https://github.com/Christian-Martens-UNCC/ECGR-4105/tree/main/Homework_2-Logistic_Regression

Problem 1:

A) The maximum weighted accuracy of 0.83117 occurred when C = 10

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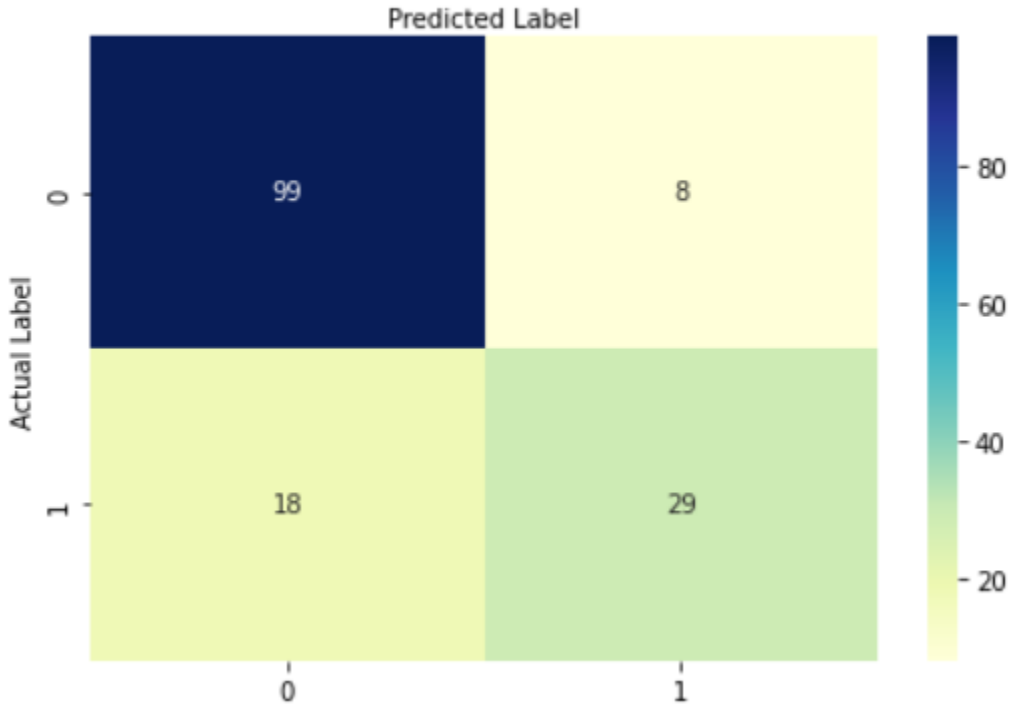
[[99  8]
 [18 29]]
```

	precision	recall	f1-score	support
0.0	0.85	0.93	0.88	107
1.0	0.78	0.62	0.69	47
accuracy			0.83	154
macro avg	0.81	0.77	0.79	154
weighted avg	0.83	0.83	0.82	154

Figure 1 - Confusion Matrix for Problem 1



Problem 2:

A) The accuracy of the model was lower compared to problem 1 by roughly 8%

```
5 folds: Accuracy = 74.92603 (5.39848)
10 folds: Accuracy = 74.27023 (5.65033)
```

Problem 3:

A) The maximum weighted accuracy of 0.97368 occurred when C = 500

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[[45  2]
 [ 1 66]]
```
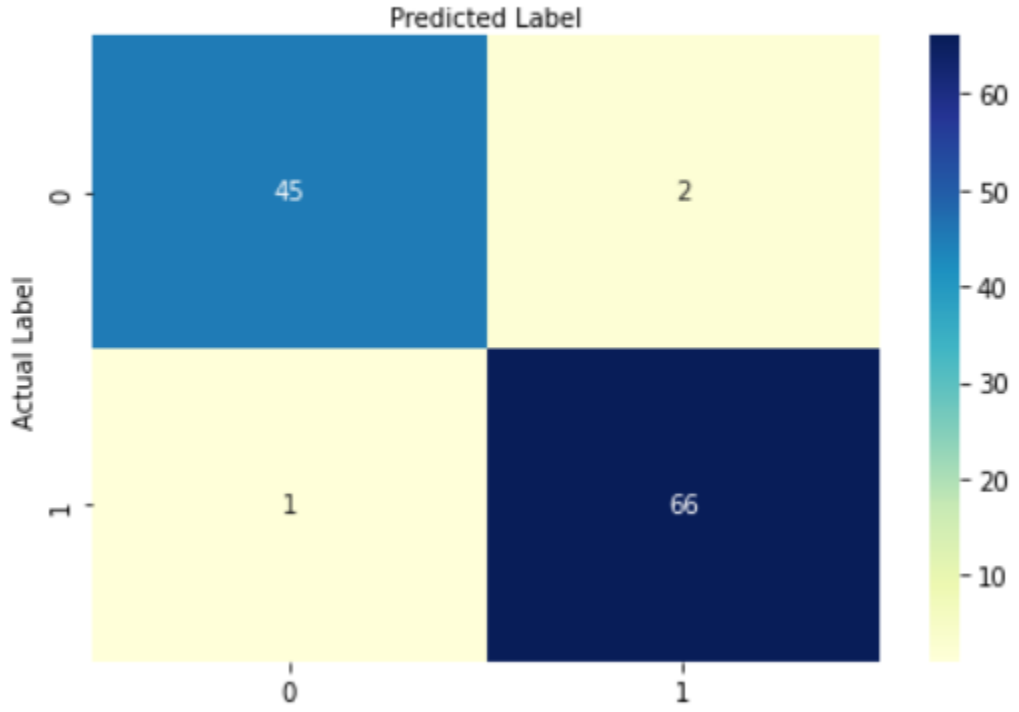

