CNN

Note: I imported Mnist data set directly from tf.keras.mnist. As it was same data.

Input shape:
after reshaping
x_train.shape (60000,28,28,1)
x_test.shape(10000,28,28,1)
y_train.shape(60000,)
y_test.shape(10000,)

I have implemented 3 classes for different optimizers.(adam, RMSprop,sgd)

i compared and combinations, like for every optimizer checked the accuracy and loss with (regularization+ with dropout),(regularization+ without dropout),(without regularization+ with dropout), (without regularization+ without dropout).

The accuracy and loss plot was only for 2 epochs, as it was taking so much time to train the model.
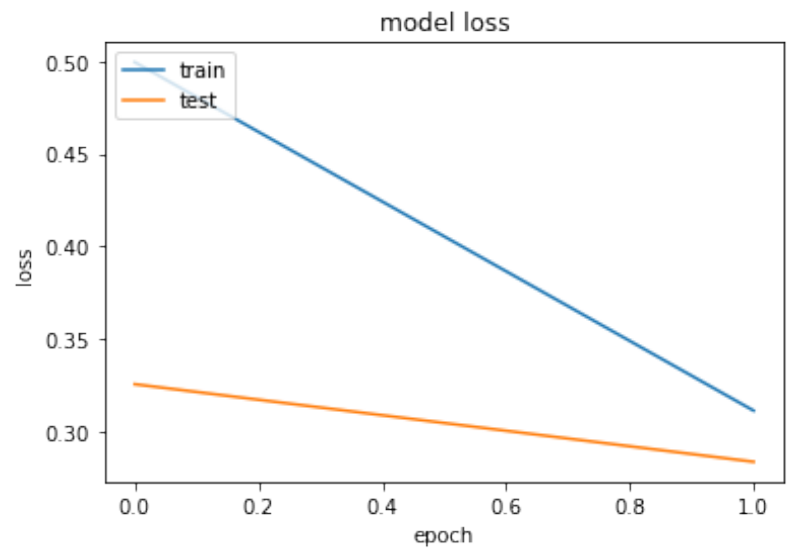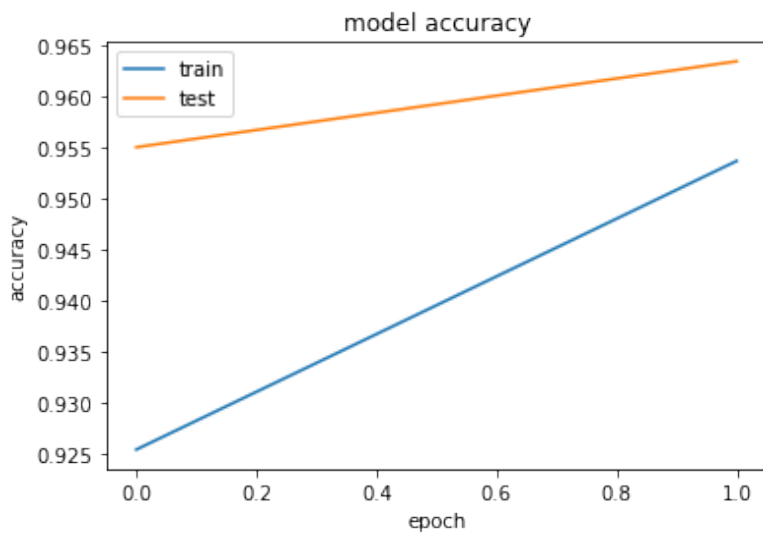
And from the below plots you can directly see that as number of epochs increases the accuracy increases and loss decreases.
