Project: Project **5** exercises implementations of separate chaining hashing and open addressing algorithms. Identifiers are read from the first input file and inserted in both the separate chaining and open addressing tables. Both separate chaining and open addressing hash tables have 100 entries. Identifiers read from the second input file are removed from both tables. Print the identifier, its separate chaining hash table index, the length of the separate chaining hash table collision chain, and the open addressing hash table index for every insertion and deletion.

Program Files:

File	Description
p05.cpp	File **p05.cpp** contains functions that process command line arguments and exercises the separate chaining and open addressing hash classes.
***05.h**	All files containing class definitions must have the suffix **05.h**.
***05.cpp**	All files containing member function implementations must have the suffix **05.cpp**.
p05make	File **p05make** contains instructions for program **p05**. Instructions are written for the UNIX utility ***make***. Program **p05** is contained in file **p05**.

Command Line: Project **5** can be invoked with zero, one, two or three program parameters. The first program parameter is the name of the file containing identifiers to be inserted into a hash table. The second parameter is the name of the file containing identifiers to be deleted from the hash table. The third parameter is the output file name. Sample command lines together with corresponding actions by program **p05** are shown below. Boldfaced type indicates data entered at the keyboard by the user.

$ **p05**
Enter the name of the input file containing identifiers to insert. **i05i.dat**
Enter the name of the input file containing identifiers to delete. **i05d.dat**
Enter the output file name. **o05.dat**

$ **p05 i05i.dat**
Enter the name of the input file containing identifiers to delete. **i05d.dat**
Enter the output file name: **o05.dat**

$ **p05 i05i.dat i05d.dat**
Enter the output file name: **o05.dat**

$ **p05 i05i.dat o05.dat**

Input Files:

Insertion	The first file contains a list of identifiers to be inserted into both hash tables. The list below is representative. abigail belle cosette dierdre estelle fantine grace hannah ilse jennifer kelsie laura melissa nell ophelia penelope qian rose sasha theresa ursula violet xavier yvette zoe
Deletion	The second file contains a list of identifiers to be deleted from both hash tables. The list below is representative. penelope estelle laura katherine

Output File: The output file consists of four columns of data as illustrated in Figure 1. The first column lists the names of identifiers inserted into or deleted from the hash tables. The second column contains the separate chaining index. The third column contains the length of chain. The fourth column contains the open addressing index. Titles are given to each of the columns as shown in Figure 1. Insertion and deletion tables are separately titled as shown in Figure 1.

```
Insert the following identifiers.
       Identifier           Separate          Separate             Open
                            Chaining          Chaining          Address
                               Table             Chain            Table
                               Index            Length            Index
          abigail                42                 1               42
            belle                29                 1               29
          cosette                97                 1               97
          dierdre                37                 1               37
          estelle                77                 1               77
          fantine                 5                 1                5
            grace                23                 1               23
           hannah                18                 1               18
             ilse                35                 1               35
         jennifer                80                 1               80
            kelsie               47                 1               47
             laura               77                 2               78
           melissa               99                 1               99
              nell               92                 1               92
           ophelia               59                 1               59
         penelope                77                 3               79
             qian                51                 1               51
             rose                87                 1               87
            sasha                22                 1               22
          theresa                31                 1               31
           ursula                33                 1               33
           violet                98                 1               98
           xavier                 4                 1                4
           yvette                13                 1               13
              zoe                39                 1               39

Delete the following identifiers.
       Identifier           Separate          Separate             Open
                            Chaining          Chaining          Address
                               Table             Chain            Table
                               Index            Length            Index
         penelope               77                 3               79
          estelle               77                 2               78
            laura               77                 1               77
        katherine               -1                 0               -1
```

Figure 3. Output file format