

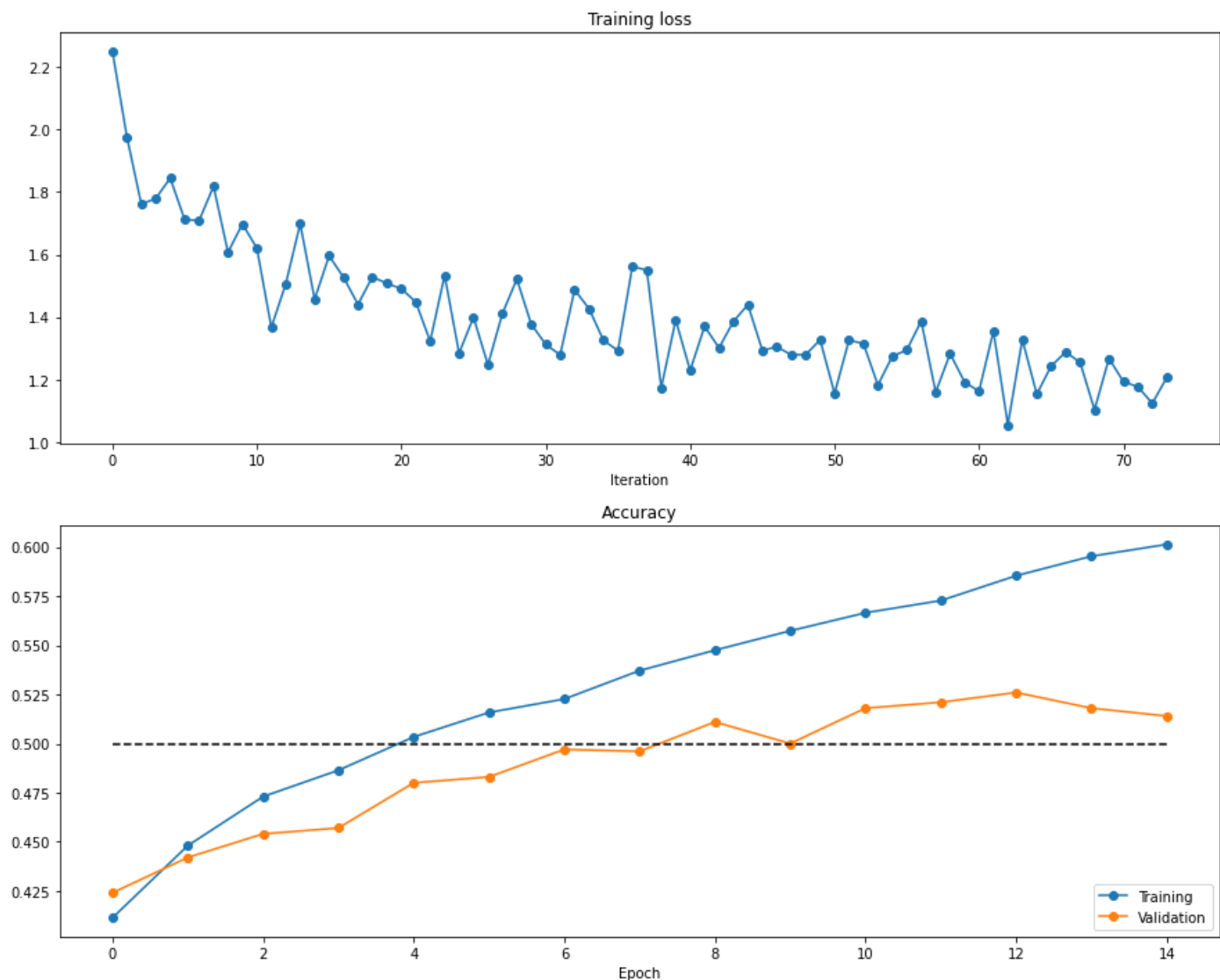
Programming Assignment #1

1. Training loss / accuracy curves for the simple neural network training with >50% validation accuracy

```
(Iteration 1 / 7350) loss: 2.3692941226311963
(Epoch 1 / 15) Training Accuracy: 0.411265306122449, Validation Accuracy: 0.424
(Epoch 2 / 15) Training Accuracy: 0.4480204081632653, Validation Accuracy: 0.442
(Iteration 1001 / 7350) loss: 1.6807085645823046
(Epoch 3 / 15) Training Accuracy: 0.4729795918367347, Validation Accuracy: 0.454
(Epoch 4 / 15) Training Accuracy: 0.4863877551020408, Validation Accuracy: 0.457
(Iteration 2001 / 7350) loss: 1.4912908546986323
(Epoch 5 / 15) Training Accuracy: 0.5033673469387755, Validation Accuracy: 0.48
(Epoch 6 / 15) Training Accuracy: 0.5158163265306123, Validation Accuracy: 0.483
(Iteration 3001 / 7350) loss: 1.419381442562482
(Epoch 7 / 15) Training Accuracy: 0.5226530612244898, Validation Accuracy: 0.497
(Epoch 8 / 15) Training Accuracy: 0.5371224489795918, Validation Accuracy: 0.496
(Iteration 4001 / 7350) loss: 1.4987470243249366
(Epoch 9 / 15) Training Accuracy: 0.5475102040816326, Validation Accuracy: 0.511
(Epoch 10 / 15) Training Accuracy: 0.5573673469387755, Validation Accuracy: 0.5
(Iteration 5001 / 7350) loss: 1.2571280289324116
(Epoch 11 / 15) Training Accuracy: 0.5665510204081633, Validation Accuracy: 0.518
(Epoch 12 / 15) Training Accuracy: 0.5727755102040817, Validation Accuracy: 0.521