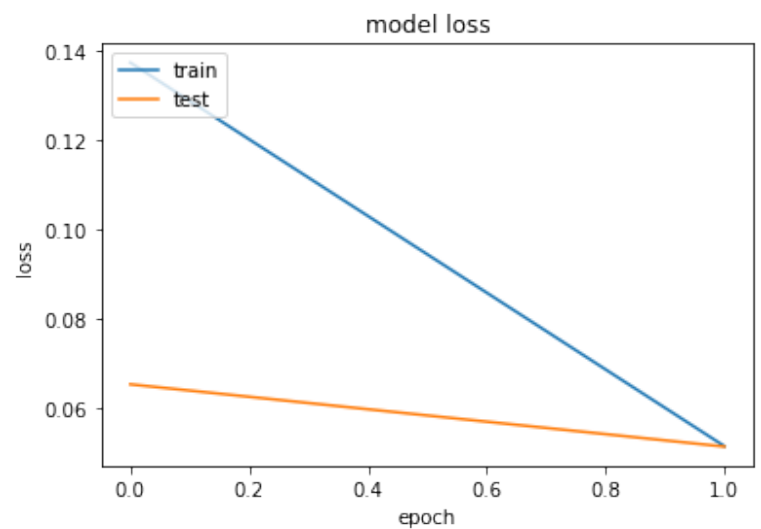
1. Optimizer : ADAM
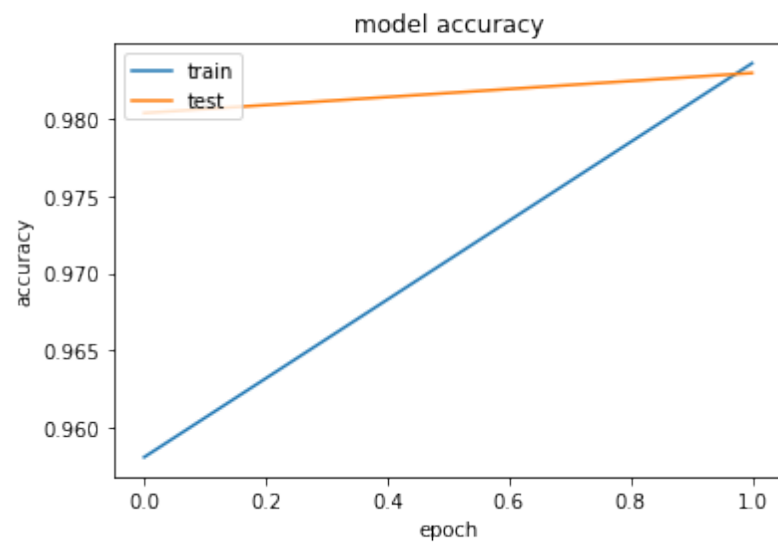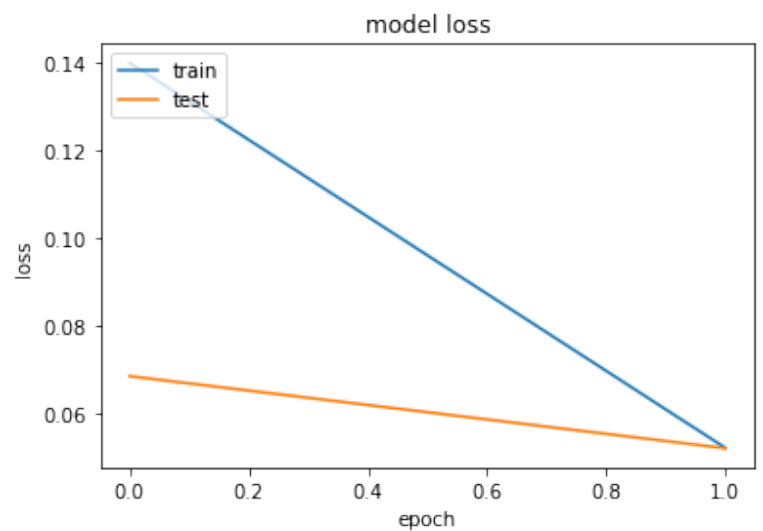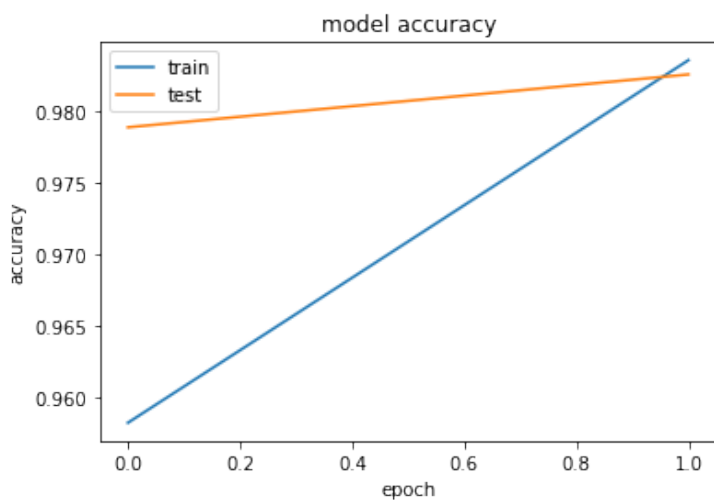
    1.1 with Regularization without dropout
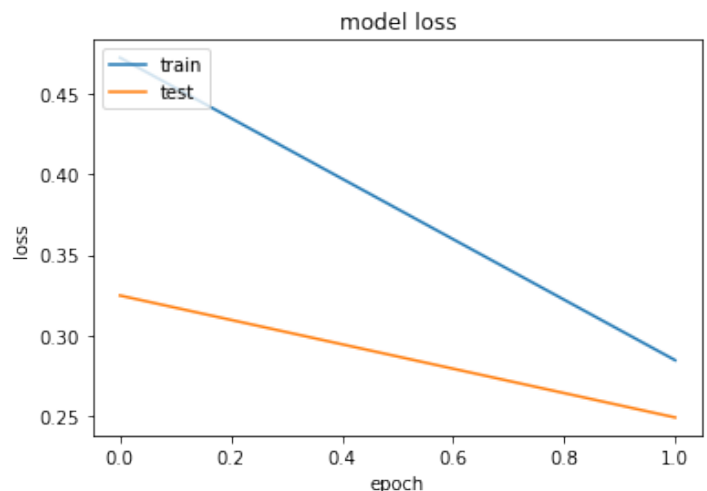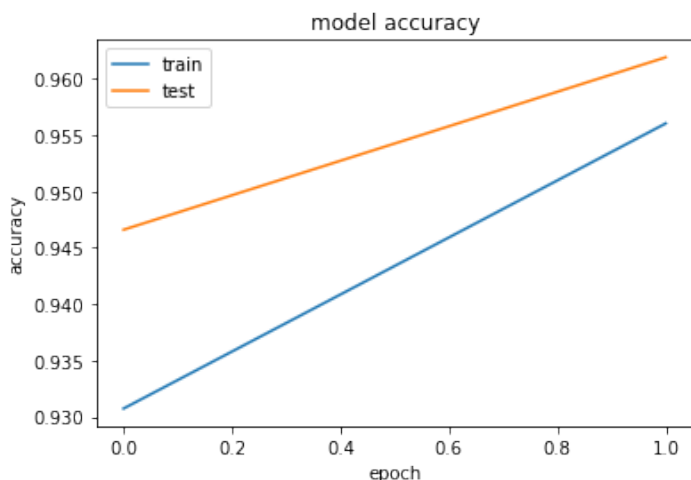
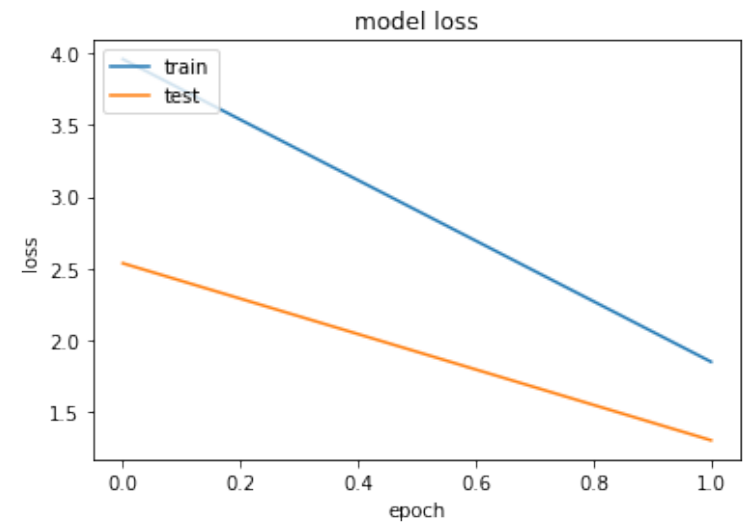## 1.2 with Regularization with dropout
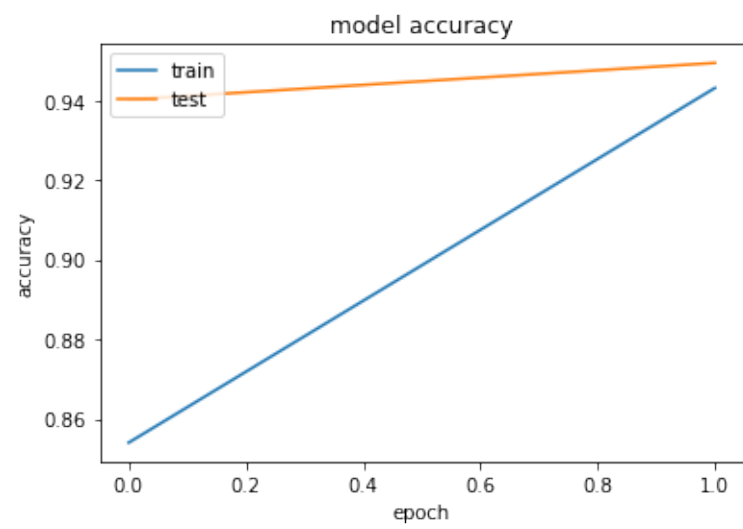

