Computer Engineering Department

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CMPE 252 – C Programming, Spring 2023

Lab 03

In this lab, you are asked to complete **difference.c** program file which has been already given in Moodle. In this program, there are four functions, namely, `main`, `findDifference`, and `printNameSurnameAge`. `main` function is already provided and it is supposed to remain as it is (you should not change it). You are required to implement `findDifference` and `printNameSurnameAge` functions.

Here are the operations performed in `main` function:

- An array of strings with name `list` is created to hold name, surname and age data in "name_surname_age" format.
- Two *arrays of pointers to strings* with names `group1` and `group2` are created along with two integer variables n1 and n2 to hold the number of elements in the arrays.
- n1 and `group1` are initialized by taking data from the standard input.
- n2 and `group2` are initialized by taking data from the standard input.
- *An array of pointers to strings* with name `diff` and an integer variable with name `diffCount` are created. The array of pointers `diff` is supposed to hold pointers to the strings that are included in `group1` but not included in `group2`. `diffCount` is supposed to hold the number of elements in the difference set. Those variables are to be filled by calling `findDifference` function.
- `findDifference` function is called with 6 arguments, which are the array of pointers (`group1` and `group2`), their number of elements (`n1` and `n2`), the array of pointers `diff`, and the address of `diffCount` variable.
- The strings pointed to, by the elements of the array `group1` are printed.
- The strings pointed to, by the elements of the array `group2` are printed.
- The strings pointed to, by the elements of the array `diff` are printed.
- The user is asked whether to print the strings in the difference set in Name Surname Age format. If the answer is 1, then:
    - `printNameSurnameAge` function is called with 2 arguments, which are the array of pointers `diff` and its number of elements `diffCount`.
    - The strings pointed to, by the elements of the array `diff` are printed again to check whether they remain unchanged after calling `printNameSurnameAge` function.

Task 1: Implement `findDifference` function.

```
void findDifference(char *group1[], char *group2[], int n1, int n2, char *diff[], int *diffCountPtr);
```

The array of pointers `diff` is an output parameter and it is supposed to hold pointers to the set of strings pointed to, by the elements of `group1` but not pointed to, by the elements of `group2`. The total number of elements in the difference is to be stored in the integer variable pointed to, by `diffCountPtr` (which is also an output parameter).

Hint: You need to compare each string in `group1` with each string in `group2`. You need to use `strcmp` function for the comparison.

```
Number of elements in group1: 5
Entries in group1: 1 5 9 4 7

Number of elements in group2: 4
Entries in group2: 9 5 1 6

group1:
zoe_vin_32
denzel_bale_65
dustin_smith_51
david_studi_17
james_alonso_30

group2:
dustin_smith_51
denzel_bale_65
zoe_vin_32
james_feldman_76

difference of group1 from group2:
david_studi_17
james_alonso_30

Do you want to print the difference in Name Surname Age format (1/0)? 0
```

Consider the above example run:

Suppose that group1 is initialized to have 6 elements, namely, `list[1]`, `list[4]`, `list[9]`, `list[3]`, `list[2]`, and `list[8]`. group2 is initialized to have 4 elements, namely, `list[9]`, `list[5]`, `list[1]`, and `list[6]`. As shown in Figure 1, the difference of group1 from group2 contains `list[4]`, `list[3]`, `list[2]`, and `list[8]`.

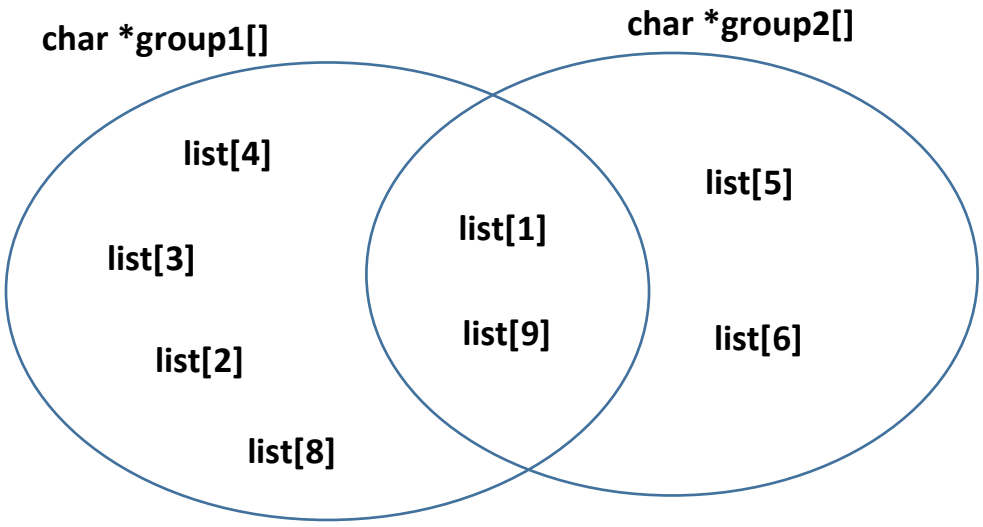

Figure 1: sets of strings

Task 2: Implement `printNameSurnameAge` function.

```
void printNameSurnameAge(char *diff[], int diffCount);
```

The strings pointed to, by the elements of the array `diff` are printed in Name Surname Age format (the first letters of Name and Surname are capitalized). `diffCount` holds the number of elements in the array `diff`.

Some functions that you might need to use are as follows:

```
//Copies the string pointed to, by src to dest.
strcpy(char* dest, const char* src);

//Breaks string str into a series of tokens separated by delim
strtok(char* str, const char* delim);

//Converts lowercase letter of str string to uppercase.
toupper(str[i]);
```

Hints:

`strtok` function changes the content of its first string argument so you need to call `strtok` function on a copy of the string argument if you do not want to change its content. For each string that can be accessed using `diff`, you should copy it into a different memory space. Consider to create a local char array (string) with size STR_LEN and use it for that purpose.

```
Number of elements in group1: 5
Entries in group1: 1 5 9 4 7

Number of elements in group2: 4
Entries in group2: 9 5 1 6

group1:
zoe_vin_32
denzel_bale_65
dustin_smith_51
david_studi_17
james_alonso_30

group2:
dustin_smith_51
denzel_bale_65
zoe_vin_32
james_feldman_76

difference of group1 from group2:
david_studi_17
james_alonso_30

Do you want to print the difference in Name Surname Age format (1/0)? 1

difference of group1 from group2 in Name Surname Age format:
David Studi 17
James Alonso 30

difference of group1 from group2:
david_studi_17
james_alonso_30
```

Above is an example run: