

SPRING 2003: COT 6405 ANALYSIS OF ALGORITHMS

[HOMEWORK 2; DUE MAR 6 IN CLASS]

Signed Statement: For every homework, add a statement to your homework that states that you have read the submission guidelines and cheating policies outlined on the course web page and that you have followed them for the homework you are submitting.

Problems

11. (**Regular**) Solve problem 9.3-1, page 192.
12. (**Exercise**) Solve problem 9.3-3, page 192. No details are needed.
13. (**Regular**) Solve 9.3-7, page 193.
14. (**Exercise**) Solve 13.3-2, page 287.
15. (**Regular**) Solve 13.4-3, page 293.
16. (**Regular**) Solve 14.2-1, page 310.
17. (**Regular**) Solve 14.3-6, page 317.
18. (**Exercise**) Huffman Coding: Release 40.42 of 31-Jan-2003 of SwissPROT Protein Database contains 121,745 sequence entries, comprising 44,680,829 amino acids. There are 20 possible amino acids. But the frequencies of occurrence of the amino acids are not the same. Run the greedy algorithm for Huffman Coding and determine the optimal coding for the 20 amino acids. Frequencies are as given below.

Alanine (A) 7.72, Glutamine (Q) 3.91, Leucine (L) 9.56, Serine (S) 6.98, Arginine (R) 5.24, Glutamic Acid (E) 6.54, Lysine (K) 5.96, Threonine (T) 5.52, Asparagine (N) 4.28, Glycine (G) 6.90, Methionine (M) 2.36, Tryptophan (W) 1.18, Aspartic Acid (D) 5.28, Histidine (H) 2.26, Phenylalanine (F) 4.06, Tyrosine (Y) 3.13, Cysteine (C) 1.60, Isoleucine (I) 5.88, Proline (P) 4.87, Valine (V) 6.66
19. (**Regular**) Solve 15.2-1, page 338.
20. (**Regular**) Solve any one of the following problems from your text (pages 364-368): **(a)** Problem 15-1 (Bitonic euclidean traveling-salesperson problem), **(b)** Problem 15-3 (Edit distance), or **(c)** Problem 15-5 (Viterbi algorithm). [Note: For those of you with old editions of the text, you may consider looking at the new edition since it has more details on these problems.]