1.3 without Regularization without dropout
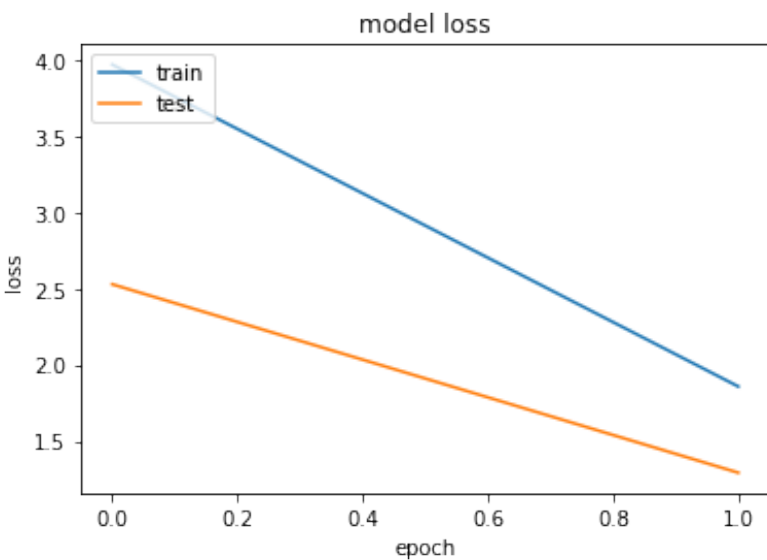

