HW3

張恩瑞 109607514

1. Arithemetic code

編譯：

```
henryc@52-0460994-H1:/mnt/c/Users/henry/desktop/College/Junior/DataSturcture/HW3/arcd/Test$ gcc -o arcd arcd.c arcd_stream.c adaptive_model.c arcd.h  adaptive_model.h
```

執行：

```
henryc@52-0460994-H1:/mnt/c/Users/henry/desktop/College/Junior/DataSturcture/HW3/arcd/Test$ ./arcd -e <test.txt | tee encoding.txt
```

```
henryc@52-0460994-H1:/mnt/c/Users/henry/desktop/College/Junior/DataSturcture/HW3/arcd/Test$ ./arcd -d <encoding.txt | tee decoding.txt
```

2. Huffman code

編譯：

```
henryc@52-0460994-H1:/mnt/c/Users/henry/desktop/College/Junior/DataSturcture/HW3/huffman$ make
cc -g -Wall -Werror -Wextra -O0 -std=c11 -D_POSIX_C_SOURCE=2   -c -o huffcode.o huffcode.c
cc  -o huffcode huffcode.o libhuffman.a
```

執行：

```
henryc@52-0460994-H1:/mnt/c/Users/henry/desktop/College/Junior/DataSturcture/HW3/huffman$ ./huffcode -i test.txt -o encode.txt -c
Time taken: 0.001041
```

```
henryc@52-0460994-H1:/mnt/c/Users/henry/desktop/College/Junior/DataSturcture/HW3/huffman$ ./huffcode -i encode.txt decode.txt -d
```
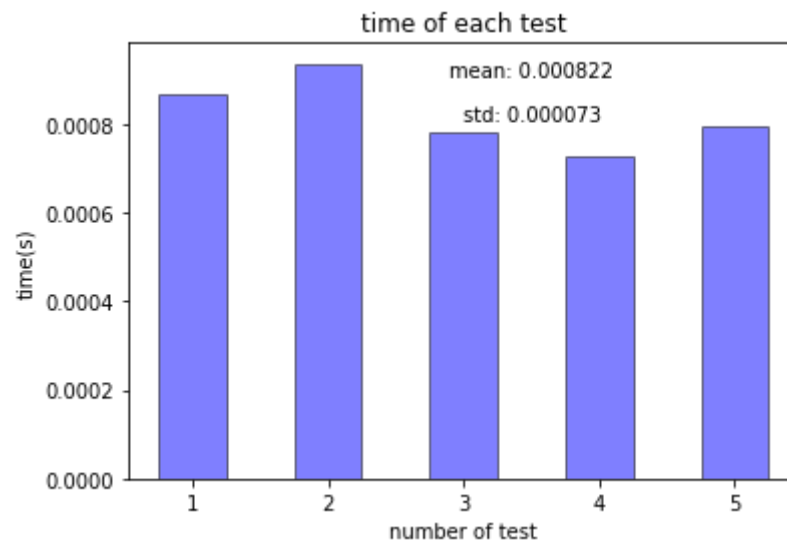
3. Comparison

- Huffman

Five time comparison

For 913 bytes data

```
henryc@52-0460994-H1:/mnt/c/Users/henry/desktop/College/Junior/DataSturcture/HW3/huffman$ ./huffcode -i test.txt -o encode.txt -c
Time taken: 0.000867
henryc@52-0460994-H1:/mnt/c/Users/henry/desktop/College/Junior/DataSturcture/HW3/huffman$ ./huffcode -i test.txt -o encode.txt -c
Time taken: 0.000937
henryc@52-0460994-H1:/mnt/c/Users/henry/desktop/College/Junior/DataSturcture/HW3/huffman$ ./huffcode -i test.txt -o encode.txt -c
Time taken: 0.000784
henryc@52-0460994-H1:/mnt/c/Users/henry/desktop/College/Junior/DataSturcture/HW3/huffman$ ./huffcode -i test.txt -o encode.txt -c
Time taken: 0.000727
henryc@52-0460994-H1:/mnt/c/Users/henry/desktop/College/Junior/DataSturcture/HW3/huffman$ ./huffcode -i test.txt -o encode.txt -c
Time taken: 0.000797
```
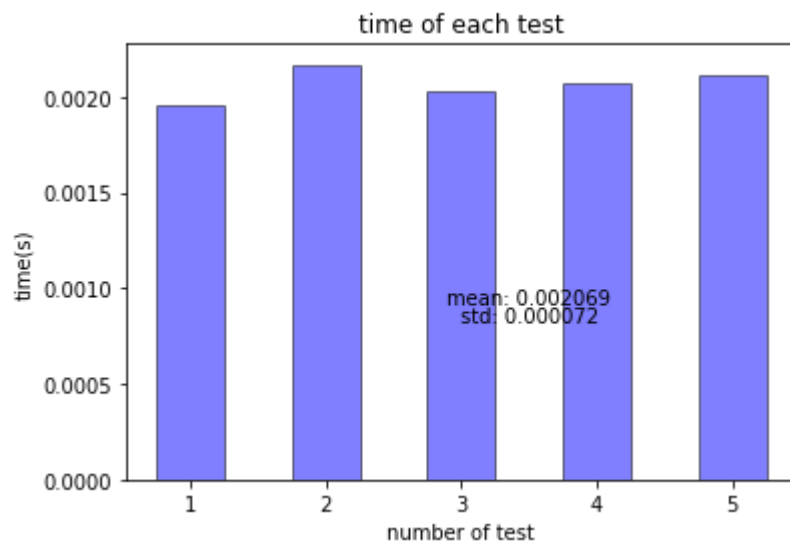

其花費時間分別為：

```
0.000867, 0.000937, 0.000784,0.000727,0.000797
```

平均花費：0.000822(s)

- Arithemetic

  Five time comparison

  For 913 bytes data

其花費時間分別為：

```
0.001961,0.002170,0.002026,0.002069,0.002117
```

平均花費：0.002069(s)

總結

五次比較平均下來 Huffman coding 所花費相較於 Arithemetic coding 所花費的時間較少。