Assignment_3

(通訊二：110503521 薛力豪)

(1).編譯結果

- Huffman

```
casper@LAPTOP-1DKFTNB9:~/work/huffmancode$ make
cc -g -Wall -Werror -Wextra -O0 -std=c11 -D_POSIX_C_SOURCE=2   -c -o huffcode.o huffcode.c
cc -g -Wall -Werror -Wextra -O0 -std=c11 -D_POSIX_C_SOURCE=2   -c -o huffman.o huffman.c
ar r libhuffman.a huffman.o
ar: creating libhuffman.a
cc  -o huffcode huffcode.o libhuffman.a
```

- Arithmetic

```
casper@LAPTOP-1DKFTNB9:~/work/arcd$ make
[ 25%] Built target arcd
[ 50%] Built target adaptive_model
[ 75%] Built target arcd_stream
[100%] Built target codec_tests
```

(2).執行結果

- Huffman Compress

(1). 500 字元

```
casper@LAPTOP-1DKFTNB9:~/work/huffman$ ./huffcode -i testfile500.txt -o com
pressfile500.txt -c
Run Time: 364 µs
```

(2). 1000 字元

```
casper@LAPTOP-1DKFTNB9:~/work/huffman$ ./huffcode -i testfile1000.txt -o co
mpressfile1000.txt -c
Run Time: 433 µs
```

(3). 3000 字元

```
casper@LAPTOP-1DKFTNB9:~/work/huffman$ ./huffcode -i testfile3000.txt -o co
mpressfile3000.txt -c
Run Time: 609 µs
```

- Huffman Decompress

(1). 500 字元

```
casper@LAPTOP-1DKFTNB9:~/work/huffman$ ./huffcode -i compressfile500.txt -o
 decompressfile500.txt -d
Run Time: 224 µs
```

(2). 1000 字元

```
casper@LAPTOP-1DKFTNB9:~/work/huffman$ ./huffcode -i compressfile1000.txt -
o decompressfile1000.txt -d
Run Time: 295 µs
```

(3). 3000 字元

```
casper@LAPTOP-1DKFTNB9:~/work/huffman$ ./huffcode -i compressfile3000.txt -
o decompressfile3000.txt -d
Run Time: 442 µs
```

- Arithmetic Compress

(1). 500 字元

```
casper@LAPTOP-1DKFTNB9:~/work/arcd/examples$ ./arcd_stream -e <testfil
e500.txt | tee compressfile500.txt
Run time: 120 µs
```

(2). 1000 字元

```
casper@LAPTOP-1DKFTNB9:~/work/arcd/examples$ ./arcd_stream -e <testfil
e1000.txt | tee compressfile1000.txt
Run time: 214 µs
```

(3). 3000 字元

```
casper@LAPTOP-1DKFTNB9:~/work/arcd/examples$ ./arcd_stream -e <testfil
e3000.txt | tee compressfile3000.txt
Run time: 593 µs
```

- Arithmetic Decompress

(1). 500 字元

```
casper@LAPTOP-1DKFTNB9:~/work/arcd/examples$ ./arcd_stream -d <compres
sfile500.txt | tee decompressfile500.txtclear
Run time: 160 µs
```

(2). 1000 字元

```
casper@LAPTOP-1DKFTNB9:~/work/arcd/examples$ ./arcd_stream -d <compres
sfile1000.txt | tee decompressfile1000.txt
Run time: 312 µs
```

(3). 3000 字元

```
casper@LAPTOP-1DKFTNB9:~/work/arcd/examples$ ./arcd_stream -d <compres
sfile3000.txt | tee decompressfile3000.txt
Run time: 922 µs
```

3. 分析

(1).字元數越多，壓縮檔案所需的時間越長

(2).運用 Arithmetic 演算法壓縮檔案所需的時間少於運用 Huffman 演算法

(3).兩種演算法的壓縮效率差不多

4. 參考資料

(1). drichardson/huffman: huffman encoder/decoder (github.com)

(2). wonder-mice/arcd: Simple arithmetic coding library in C (github.com)