

EENG/CPSC 410 Midterm Project

Two “loaded” dice are used to generate a sequence of whole numbers between 2 and 12 inclusive. One die is loaded so that $P(3)=0.5$ and the other five results are equiprobable so that $P(1,2,4,5 \text{ or } 6)=0.1$. The other die is loaded so that $P(4)=0.5$ and the other five results are equiprobable so that $P(1,2,3,5 \text{ or } 6)=0.1$.

Write a Huffman source coding MATLAB program to determine the average Huffman source code word length and the Huffman source code efficiency for the first, second, third and fourth extensions of this zero-memory source.

To check your program the correct results for the first extension are:

$$L=2.9500 \text{ binit/symbol}$$

$$Eff=0.9886$$

A possible Huffman code for the first extension is:

```
2:  0 1 1 0 1 0 1
3:  0 1 1 0 0
4:  0 0 0
5:  0 1 0
6:  1 0 1
7:  1 1
8:  1 0 0
9:  0 0 1
A:  0 1 1 1
B:  0 1 1 0 1 1
C:  0 1 1 0 1 0 0
```

Due: October 11, 2019

Deliverables:

- MATLAB program listing
- Average Huffman source code word lengths and efficiencies for the first, second, third and fourth extensions of the source. Show results to four decimal places.