

## CS 5311 Assignment 4

Due on Tuesday, April 9th, 2013

Each student is required to do this assignment **individually** and to hand in a hard copy of your solution on due date. Computer typeset for the solution is preferred. Hand written is also acceptable, but request to write clearly.

Put your Name, Student Number, Course Number (CS 5311) on your answer sheet.

Assignments which are not met the above requirements will not be marked. The score of the assignment will depend on:

Specification and documentation: 10 %

Correctness: 90 %

Late assignments will be penalized and will not be accepted after 3 days.

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### Problem 1.

Use the Huffman algorithm to construct a prefix code so that the following text (which can be downloaded from the course web) is encoded using the shortest possible bitstring. So you first need to calculate the frequency of each letters (include space, , . etc). Then implement the Huffman algorithm to establish the Huffman tree. Finally, output the Huffman code.

in graph theory, a flow network, also known as a transportation network, is a directed graph where each edge has a capacity and each edge receives a flow. The amount of flow on an edge cannot exceed the capacity of the edge. a flow must satisfy the restriction that the amount of flow into a node equals the amount of flow out of it, except when it is a source, which has more outgoing flow, or sink, which has more incoming flow.

### Problem 2.

Compute how many bits the encoded text in Problem 1 will be. Compare it to the text in ASCII code encoded file (or compare to a plain text file .txt).

### Problem 3.

The Johnson, Pate, Sears and Ward families are going to the Winter Park Art Festival. Four cars available to transport the families to the show. The car can carry the following numbers of people: car 1, four; car 2, three; car 3, three; and car 4, four. There are four people in each family and no car can carry more than two people from any one family. Formulate the problem of transporting the maximum possible number of people to the festival as a maximum-flow problem.

**Problem 4.**

Using FF EK Maximum-flow algorithm to find a maximum flow and minimum cut for following network.

