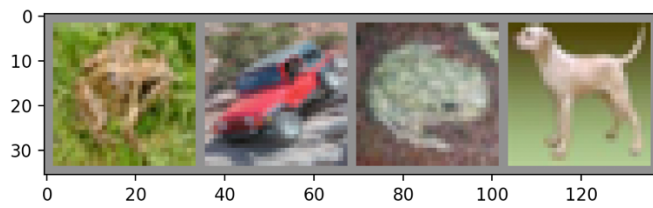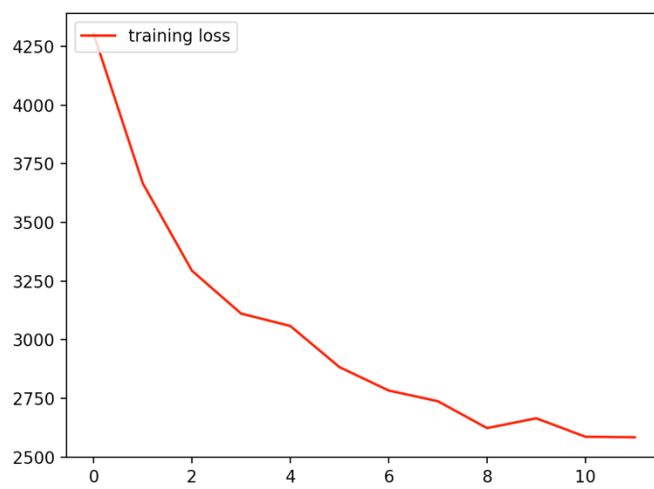# Task 5.1C

Function to show image:

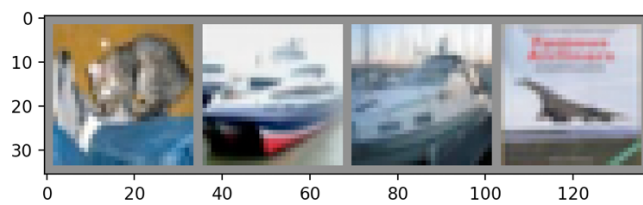**Image**

frog   car   frog   dog

Loss function graph:

Ground truth images:


```
GroundTruth:    cat  ship  ship plane
Predicted:      cat  ship   car  ship
```

Confusion matrix

```
classes = ('plane', 'car', 'bird', 'cat', 'deer', 'dog', 'frog', 'horse', 'ship', 'truck')
```

```
[[591  16  78  12  31   4  18   2 220  28]
 [ 48 621  24  12  11   2  21   5 104 152]
 [ 90   5 543  38 121  57  87  13  41   5]
 [ 39   4 141 338 126 119 144  19  48  22]
 [ 36   5 193  38 531  24 101  34  32   6]
 [ 19   1 161 199 128 346  75  30  31  10]
 [ 12   9  97  49  71  12 716   5  12  17]
 [ 34   4  76  41 189  88  30 487  19  32]
 [ 71  34  30   9   7   3  10   3 799  34]
 [ 62 105  22  18  16   9  22  17 118 611]]
```

```
Accuracy of the network on the 10000 test images: 55 %

Accuracy of plane : 59 %
Accuracy of   car : 62 %
Accuracy of  bird : 54 %
Accuracy of   cat : 33 %
Accuracy of  deer : 53 %
Accuracy of   dog : 34 %
Accuracy of  frog : 71 %
Accuracy of horse : 48 %
Accuracy of  ship : 79 %
Accuracy of truck : 61 %
```

Time ran using local machine:

Training time:

```
[2,  8000] loss: 1.302
[2, 10000] loss: 1.282
[2, 12000] loss: 1.277
Finished Training
Training time in 59.11102914810181 seconds ---
```

Testing time:

```
Accuracy of the network on the 10000 test images: 56 %
Testing time is in 3.0085721015930176 seconds ---
```

Time ran using GPU on google colab:

Training time:

```
[2,  8000] loss: 1.304
[2, 10000] loss: 1.318
[2, 12000] loss: 1.298
Finished Training
Training time in 142.3272349834442 seconds ---
```

Testing time:

```
Accuracy of the network on the 10000 test images: 54 %
Testing time is in 9.57024741727905 seconds ---
```