**CS 515 Exercise A03: Huffman Coding**

\_\_\_\_\_ /50

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**Lecture Section: 02 (circle one)**

**[20 pts]** Build a Huffman coding for “ABRACADABRA”. Show the final trie and the final mapping it represents. In the interest of everyone getting similar tries, combine singleton (leaf) nodes with each other rather than with parent nodes.

Symbol Frequency Encoding

|  |  |  |
| --- | --- | --- |
| **A** | **5** | **0** |
| **B** | **2** | **100** |
| **C** | **1** | **110** |
| **D** | **1** | **111** |
| **R** | **2** | **101** |

**A close up of a logo

Description automatically generated**

D

*More on the back…*

**[30 pts]** Build a Huffman coding for the following phrase. Show the final trie and the final mapping it represents. In the interest of everyone getting similar tries, prefer combining nodes near each other first.

Phrase: “How much wood could a woodchuck chuck if a woodchuck could chuck wood?”

|  |  |  |
| --- | --- | --- |
| 10 | [space] | 12 |
| 000 | c | 11 |
| 001 | o | 11 |
| 110 | u | 7 |
| 0100 | d | 6 |
| 0101 | h | 5 |
| 0110 | w | 5 |
| 1110 | k | 4 |
| 11110 | a | 2 |
| 011101 | l | 2 |
| 011100 | f | 1 |
| 011110 | i | 1 |
| 011111 | m | 1 |
| 111110 | H | 1 |
| 111111 | ? | 1 |

Here are the frequencies for each of the symbols (so you don’t make counting errors). Write the code next to them in the table.

1

1

1

1

1

1

1

1

1

1

1

1

1

1

0

0

0

0

0

0

0

0

0

0

0

0

0

0

c

[space]

o

?

H

m

i

a

l

f

k

w

d

h

u