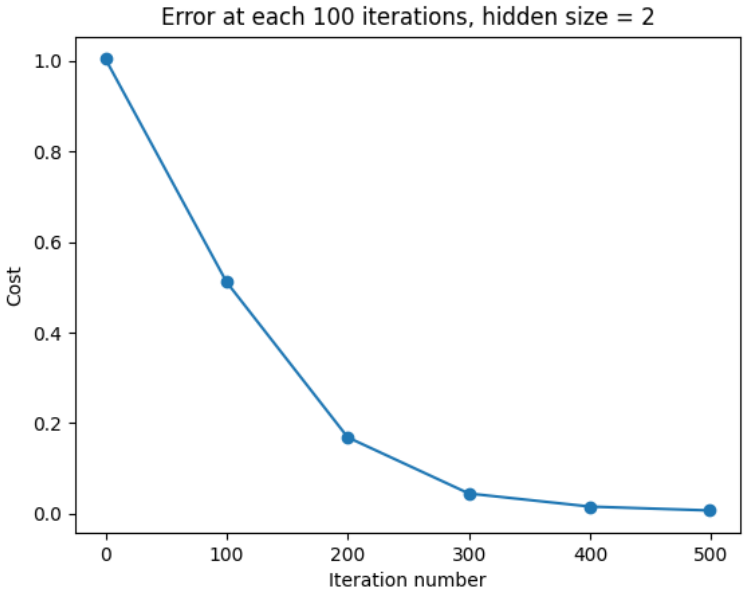
y_pred

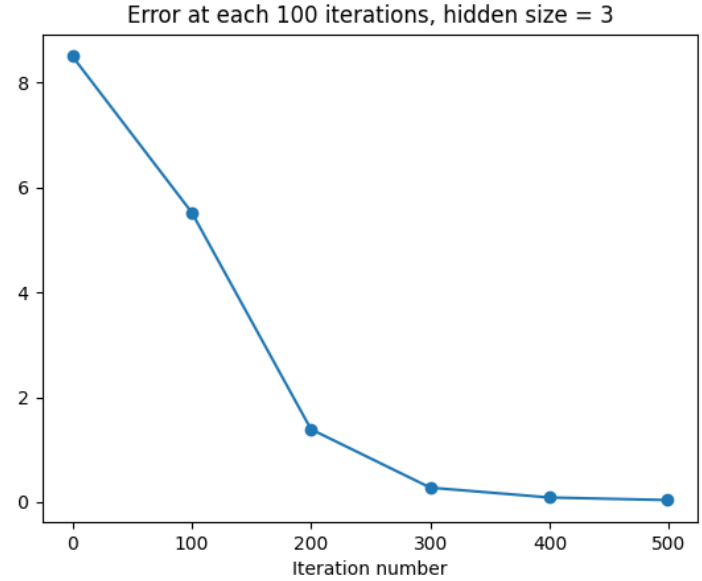
	0	1	2	3
0	0.00031	0.00859	0.00842	0.97260

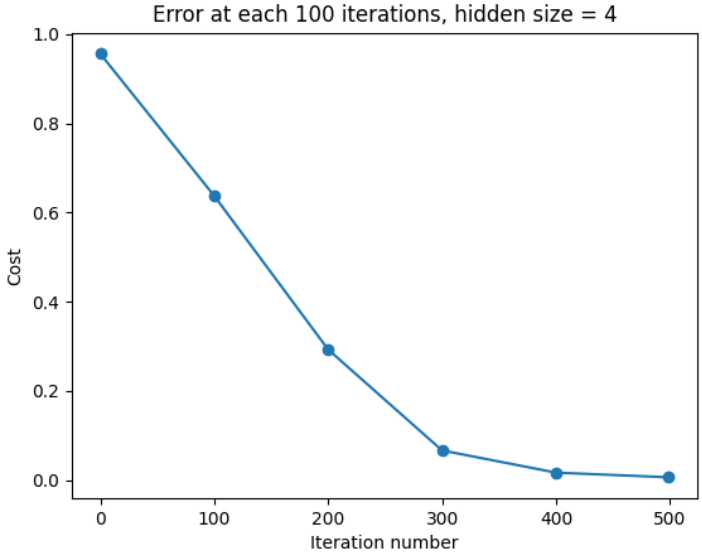
b.) The hyperparameters are same as in part (a)

