MIDDLE EAST TECHNICAL UNIVERSITY
NORTHERN CYPRUS CAMPUS

# CNG 466 – FUNDAMENTAL IMAGE PROCESSING TECHNIQUES
# Assignment 3

**Objectives:**
The purpose of this assignment is to familiarize yourselves with the color image processing, image segmentation, morphological image processing and pattern recognition techniques. Another porpose is to familiarize yourselves to analyse the statistical properties of collected data and to explore topics which are covered/not covered in the lectures. For this assignment you are given five images from six different fruit trees. Your job is to process the images and implement fruit tree recognition system.

**Description:**

1) You are required to design and implement fruit tree recognition system which includes following stages;
   - Acquisition: The database is already acquired and provided to you. There are 6 classes with 5 tree images. In total database contains 30 images. At this stage, you should read tree images from the database folder and create labels for each.
   - Feature Extraction: you should extract unique features from tree images. Use one of the techniques that you have seen in image representation and description (e.g. chain codes, shape numbers, statistical moments, color info etc.) lecture. How and which to use you will decide.
   - Validation: you should divide the database into training and testing sets. Use validation method (e.g. k-fold cross-validation, leave-one-out, hold-out etc.) for this purpose. How and which to use you will decide.
   - Recognition: you should use a classification technique (e.g. knn, naïve bayes, svm classifier etc.) to identify the identity of test signature samples. How and which to use you will decide.
   - Performance: the overall performance of your recognition algorithm will be computed as the total number of correct classifications of test images divide by the total number of test images.

**Grading:**
- Acquisition
- Feature Extraction
- Validation
- Recognition
- Performance of the system (higher performance higher points)
- Explanation (reasons) of used techniques for every stage
- Displaying output

**Regulations:**

1) **Programming Language and Implementation:** You must code your program in MATLAB. You must use comments to explain what your code is doing step by step. You are expected make sure your code runs successfully.

2) **Submission:** Submit ONLY one .m file. You are allowed to write functions in this .m file.

3) **Deadline:** 30/01/2022 @23:00

4) **Late Submission:** Late submission is not allowed.

5) **Cheating:** Please read carefully cheating policy from the course syllabus.

**Please note that failing to do any of the above regulations may result as zero grade.**