(Iteration 6001 / 7350) loss: 1.131645836652814
(Epoch 13 / 15) Training Accuracy: 0.5854285714285714, Validation Accuracy: 0.526
(Epoch 14 / 15) Training Accuracy: 0.5953469387755103, Validation Accuracy: 0.518
(Iteration 7001 / 7350) loss: 1.1480753421437928
(Epoch 15 / 15) Training Accuracy: 0.6013673469387755, Validation Accuracy: 0.514
```

```
dict_keys(['fc1_w', 'fc1_b', 'fc2_w', 'fc2_b'])
```

```
Loading Params: fc1_w Shape: (3072, 512)
Loading Params: fc1_b Shape: (512,)
Loading Params: fc2_w Shape: (512, 10)
Loading Params: fc2_b Shape: (10,)
Validation Accuracy: 51.4%
Testing Accuracy: 53.800000000000004%
```



2. Plots for comparing vanilla SGD to SGD + Momentum

Training with Vanilla SGD...

(Iteration 1 / 200) loss: 2.784078790273408

(Epoch 1 / 5) Training Accuracy: 0.287, Validation Accuracy: 0.262

(Epoch 2 / 5) Training Accuracy: 0.339, Validation Accuracy: 0.298

(Iteration 101 / 200) loss: 1.8888786035632594

(Epoch 3 / 5) Training Accuracy: 0.34, Validation Accuracy: 0.296

(Epoch 4 / 5) Training Accuracy: 0.39475, Validation Accuracy: 0.329

(Epoch 5 / 5) Training Accuracy: 0.416, Validation Accuracy: 0.315

Training with SGD plus Momentum...

(Iteration 1 / 200) loss: 2.4144157882454107

(Epoch 1 / 5) Training Accuracy: 0.32475, Validation Accuracy: 0.296

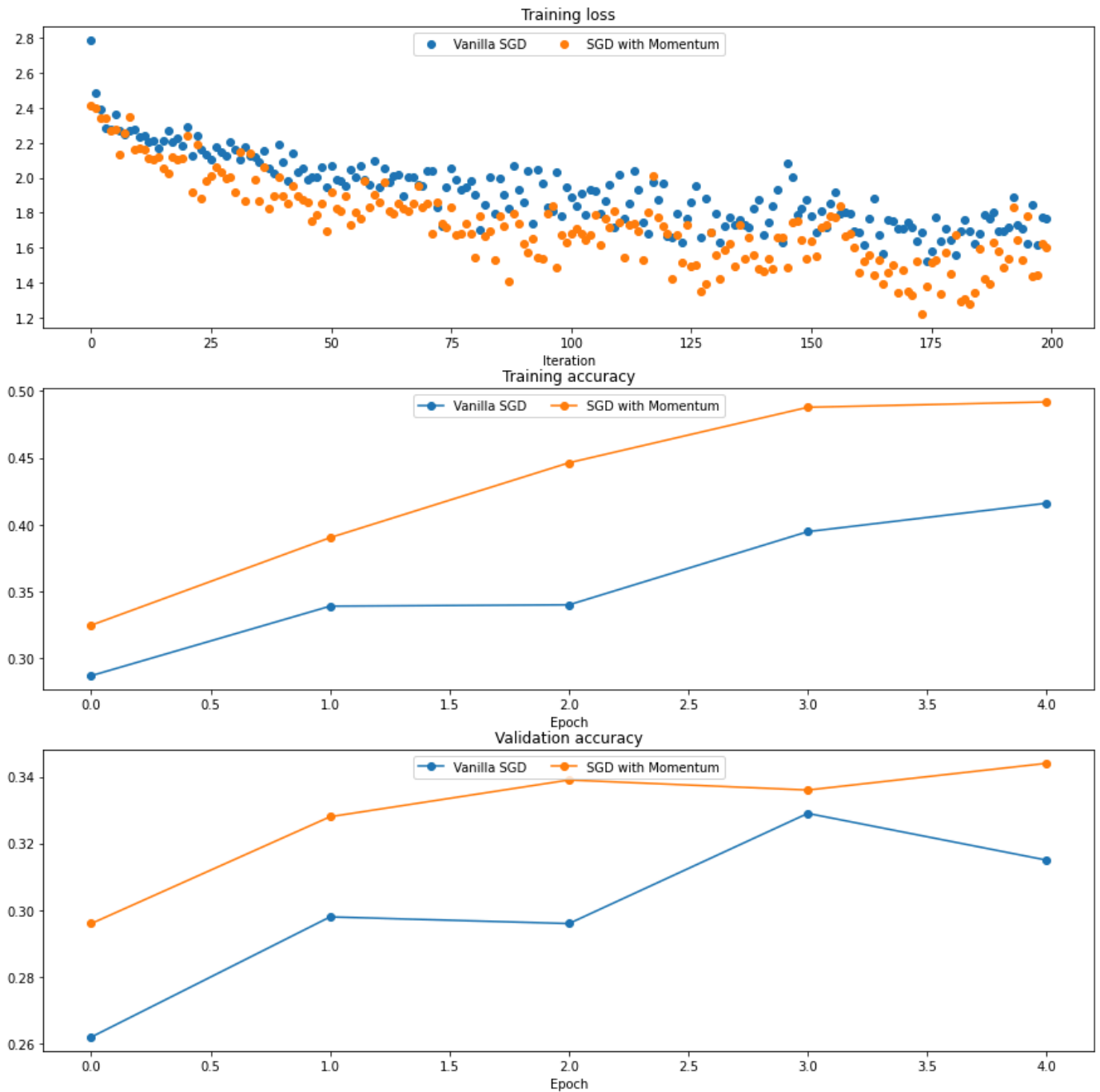
(Epoch 2 / 5) Training Accuracy: 0.39025, Validation Accuracy: 0.328