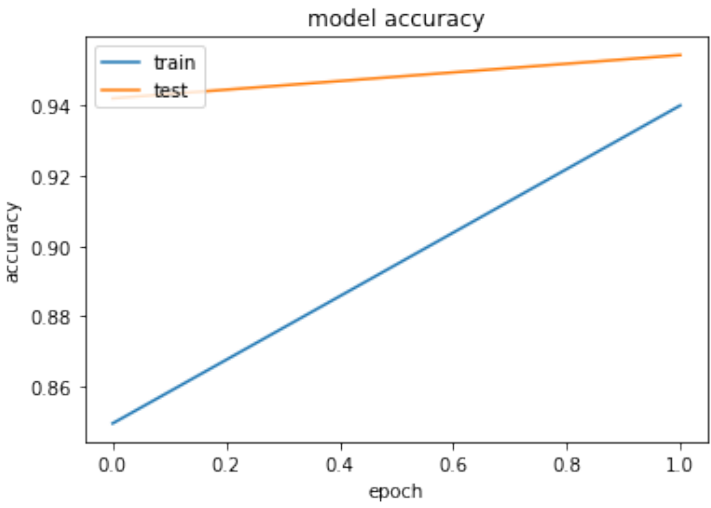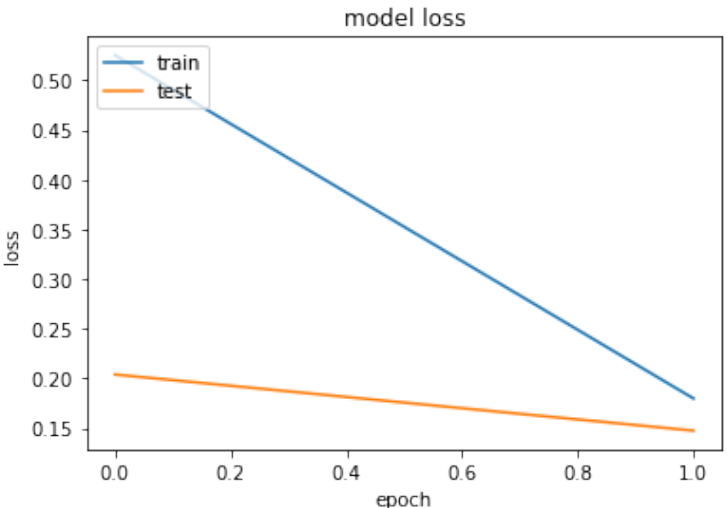## 1.4 without Regularization with dropout

