**EEL 2880 Engineering Software Techniques: FALL 2019**

**Dr. Subbarao V Wunnava: 11 07 2019: Project 2**

**General Considerations: (Reference: Chapters 5, 6, 7, 8 and 11, 15, 16**

1. You may form into groups of no more than three individuals
2. Class period of 11 14 2019 Thursday delegated for your interaction among yourselves & TA
3. One neat hard copy of report is due at the beginning of class of 11 21 2019 Thursday per group.
4. The report should contain clearly: your methodology, pseudo code, flow charts, actual code, your results, analysis and scope for improvement, with alternate approaches. Use C, and cross check with C++ or Java.

**PROBLEM STATEMENTS: Work all the 3 problems with clear and to the point documentation:**

**Problem 1: String Operations and Data Security:** To improve data security in the transmission of data and information, dynamic character coding is being practiced. The modification of the original characters can be using the first 10 prime members [1, 2, 3, 5, 7, 11, 13, 17, 19, 23]: First character enhanced by 1; second character by 2, third by 3, .. 10th character by 23. Next 10 characters use the prime numbers in the reverse order 23..1, and decrease the values. Use a total message of at least 40 characters and repeat the process of modifying; Make your own message. After the message is coded, decoding should also be done, to restore the original message. You may want to change the lower case and upper case transitions as well. You may use your modifications to make more security built in.

Example: Original Message A B C D. …..

Normal ASCII 65 66 67 68 ….

Prime Numbers 1 2 3 5 ….

Modified ASCII 66 68 70 73 ….

Coded Message B D F I ……

**Problem 2: Card Shuffling: Entertainment Industry:**

Using random number generation, and multi-dimensional array/structure concepts: deal 52 cards into 4 different hands (P, Q, R, and S), 13 cards each hand. The 4 colors are Spades, Hearts, Diamonds and Clubs. 13 cards are: A, K, Q, J, 10, 9, 8, 7, 6, 5, 4, 3, 2. Your software should eliminate any duplication of the cards.

1. Ace has a value of 13; King 12, and so on; Spades value of: 4, Hearts 3, Diamonds 2, and Clubs 1.
2. After each hand is dealt, calculate the total value each hand has in numerical value.
3. Highest score wins. P hand is the dealer and should win at least 3 out of 4 times [75% of the time].
4. Extend the game to 8 players (P,Q,R, S, T, U, V, W) with 6 cards each and 4 cards remaining at random. Dealer hand P should win at least 5 out of 8 times [62.5% of the time]
5. Clearly explain in your report, how you are accomplishing these tasks.

**Problem 3: Your own modification of Problem 1 or 2.**

Assess your original problem solution and device and implement your own which would be more efficient, and more portable.

Courtesy: Mr. Mohammad Jaffari TA; Mr. Carlos Velez, Mr. Tony Rubio, Mr. Mike Abada, Volunteer TAs

**GOOD LUCK**