(Iteration 101 / 200) loss: 1.6831844456130503

(Epoch 3 / 5) Training Accuracy: 0.44625, Validation Accuracy: 0.339

(Epoch 4 / 5) Training Accuracy: 0.48775, Validation Accuracy: 0.336

(Epoch 5 / 5) Training Accuracy: 0.49175, Validation Accuracy: 0.344



3. "Comparing different Optimizers" plots

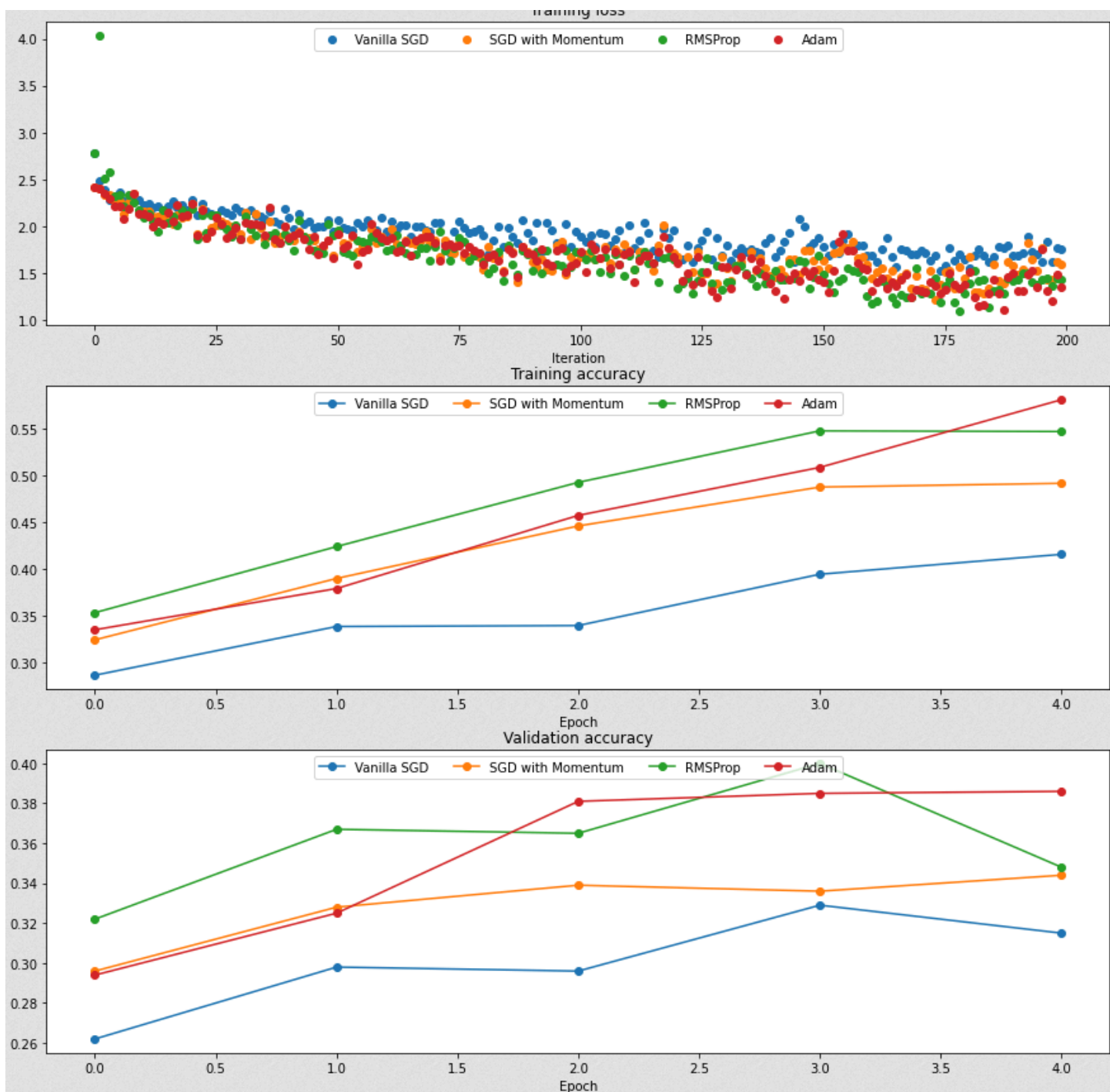
Training with RMSProp...

```
(Iteration 1 / 200) loss: 2.784078790273408
(Epoch 1 / 5) Training Accuracy: 0.35375, Validation Accuracy: 0.322
(Epoch 2 / 5) Training Accuracy: 0.42425, Validation Accuracy: 0.367
(Iteration 101 / 200) loss: 1.7261488059097405
(Epoch 3 / 5) Training Accuracy: 0.49275, Validation Accuracy: 0.365
(Epoch 4 / 5) Training Accuracy: 0.54775, Validation Accuracy: 0.4
(Epoch 5 / 5) Training Accuracy: 0.547, Validation Accuracy: 0.348
```

