**COLLEGE OF ENGINEERING & TECHNOLOGY**

**Department :** Computer Engineering

**Lecturer :** Dr. Ashraf Tammam

**Course Name :** Data Structures

**Course Code :** CC215

**TA :** Eng. Nour S. Eissa, Eng. Reeham ElSafy



Project Briefing

Huffman Text File Compressor

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*This document contains the briefing for the CC215 Data Structures course project for the academic term Spring 2021. Read it carefully and fill-in the information in the sign-up section found in page 3 and then upload the saved document to the learning moodle system.This is a group project that will evaluate you for 20 marks. Failure in submitting the project will result in the loss of the 20 marks.*

# Description

Using what you studied in the CC215 Data Structures course, develop an application that can compress and decompress ASCII-based text files, using Huffman lossless encoding.

# Requirements

1. Read a user-specified text file and generate the frequency table based on the read data.
   1. The application must be able to read a user specified file.
   2. The input file has a maximum length of **2.00GB**.
   3. The input file is ASCII based.
2. Implement a linked-list priority queue to dynamically sort the frequency table.
   1. The priority queue must be based on linked lists.
3. Design the required binary tree data structure that serves as a base for the Huffman tree.
   1. Only one binary tree is allowed.
   2. The tree data field must be able to accommodate both the frequency and the value of any character.
4. Build the Huffman tree.
   1. The Huffman tree must be generated using the tree designed in step 3.
5. Generate the variable-length codes from the Huffman tree and store them in a file.
   1. The generated codes must be displayed on the screen.
   2. The generated codes must be saved to a separate file, with the same filename as the input but with an extension of “.cod”.
   3. This file will be used during the decompression part, to be able to decompress any file later on.
6. Compress the input file using the codes generated from the Huffman tree.
   1. The generated output must have the same filename as the input but with the extension “.com”.
   2. The output file cannot have a size larger than the input file.
7. Decompress any previously compressed file using the code file [from step 5].
   1. The decompressed file must match the original uncompressed file.
   2. You must use the code file generated in step 5b to retrieve the codes required for the decompression process.

# Guidelines

1. An exact number of **4 students** must work on the project. Each team member will be responsible of certain parts of the project. Once assigned, individuals cannot change their respective part in the project.
2. An oral discussion session will be held after the submission of the project. This session is part of your evaluation process.
3. Any submission that contains syntax errors will be rejected and a grade of **ZERO** will be assigned for the project.
4. All applications must be developed using **Microsoft Visual Studio (>=2015)** and must run on **Microsoft Windows operating systems.**
5. Parts of the project depend on the correct implementation of earlier parts. Any **missing parts of the project will negatively affect the marks assigned to the project**. Choose your team members and manage your timing carefully.

# Sign-up form

Use the following table to enter the information of your team members according to their respective roles.

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Name** | **Class (A, B, C, D)** | **Role** |
| 19105748 | Ahmed Hatem | A | Requirements 1, 2 and 3. |
| 19104600 | Mohamed Ramadan | A | Requirements 4 and 5. |
| 19104753 | Walid Atef | A | Requirement 6. |
| 19105888 | Omar Wael | A | Requirement 7. |

\* Any submission with missing information will be rejected and any missing students will be assigned to random groups based on the preferences of your course instructors.