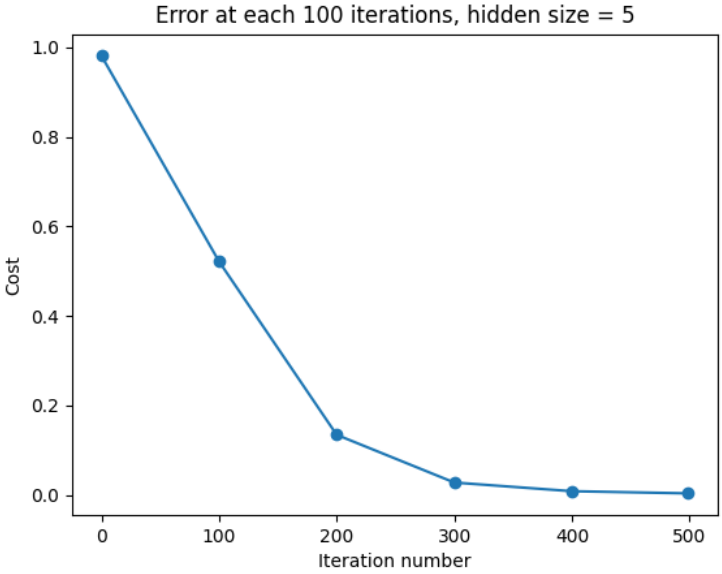


c.) Number of iterations are halved so it is 500.
Hidden units are tried as 2,3,4 and 5 as they can be seen from the title of each figure.









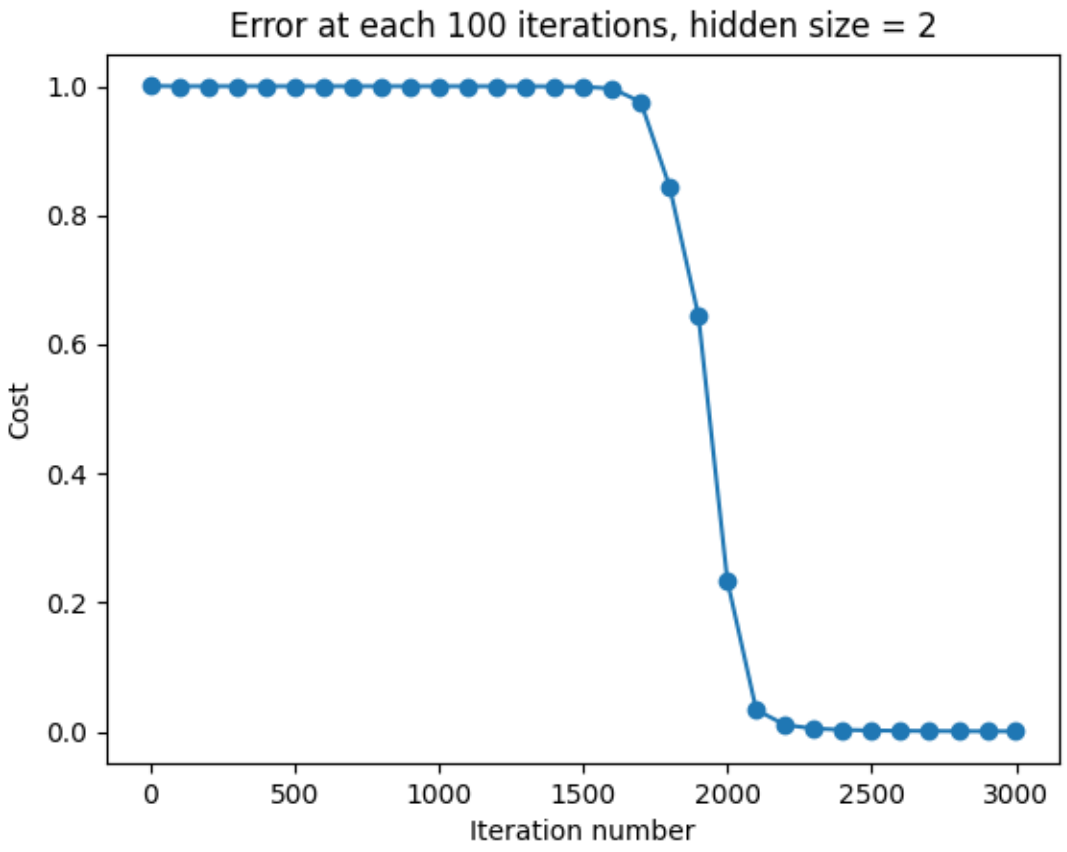
3)
a.) Here a large number of iterations and high learning rate was needed.
Learning rate = 1 and **iteration number = 3000**.

```
if i == iterNo-1:
    y_pred = self.predict(X)
    print("Final prediction is", y_pred)
```