Training with Adam...

```
(Iteration 1 / 200) loss: 2.4144157882454107
(Epoch 1 / 5) Training Accuracy: 0.3355, Validation Accuracy: 0.294
(Epoch 2 / 5) Training Accuracy: 0.3795, Validation Accuracy: 0.325
(Iteration 101 / 200) loss: 1.7290538183149784
```

(Epoch 3 / 5) Training Accuracy: 0.4575, Validation Accuracy: 0.381
 (Epoch 4 / 5) Training Accuracy: 0.50875, Validation Accuracy: 0.385
 (Epoch 5 / 5) Training Accuracy: 0.581, Validation Accuracy: 0.386



4. Dropout comparison plot

Dropout Keep Prob = 0
 (Iteration 1 / 250) loss: 2.8714007645507165
 (Epoch 1 / 50) Training Accuracy: 0.1, Validation Accuracy: 0.089
 (Epoch 2 / 50) Training Accuracy: 0.16, Validation Accuracy: 0.105
 (Epoch 3 / 50) Training Accuracy: 0.17, Validation Accuracy: 0.117
 (Epoch 4 / 50) Training Accuracy: 0.21, Validation Accuracy: 0.126
 (Epoch 5 / 50) Training Accuracy: 0.24, Validation Accuracy: 0.127

(Epoch 6 / 50) Training Accuracy: 0.28, Validation Accuracy: 0.135
(Epoch 7 / 50) Training Accuracy: 0.34, Validation Accuracy: 0.134
(Epoch 8 / 50) Training Accuracy: 0.36, Validation Accuracy: 0.138
(Epoch 9 / 50) Training Accuracy: 0.4, Validation Accuracy: 0.143
(Epoch 10 / 50) Training Accuracy: 0.42, Validation Accuracy: 0.146
(Epoch 11 / 50) Training Accuracy: 0.49, Validation Accuracy: 0.147
(Epoch 12 / 50) Training Accuracy: 0.52, Validation Accuracy: 0.153
(Epoch 13 / 50) Training Accuracy: 0.52, Validation Accuracy: 0.152
(Epoch 14 / 50) Training Accuracy: 0.6, Validation Accuracy: 0.159
(Epoch 15 / 50) Training Accuracy: 0.61, Validation Accuracy: 0.165
(Epoch 16 / 50) Training Accuracy: 0.66, Validation Accuracy: 0.163
(Epoch 17 / 50) Training Accuracy: 0.66, Validation Accuracy: 0.169
(Epoch 18 / 50) Training Accuracy: 0.68, Validation Accuracy: 0.173
(Epoch 19 / 50) Training Accuracy: 0.68, Validation Accuracy: 0.172
(Epoch 20 / 50) Training Accuracy: 0.71, Validation Accuracy: 0.171
(Epoch 21 / 50) Training Accuracy: 0.74, Validation Accuracy: 0.17
(Epoch 22 / 50) Training Accuracy: 0.76, Validation Accuracy: 0.17
(Epoch 23 / 50) Training Accuracy: 0.78, Validation Accuracy: 0.17
(Epoch 24 / 50) Training Accuracy: 0.78, Validation Accuracy: 0.169
(Epoch 25 / 50) Training Accuracy: 0.79, Validation Accuracy: 0.173
(Epoch 26 / 50) Training Accuracy: 0.81, Validation Accuracy: 0.175
(Epoch 27 / 50) Training Accuracy: 0.85, Validation Accuracy: 0.174
(Epoch 28 / 50) Training Accuracy: 0.87, Validation Accuracy: 0.177
(Epoch 29 / 50) Training Accuracy: 0.88, Validation Accuracy: 0.178
(Epoch 30 / 50) Training Accuracy: 0.88, Validation Accuracy: 0.178
(Epoch 31 / 50) Training Accuracy: 0.88, Validation Accuracy: 0.18
(Epoch 32 / 50) Training Accuracy: 0.89, Validation Accuracy: 0.182
(Epoch 33 / 50) Training Accuracy: 0.9, Validation Accuracy: 0.184
(Epoch 34 / 50) Training Accuracy: 0.92, Validation Accuracy: 0.185
(Epoch 35 / 50) Training Accuracy: 0.93, Validation Accuracy: 0.184
(Epoch 36 / 50) Training Accuracy: 0.93, Validation Accuracy: 0.187
(Epoch 37 / 50) Training Accuracy: 0.94, Validation Accuracy: 0.187
(Epoch 38 / 50) Training Accuracy: 0.94, Validation Accuracy: 0.186
(Epoch 39 / 50) Training Accuracy: 0.94, Validation Accuracy: 0.185
(Epoch 40 / 50) Training Accuracy: 0.94, Validation Accuracy: 0.186
(Epoch 41 / 50) Training Accuracy: 0.95, Validation Accuracy: 0.19
(Epoch 42 / 50) Training Accuracy: 0.95, Validation Accuracy: 0.189
(Epoch 43 / 50) Training Accuracy: 0.95, Validation Accuracy: 0.191
(Epoch 44 / 50) Training Accuracy: 0.95, Validation Accuracy: 0.19
(Epoch 45 / 50) Training Accuracy: 0.95, Validation Accuracy: 0.19
(Epoch 46 / 50) Training Accuracy: 0.96, Validation Accuracy: 0.193
(Epoch 47 / 50) Training Accuracy: 0.96, Validation Accuracy: 0.193
(Epoch 48 / 50) Training Accuracy: 0.96, Validation Accuracy: 0.192
(Epoch 49 / 50) Training Accuracy: 0.96, Validation Accuracy: 0.192
(Epoch 50 / 50) Training Accuracy: 0.97, Validation Accuracy: 0.193