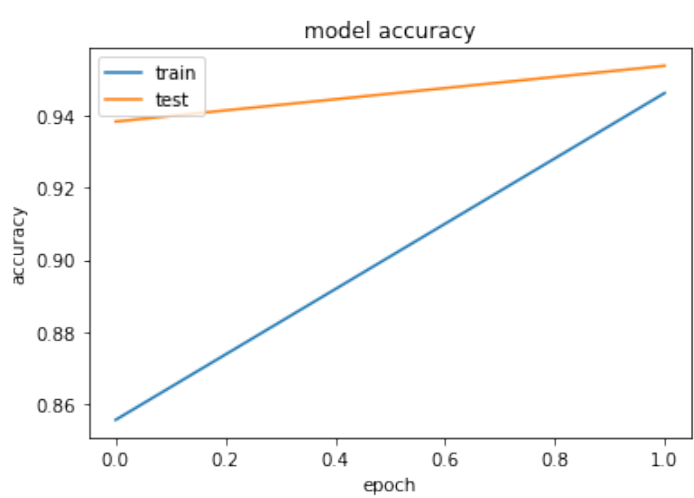## 2. Optimizer: SGD
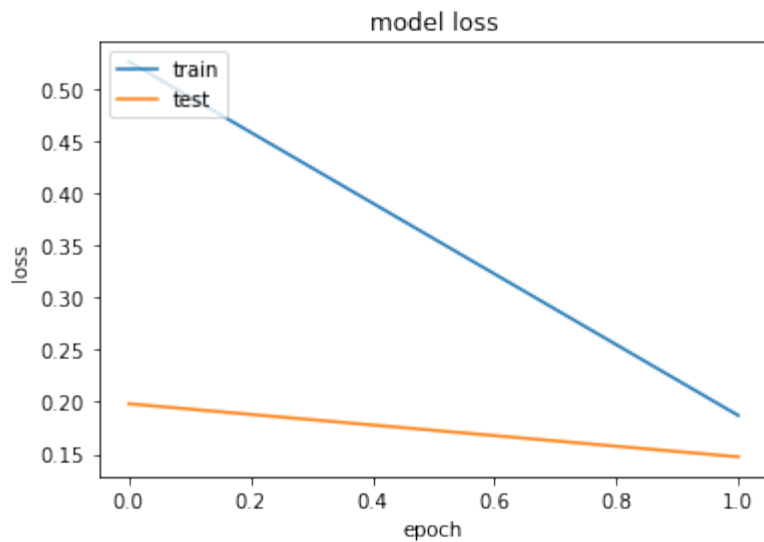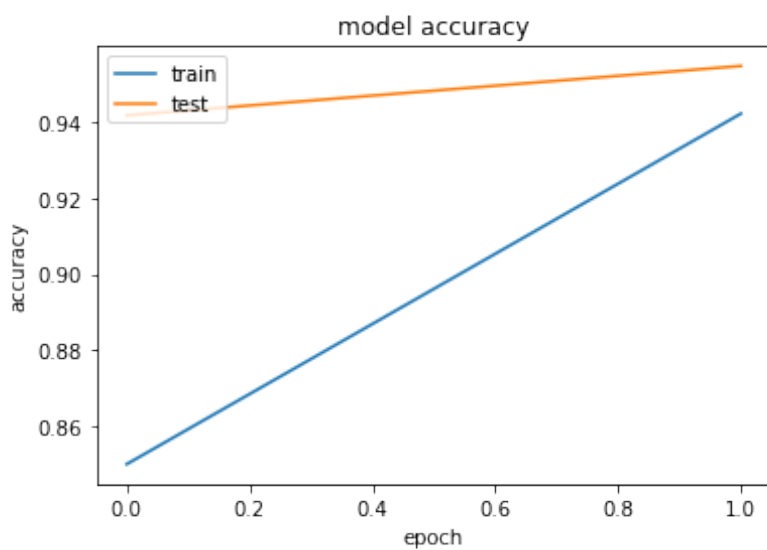
2.1 with Regularization without dropout