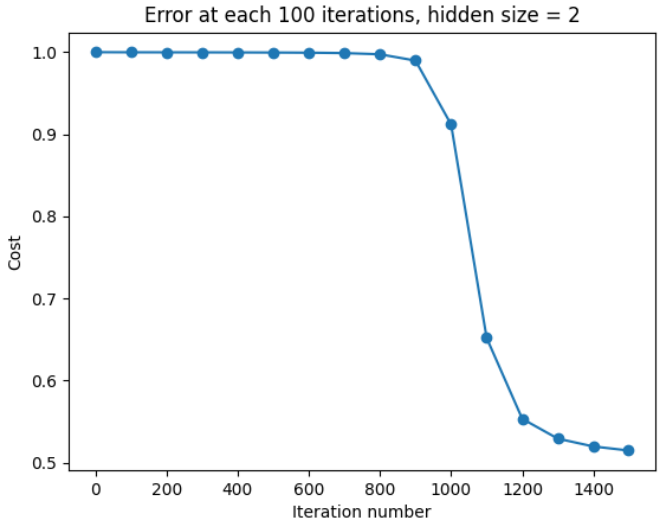
y_pred

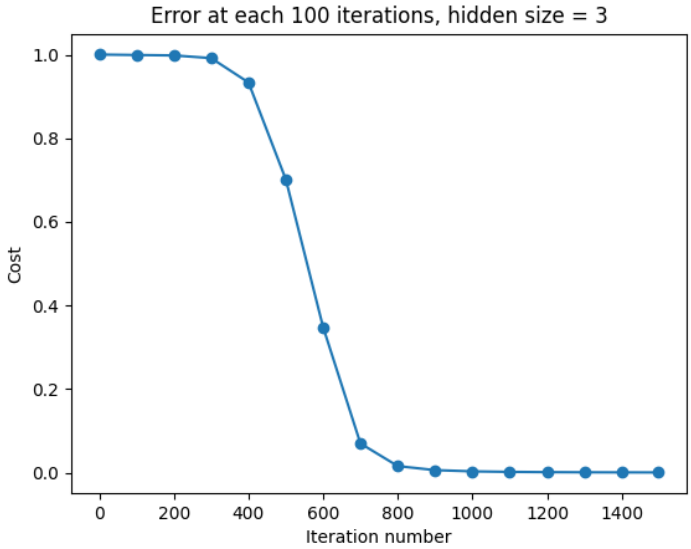
	0	1	2	3
0	0.01209	0.99093	0.99088	0.00983

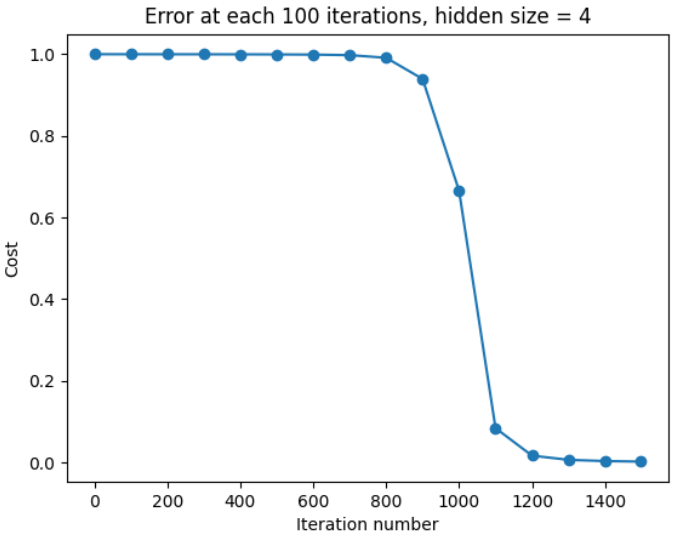
b.) Hyperparameters are same as in part(a).

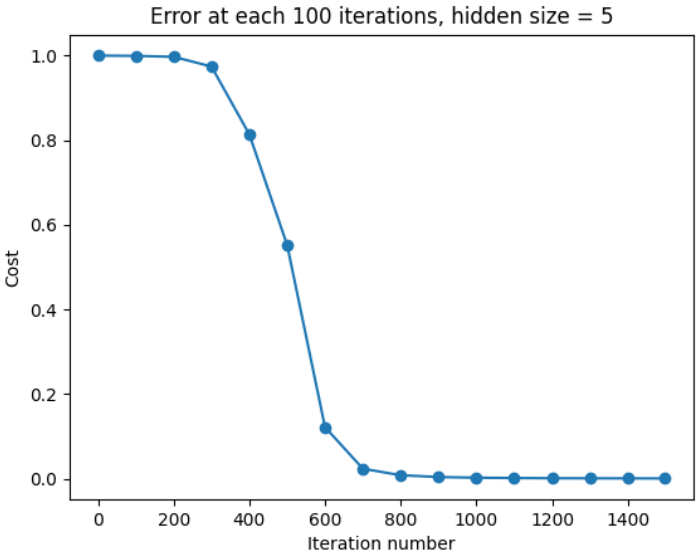


c.) Number of iterations are halved so it is 1500.
Hidden units are tried as 2,3,4 and 5 as they can be seen from the title of each figure.









We can see that for different hidden unit neurons the ANN learns the function at different iteration numbers.