Dropout Keep Prob = 0.25

(Iteration 1 / 250) loss: 3.6114705539808982

(Epoch 1 / 50) Training Accuracy: 0.12, Validation Accuracy: 0.099
(Epoch 2 / 50) Training Accuracy: 0.12, Validation Accuracy: 0.109
(Epoch 3 / 50) Training Accuracy: 0.13, Validation Accuracy: 0.116
(Epoch 4 / 50) Training Accuracy: 0.16, Validation Accuracy: 0.126
(Epoch 5 / 50) Training Accuracy: 0.18, Validation Accuracy: 0.129
(Epoch 6 / 50) Training Accuracy: 0.19, Validation Accuracy: 0.132
(Epoch 7 / 50) Training Accuracy: 0.21, Validation Accuracy: 0.143
(Epoch 8 / 50) Training Accuracy: 0.25, Validation Accuracy: 0.144
(Epoch 9 / 50) Training Accuracy: 0.29, Validation Accuracy: 0.143
(Epoch 10 / 50) Training Accuracy: 0.32, Validation Accuracy: 0.141
(Epoch 11 / 50) Training Accuracy: 0.35, Validation Accuracy: 0.148
(Epoch 12 / 50) Training Accuracy: 0.38, Validation Accuracy: 0.153
(Epoch 13 / 50) Training Accuracy: 0.4, Validation Accuracy: 0.158
(Epoch 14 / 50) Training Accuracy: 0.4, Validation Accuracy: 0.157
(Epoch 15 / 50) Training Accuracy: 0.42, Validation Accuracy: 0.162
(Epoch 16 / 50) Training Accuracy: 0.43, Validation Accuracy: 0.164

(Epoch 17 / 50) Training Accuracy: 0.44, Validation Accuracy: 0.174
(Epoch 18 / 50) Training Accuracy: 0.45, Validation Accuracy: 0.172
(Epoch 19 / 50) Training Accuracy: 0.47, Validation Accuracy: 0.176
(Epoch 20 / 50) Training Accuracy: 0.49, Validation Accuracy: 0.182
(Epoch 21 / 50) Training Accuracy: 0.54, Validation Accuracy: 0.18
(Epoch 22 / 50) Training Accuracy: 0.56, Validation Accuracy: 0.186
(Epoch 23 / 50) Training Accuracy: 0.55, Validation Accuracy: 0.187
(Epoch 24 / 50) Training Accuracy: 0.57, Validation Accuracy: 0.179
(Epoch 25 / 50) Training Accuracy: 0.61, Validation Accuracy: 0.187
(Epoch 26 / 50) Training Accuracy: 0.63, Validation Accuracy: 0.188
(Epoch 27 / 50) Training Accuracy: 0.61, Validation Accuracy: 0.185
(Epoch 28 / 50) Training Accuracy: 0.62, Validation Accuracy: 0.187
(Epoch 29 / 50) Training Accuracy: 0.64, Validation Accuracy: 0.192
(Epoch 30 / 50) Training Accuracy: 0.63, Validation Accuracy: 0.192
(Epoch 31 / 50) Training Accuracy: 0.65, Validation Accuracy: 0.196
(Epoch 32 / 50) Training Accuracy: 0.66, Validation Accuracy: 0.198
(Epoch 33 / 50) Training Accuracy: 0.66, Validation Accuracy: 0.197
(Epoch 34 / 50) Training Accuracy: 0.69, Validation Accuracy: 0.194
(Epoch 35 / 50) Training Accuracy: 0.73, Validation Accuracy: 0.198
(Epoch 36 / 50) Training Accuracy: 0.72, Validation Accuracy: 0.199
(Epoch 37 / 50) Training Accuracy: 0.76, Validation Accuracy: 0.201
(Epoch 38 / 50) Training Accuracy: 0.74, Validation Accuracy: 0.199
(Epoch 39 / 50) Training Accuracy: 0.76, Validation Accuracy: 0.202
(Epoch 40 / 50) Training Accuracy: 0.75, Validation Accuracy: 0.206
(Epoch 41 / 50) Training Accuracy: 0.79, Validation Accuracy: 0.209
(Epoch 42 / 50) Training Accuracy: 0.81, Validation Accuracy: 0.199
(Epoch 43 / 50) Training Accuracy: 0.81, Validation Accuracy: 0.204
(Epoch 44 / 50) Training Accuracy: 0.82, Validation Accuracy: 0.205
(Epoch 45 / 50) Training Accuracy: 0.81, Validation Accuracy: 0.212
(Epoch 46 / 50) Training Accuracy: 0.84, Validation Accuracy: 0.209
(Epoch 47 / 50) Training Accuracy: 0.83, Validation Accuracy: 0.208
(Epoch 48 / 50) Training Accuracy: 0.83, Validation Accuracy: 0.205
(Epoch 49 / 50) Training Accuracy: 0.82, Validation Accuracy: 0.201
(Epoch 50 / 50) Training Accuracy: 0.85, Validation Accuracy: 0.206