2.2 with Regularization with dropout
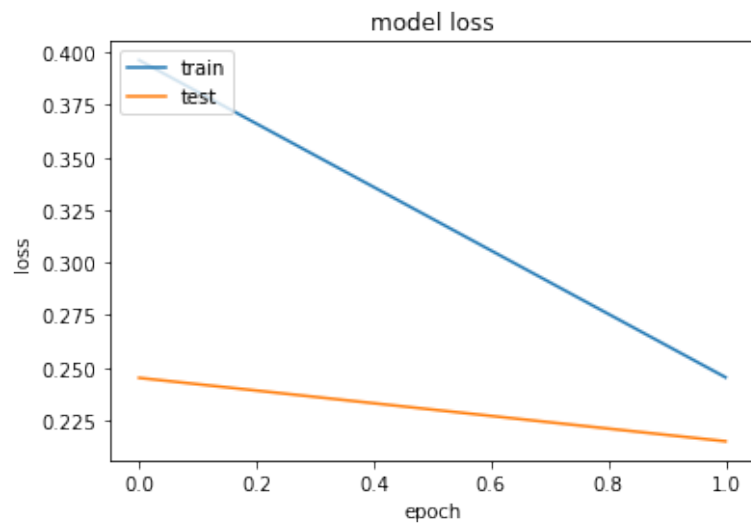

2.3 without Regularization without dropout

2.4 without Regularization with dropout

3.Optimizer: RMS prop

3.1 with Regularization without dropout

3.2 with Regularization with dropout
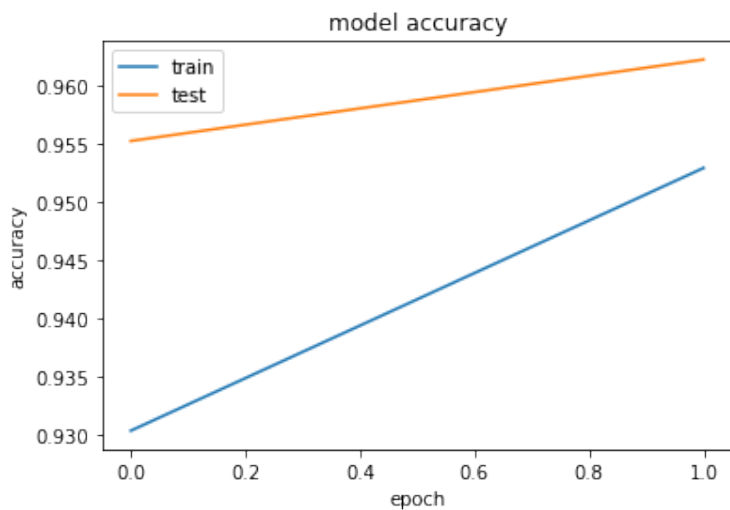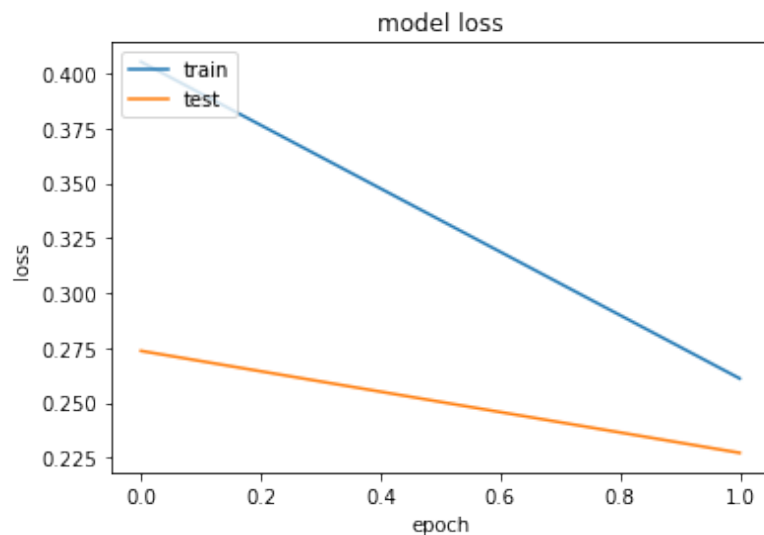
3.3 without Regularization without dropout

