Istanbul Medipol University

School of Engineering and Natural Sciences

Advanced Programming Laboratory Instructions

- 2 exercises will be held during laboratory sections.
- Second exercise will be done individually and grading will be done according to that performance.
- Exercises will be about the topics which have been held by Prof. Dr. Selim Akyokuş in that week.
- **Submissions after Friday 6:30 PM will not be accepted.**
- **For second exercise, any type of plagiarism is not allowed.**
- Please submit your exercises as YourDept_StudentID_Lab#.py and zip it as YourDept_StudentID_Lab#.zip
- Your codes should have comments. Codes with no comments will not receive full credit.
- For any questions,please contact me via Teams.

Exercise

In the k-nearest neighbors algorithm, the computation time for classifying samples increases with the value of k. Use %timeit function for jupyter nutebook or Time library for Python console to calculate the run time of the KNeighborsClassifier cross-validation for the Digits dataset. Use values of 1, 10 and 20 for k.

1. Compare the results.
2. Display the accuracy and mean of cross-validation score by using following loop.

```
for k in range(1, 20, 2):
    kfold = KFold(n_splits=10, random_state=11, shuffle=True)
    knn = KNeighborsClassifier(n_neighbors=k)
    scores = cross_validate(estimator=knn,
        X=digits.data, y=digits.target, cv=kfold)
    print(f'k={k:<2}')
    print(f'score mean accuracy={scores["test_score"].mean():.2%}')
    print(f'score time mean={scores["score_time"].mean():.5}')
    print()
```