

1. In this assignment, you are required to handle strings. You may use the standard C library functions on strings, such as `strcat()`, `strcpy()`, and `strcmp()`.
 - (a) Write a function, `readinp()`, which reads a set of words from a text file, `input.dat`, and stores them into an array, `A`, of strings.
 - (b) Write a function, `reverse()`, which reverses each string in `A`. For example, the reverse of the word `confound` is `dnuofnoc`.
 - (c) Write a function named `rhyme()` with appropriate arguments to print the words in `A` in an order such that rhyming words appear close to each other. Use the following approach:
 - (i) Use the function, `reverse()`, to reverse the letters in each word in `A`.
 - (ii) Sort the resulting array.
 - (iii) Use `reverse()` to reverse the letters in each word back to their original order.
 - (iv) Print the strings without repetition.For example, `confound` is adjacent to words such as `astound` and `surround` in the resulting list.
 - (d) We also wish to count the frequency of each word in the array `A`. Write a function named `printfreq()` to print each word in `A` (without repetition) and their frequency. [Hint: *The array `A` after executing the function of part (c) may prove to be useful.*]
2. The following structure defines the accommodation records maintained for all residents of IIT Campus.

```
struct accommodation {
    char firstname[50];
    char lastname[50];
    int idtype;
    union idnum {
        char aadhaar[13];
        char passport[9];
        int empcode;
    };
    char address[100];
}
```

The field `idtype` takes a value 0, 1, or 2, indicating whether the ID is Aadhaar Card number,

Passport number, or Employee code.

- (a) Write a function, `readinp()`, which reads a set of N records from the input text file, `input.dat` into a dynamically allocated array `B` of structures (use `malloc`). The first line of the file contains the value of N . Each of the next N lines contain one record. For example a file with 2 records (that is, $N=2$) may look like the following:

```
2
Sumanta Dey 2 2022513 Formal Methods Lab
Pallab Dasgupta 1 ZF351076 Dept. of CSE, IIT Kharagpur
```

After reading `idnum` you must treat the rest of the line as the address.

- (b) Print the records in `B` so that all those who have provided passport numbers are listed first, all those who have provided Aadhaar card numbers are listed next, and all those who have provided Employee code are listed at the end.
- (c) We wish to print the records in `B` in alphabetic order of names (sorted by `firstname` and ties resolved by `lastname`). Instead of sorting the records in `B`, we will create a thing called `index`. For this purpose, dynamically allocate an array, `index`, of N integers, and then for each k , $0 \leq k < N$, populate `index[k]` with the index of the record containing the k^{th} name in alphabetic order. For example, the index for the records of part (a) will be as follows:

```
index[0]=1    index[1]=0
```

- (d) Use the array, `index[]`, to print the records in alphabetic order of names.