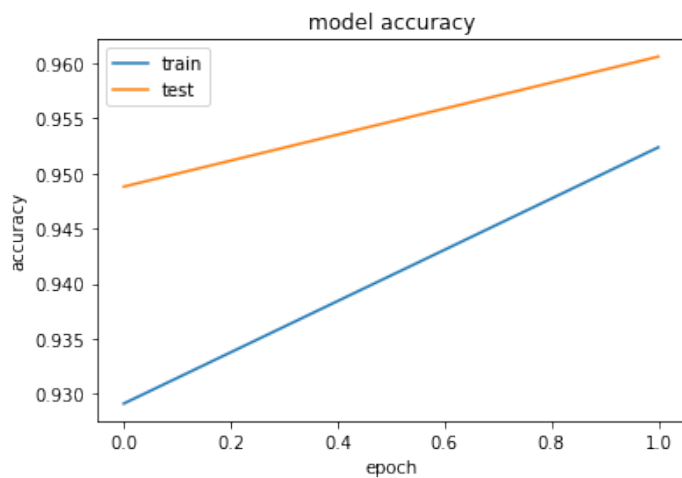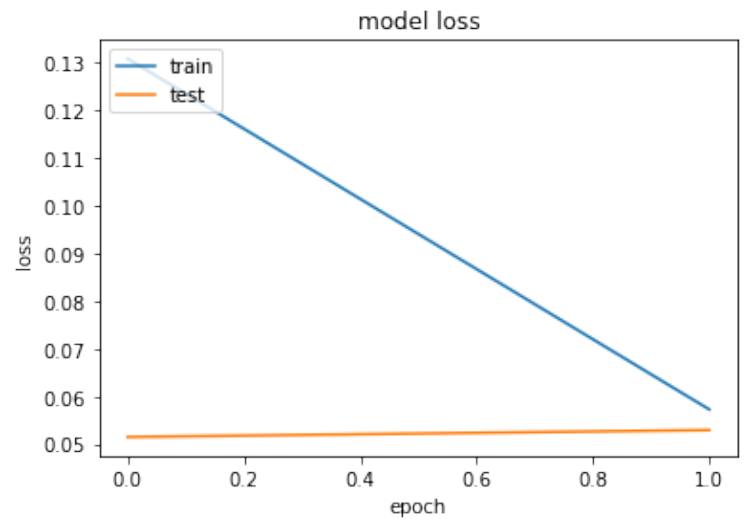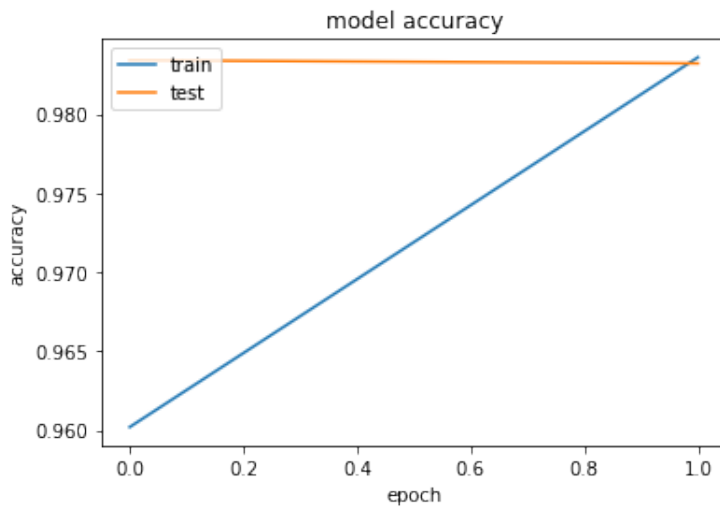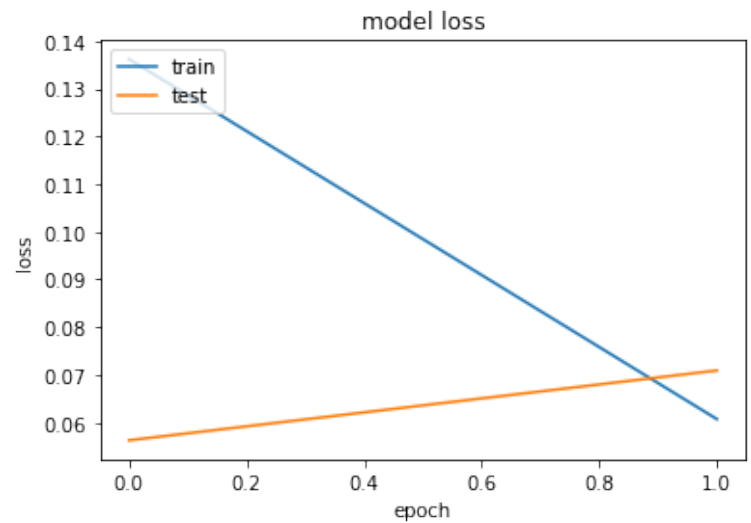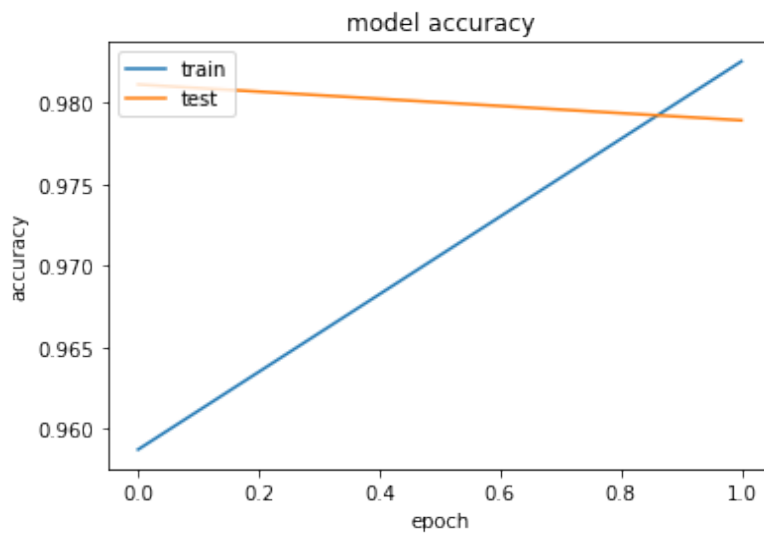## 3.4 without Regularization with dropout

With no regularization and no dropout we have overfitting problem on train data set.
and test data set out accuracy decreases as generalization ability is not best in case of overfitting.
almost all optimizers perform well. Adam accuracy is best.