Dropout Keep Prob = 0.5

(Iteration 1 / 250) loss: 2.9792507415963403

(Epoch 1 / 50) Training Accuracy: 0.12, Validation Accuracy: 0.097
(Epoch 2 / 50) Training Accuracy: 0.16, Validation Accuracy: 0.108
(Epoch 3 / 50) Training Accuracy: 0.17, Validation Accuracy: 0.118
(Epoch 4 / 50) Training Accuracy: 0.18, Validation Accuracy: 0.129
(Epoch 5 / 50) Training Accuracy: 0.2, Validation Accuracy: 0.134
(Epoch 6 / 50) Training Accuracy: 0.23, Validation Accuracy: 0.14
(Epoch 7 / 50) Training Accuracy: 0.29, Validation Accuracy: 0.138
(Epoch 8 / 50) Training Accuracy: 0.31, Validation Accuracy: 0.14
(Epoch 9 / 50) Training Accuracy: 0.36, Validation Accuracy: 0.156
(Epoch 10 / 50) Training Accuracy: 0.38, Validation Accuracy: 0.158
(Epoch 11 / 50) Training Accuracy: 0.39, Validation Accuracy: 0.159
(Epoch 12 / 50) Training Accuracy: 0.41, Validation Accuracy: 0.158
(Epoch 13 / 50) Training Accuracy: 0.42, Validation Accuracy: 0.162
(Epoch 14 / 50) Training Accuracy: 0.42, Validation Accuracy: 0.164
(Epoch 15 / 50) Training Accuracy: 0.47, Validation Accuracy: 0.173
(Epoch 16 / 50) Training Accuracy: 0.49, Validation Accuracy: 0.172
(Epoch 17 / 50) Training Accuracy: 0.53, Validation Accuracy: 0.174
(Epoch 18 / 50) Training Accuracy: 0.53, Validation Accuracy: 0.177
(Epoch 19 / 50) Training Accuracy: 0.55, Validation Accuracy: 0.172
(Epoch 20 / 50) Training Accuracy: 0.59, Validation Accuracy: 0.175
(Epoch 21 / 50) Training Accuracy: 0.59, Validation Accuracy: 0.176
(Epoch 22 / 50) Training Accuracy: 0.61, Validation Accuracy: 0.177
(Epoch 23 / 50) Training Accuracy: 0.63, Validation Accuracy: 0.183
(Epoch 24 / 50) Training Accuracy: 0.64, Validation Accuracy: 0.181
(Epoch 25 / 50) Training Accuracy: 0.67, Validation Accuracy: 0.179
(Epoch 26 / 50) Training Accuracy: 0.68, Validation Accuracy: 0.194
(Epoch 27 / 50) Training Accuracy: 0.72, Validation Accuracy: 0.19