	precision	recall	f1-score	support
0.0	0.98	0.96	0.97	47
1.0	0.97	0.99	0.98	67
accuracy			0.97	114
macro avg	0.97	0.97	0.97	114
weighted avg	0.97	0.97	0.97	114

Figure 2 - Confusion Matrix for Problem 3



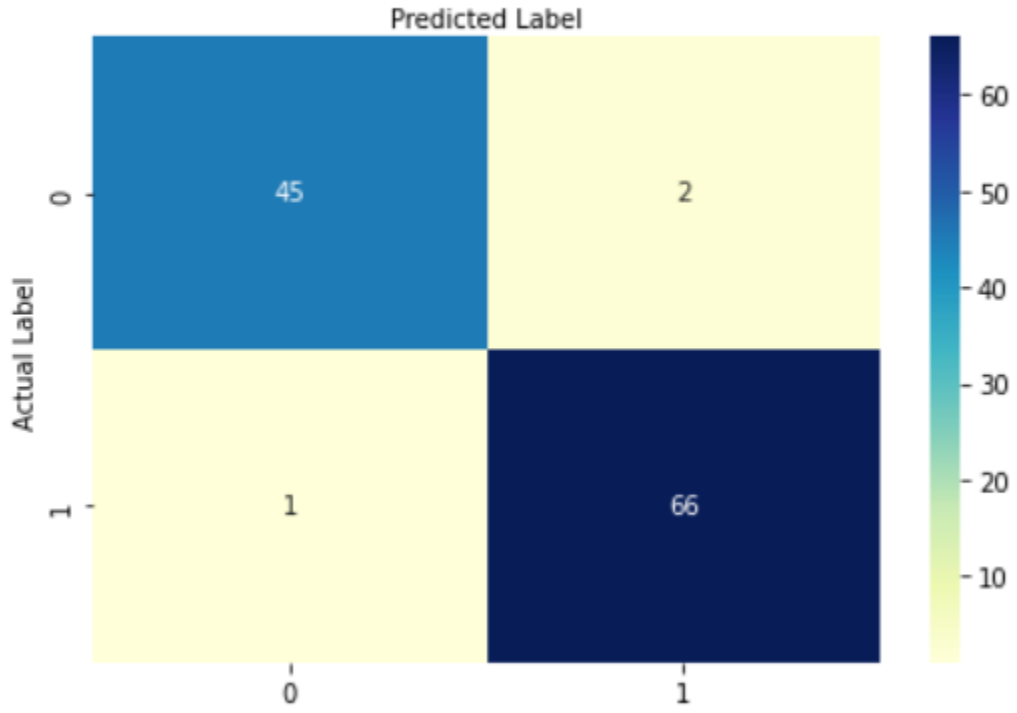
B) The maximum weighted accuracy of 0.97368 occurred when C = 2 when a parameter penalty of type “l1” was applied. The accuracy is exactly the same as the original model. However, the training accuracy is better for larger values of C and less accurate for lower

values of C.

```
[[45  2]
 [ 1 66]]
```

	precision	recall	f1-score	support
0.0	0.98	0.96	0.97	47
1.0	0.97	0.99	0.98	67
accuracy			0.97	114
macro avg	0.97	0.97	0.97	114
weighted avg	0.97	0.97	0.97	114

Figure 3 - Confusion Matrix for Problem 3 with a Parameter Penalty



Problem 4:

A) The accuracy of the model was lower compared to problem 3 by roughly 3%

```
5 folds: Accuracy = 95.38462 (1.28153)
10 folds: Accuracy = 95.38164 (3.49788)
```

B) With a parameter penalty added, the accuracy of the model increased by roughly 1 percent for both 5-folds and 10-folds models

```
5 folds with a Parameter Penalty: Accuracy = 96.04396 (1.49062)
10 folds with a Parameter Penalty: Accuracy = 96.27053 (2.60259)
```