**Project specification draft**

Notes:

1. Each team can have up to 2 members.
2. The deadline of this project is May 13.
3. Submit one zipped folder containing codes and screen shots of sample runs

Question 1

Implement the adaptive version of the arithmetic encoding and decoding algorithm. When the program first starts, a parameter is provided to decide how often the probability of symbols will be changed. E.g., if the parameter is 10, then after transmitting/receiving 10 symbols the probability table is changed according to all symbols transmitted/received so far. Consequently the domain assignments are also changed. Initially you can assume the uniform distribution. The underflow problem should be avoided.

Question 2

Develop a system that can count the amount of money scattered on a uniform background. There are 2 modules to this system: one is to learn the bills and coins to be recognized in the system; the other is the money counting module.

* There are at least three rectangular bills and four types of coins to be recognized in your system. Your system first learns the bills and coins from people: you upload a picture consisting of all bills and coins and then tell the system the amount of money each bill or coin signifies.
* Bills have different size; while coins differ by size and/or color, e.g., American pennies are reddish, quarters are white grayish. For bills, you can draw your own “bills” that are rectangles with different size to freely assign a money amount you would like to assign.
* The coins and bills to be counted may overlap each other. Your system should be able to endure some noises and identify fake bills/coins that are not recognizable in your system.
* Furthermore, your system should also be able to deal with the case when the capturing camera is not perpendicular to the ground, whence the circles and rectangles are warped. Your system should be able to rectify this angle to present the perpendicular view.
* Your system should be able to handle uneven lighting conditions.