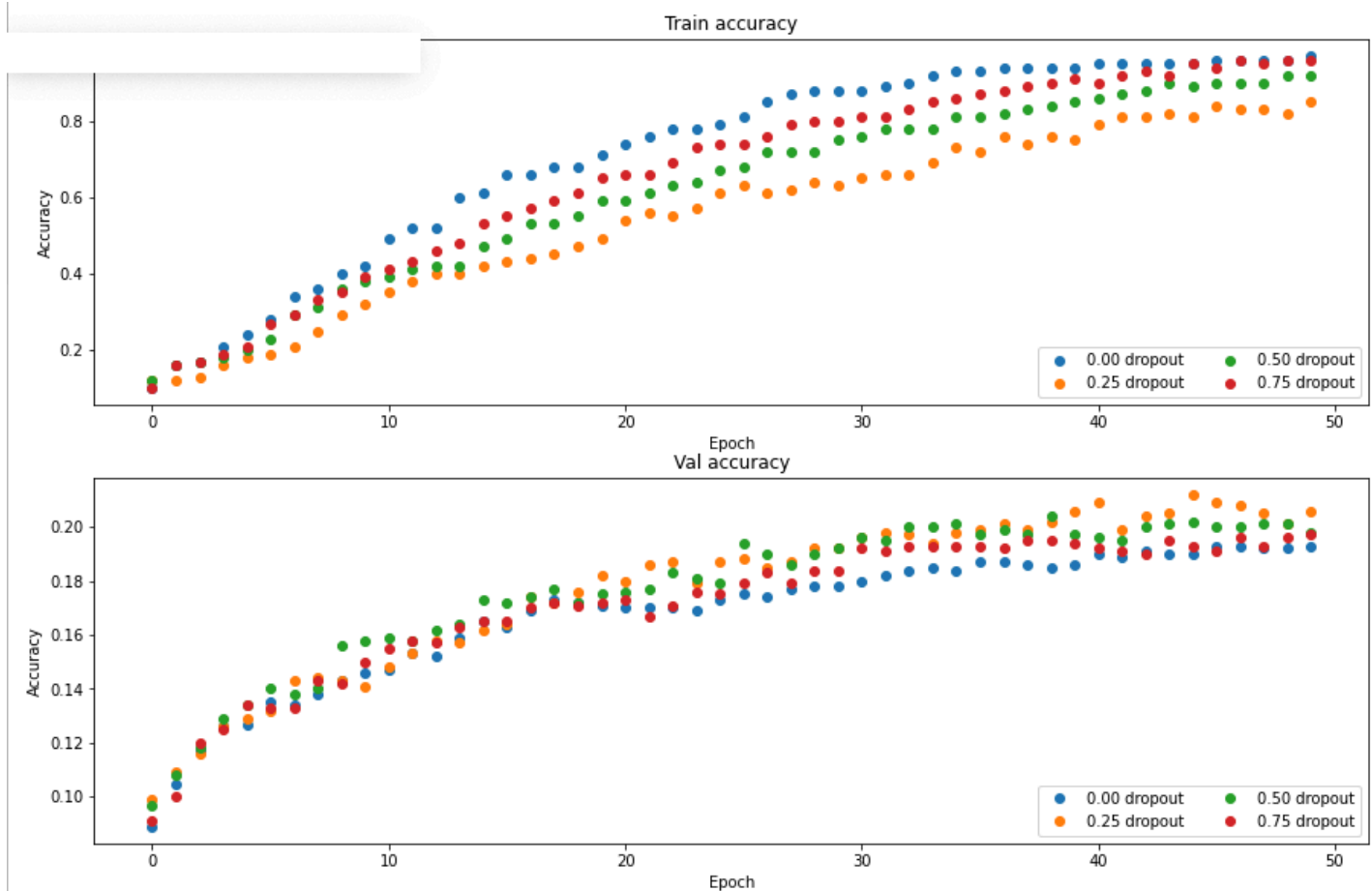
(Epoch 28 / 50) Training Accuracy: 0.72, Validation Accuracy: 0.186
(Epoch 29 / 50) Training Accuracy: 0.72, Validation Accuracy: 0.19
(Epoch 30 / 50) Training Accuracy: 0.75, Validation Accuracy: 0.192
(Epoch 31 / 50) Training Accuracy: 0.76, Validation Accuracy: 0.196
(Epoch 32 / 50) Training Accuracy: 0.78, Validation Accuracy: 0.195
(Epoch 33 / 50) Training Accuracy: 0.78, Validation Accuracy: 0.2
(Epoch 34 / 50) Training Accuracy: 0.78, Validation Accuracy: 0.2
(Epoch 35 / 50) Training Accuracy: 0.81, Validation Accuracy: 0.201
(Epoch 36 / 50) Training Accuracy: 0.81, Validation Accuracy: 0.197
(Epoch 37 / 50) Training Accuracy: 0.82, Validation Accuracy: 0.199
(Epoch 38 / 50) Training Accuracy: 0.83, Validation Accuracy: 0.197
(Epoch 39 / 50) Training Accuracy: 0.84, Validation Accuracy: 0.204
(Epoch 40 / 50) Training Accuracy: 0.85, Validation Accuracy: 0.197
(Epoch 41 / 50) Training Accuracy: 0.86, Validation Accuracy: 0.196
(Epoch 42 / 50) Training Accuracy: 0.87, Validation Accuracy: 0.195
(Epoch 43 / 50) Training Accuracy: 0.88, Validation Accuracy: 0.2
(Epoch 44 / 50) Training Accuracy: 0.9, Validation Accuracy: 0.201
(Epoch 45 / 50) Training Accuracy: 0.89, Validation Accuracy: 0.202
(Epoch 46 / 50) Training Accuracy: 0.9, Validation Accuracy: 0.2
(Epoch 47 / 50) Training Accuracy: 0.9, Validation Accuracy: 0.2
(Epoch 48 / 50) Training Accuracy: 0.9, Validation Accuracy: 0.201
(Epoch 49 / 50) Training Accuracy: 0.92, Validation Accuracy: 0.201
(Epoch 50 / 50) Training Accuracy: 0.92, Validation Accuracy: 0.198

