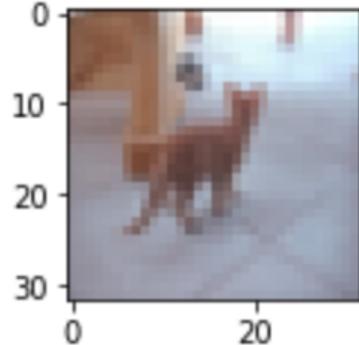
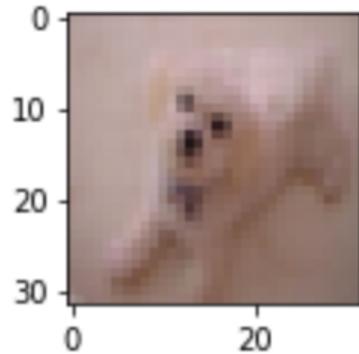
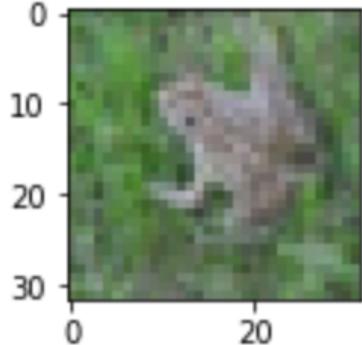
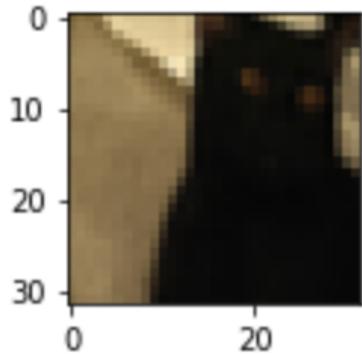


Image Visualization

```
for i in range(4):  
    img = traindata[i]  
    img = img.reshape(-1, 32, 32).transpose([1,2,0])  
    #img = img.reshape(32, 32, 3)  
    plt.subplot(2,2,i+1)  
    plt.imshow(img)
```



Data Unbalanced Problem

- Ideas:

- Under-sampling: e.g. eliminate majority class examples
- Over-sampling: e.g. generate additional instances of the fewer class

- Useful links:

- <https://towardsdatascience.com/having-an-imbalanced-dataset-here-is-how-you-can-solve-it-1640568947eb>
- https://shiring.github.io/machine_learning/2017/04/02/unbalanced