Dropout Keep Prob = 0.75

(Iteration 1 / 250) loss: 2.904214955719195

(Epoch 1 / 50) Training Accuracy: 0.1, Validation Accuracy: 0.091
(Epoch 2 / 50) Training Accuracy: 0.16, Validation Accuracy: 0.1
(Epoch 3 / 50) Training Accuracy: 0.17, Validation Accuracy: 0.12
(Epoch 4 / 50) Training Accuracy: 0.19, Validation Accuracy: 0.125
(Epoch 5 / 50) Training Accuracy: 0.21, Validation Accuracy: 0.134
(Epoch 6 / 50) Training Accuracy: 0.27, Validation Accuracy: 0.133
(Epoch 7 / 50) Training Accuracy: 0.29, Validation Accuracy: 0.133
(Epoch 8 / 50) Training Accuracy: 0.33, Validation Accuracy: 0.143
(Epoch 9 / 50) Training Accuracy: 0.35, Validation Accuracy: 0.142
(Epoch 10 / 50) Training Accuracy: 0.39, Validation Accuracy: 0.15
(Epoch 11 / 50) Training Accuracy: 0.41, Validation Accuracy: 0.155
(Epoch 12 / 50) Training Accuracy: 0.43, Validation Accuracy: 0.158
(Epoch 13 / 50) Training Accuracy: 0.46, Validation Accuracy: 0.157
(Epoch 14 / 50) Training Accuracy: 0.48, Validation Accuracy: 0.163
(Epoch 15 / 50) Training Accuracy: 0.53, Validation Accuracy: 0.165
(Epoch 16 / 50) Training Accuracy: 0.55, Validation Accuracy: 0.165
(Epoch 17 / 50) Training Accuracy: 0.57, Validation Accuracy: 0.17
(Epoch 18 / 50) Training Accuracy: 0.59, Validation Accuracy: 0.172
(Epoch 19 / 50) Training Accuracy: 0.61, Validation Accuracy: 0.171
(Epoch 20 / 50) Training Accuracy: 0.65, Validation Accuracy: 0.172
(Epoch 21 / 50) Training Accuracy: 0.66, Validation Accuracy: 0.173
(Epoch 22 / 50) Training Accuracy: 0.66, Validation Accuracy: 0.167
(Epoch 23 / 50) Training Accuracy: 0.69, Validation Accuracy: 0.171
(Epoch 24 / 50) Training Accuracy: 0.73, Validation Accuracy: 0.176
(Epoch 25 / 50) Training Accuracy: 0.74, Validation Accuracy: 0.175
(Epoch 26 / 50) Training Accuracy: 0.74, Validation Accuracy: 0.179
(Epoch 27 / 50) Training Accuracy: 0.76, Validation Accuracy: 0.183
(Epoch 28 / 50) Training Accuracy: 0.79, Validation Accuracy: 0.179
(Epoch 29 / 50) Training Accuracy: 0.8, Validation Accuracy: 0.184
(Epoch 30 / 50) Training Accuracy: 0.8, Validation Accuracy: 0.184
(Epoch 31 / 50) Training Accuracy: 0.81, Validation Accuracy: 0.192
(Epoch 32 / 50) Training Accuracy: 0.81, Validation Accuracy: 0.191
(Epoch 33 / 50) Training Accuracy: 0.83, Validation Accuracy: 0.193
(Epoch 34 / 50) Training Accuracy: 0.85, Validation Accuracy: 0.193
(Epoch 35 / 50) Training Accuracy: 0.86, Validation Accuracy: 0.193
(Epoch 36 / 50) Training Accuracy: 0.87, Validation Accuracy: 0.193
(Epoch 37 / 50) Training Accuracy: 0.88, Validation Accuracy: 0.192
(Epoch 38 / 50) Training Accuracy: 0.89, Validation Accuracy: 0.195

(Epoch 39 / 50) Training Accuracy: 0.9, Validation Accuracy: 0.195
 (Epoch 40 / 50) Training Accuracy: 0.91, Validation Accuracy: 0.194
 (Epoch 41 / 50) Training Accuracy: 0.9, Validation Accuracy: 0.192
 (Epoch 42 / 50) Training Accuracy: 0.92, Validation Accuracy: 0.191
 (Epoch 43 / 50) Training Accuracy: 0.93, Validation Accuracy: 0.19
 (Epoch 44 / 50) Training Accuracy: 0.92, Validation Accuracy: 0.195
 (Epoch 45 / 50) Training Accuracy: 0.95, Validation Accuracy: 0.193
 (Epoch 46 / 50) Training Accuracy: 0.94, Validation Accuracy: 0.191
 (Epoch 47 / 50) Training Accuracy: 0.96, Validation Accuracy: 0.196
 (Epoch 48 / 50) Training Accuracy: 0.95, Validation Accuracy: 0.193
 (Epoch 49 / 50) Training Accuracy: 0.96, Validation Accuracy: 0.196
 (Epoch 50 / 50) Training Accuracy: 0.96, Validation Accuracy: 0.197



5. Dropout inline question answer

Ans: 0 dropout has the best accuracy at training time in most epochs and 0.25 has worst accuracy. The opposite happens at validation time, accuracy improves when 0.25 and 0.75 keep_prob is added, but 0 or no dropout has the worst accuracy in this case.

6. Activation function plot

