

CPP Problem Design Example

Subject: Student Records

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Main testing concept: Structures

Basics

- ☒ C++ BASICS
- ☒ FLOW OF CONTROL
- ☒ FUNCTION BASICS
- ☐ PARAMETERS AND OVERLOADING
- ☒ ARRAYS
- ☒ STRUCTURES AND CLASSES
- ☐ CONSTRUCTORS AND OTHER TOOLS
- ☐ OPERATOR OVERLOADING, FRIENDS, AND REFERENCES
- ☒ STRINGS
- ☐ POINTERS AND DYNAMIC ARRAYS

Functions

- ☐ SEPARATE COMPILATION AND NAMESPACES
- ☐ STREAMS AND FILE I/O
- ☐ RECURSION
- ☐ INHERITANCE
- ☐ POLYMORPHISM AND VIRTUAL FUNCTIONS
- ☐ TEMPLATES
- ☐ LINKED DATA STRUCTURES
- ☐ EXCEPTION HANDLING
- ☐ STANDARD TEMPLATE LIBRARY
- ☐ PATTERNS AND UML

Description:

Write a program that records at most 10 student data by structures. There are four function for user to use:

(1) insert (up to 10 records), (2) search, (3) delete, (4) print.

A record of a student is defined as follow:

```
typedef struct {
    char firstName[25];
    char lastName[30];
    char phone[15];
} StRec;
```

Input:

Enter a string to call the function. There are four kinds of command (insert, delete search and print). Except “print” command, the other three command need to enter with firstName, lastName and phone. Use space to separate each data. The print command only needs to enter “print” .

Format of four commands:

(1) insert + firstName + lastName + phone

(E.g. insert Harry Potter 0987654321)

(2) delete + firstName + lastName + phone

(E.g. delete Harry Potter 0987654321)

(3) search + firstName + lastName + phone

(E.g. search Harry Potter 0987654321)

(4) print

(firstName <= 25 letters, lastName <= 30 letters, phone <= 15 numbers)

User can enter command until read EOF.

Output:

User needs to check for the input format. (1) the length of firstName or lastName or phone is too long. (2) Input is not the four commands. (3) phone is not number. If any problems meet the above conditions, print “Input Error” and re-enter a command.

When **insert** is called, insert the record after last record. If there are

already 10 records or the record already exists (firstName and lastName and phone are the same as input data), print "Insert Error" .

When **delete** is called, finds the record and delete it. If it does not exist, print "Delete Error" .

When **search** is called, finds the record and print which index the record is in. If it does not exist, print "Search Error" .

When **print** is called, print all records. Please print three data and separate them by space (e.g. Harry Potter 0987654321). If there are no records, print "Print Error" .

Sample Input / Output :

Sample Input	Sample Output
print	Print Error
insert Elijah Smith 0912345585	Elijah Smith 0912345585
print	Elijah Smith 0912345585
insert Nicol Green 0901563245	Nicol Green 0901563245
insert Tom Taylor 0905615613	Tom Taylor 0905615613
insert Paul Miller 0916548960	Paul Miller 0916548960
print	0
search Elijah Smith 0912345585	2
search Tom Taylor 0905615613	Search Error
search Alen Lee 0953440450	Elijah Smith 0912345585
delete Tom Taylor 0905615613	Nicol Green 0901563245
print	Paul Miller 0916548960
delete David King 0946549409	Delete Error
print	The record already exists.
insert Obmar Wood 0965406546	Elijah Smith 0912345585
print	Nicol Green 0901563245
insert Jone Smith 0916504894	Paul Miller 0916548960
insert Nicol Green 0901563245	Elijah Smith 0912345585
print	Nicol Green 0901563245
insert	Paul Miller 0916548960
ovuvuevuevueenyetuenwuevueugbemugb	Obmar Wood 0965406546
emosas Tom 0123456789012345	Insert Error
insert Rainy Jazz 0987a12345987654	Elijah Smith 0912345585
insert Jone Six 0987580780	Nicol Green 0901563245
insert Tom Seven 0951348632	Paul Miller 0916548960
insert Jack Eight 886923654321	Obmar Wood 0965406546
insert Sam Nine 00886958643215	Jone Smith 0916504894
insert TF Ten 0913648762	Input Error
insert Howard Eleven 0913215468	Input Error
	Insert Error

- ☐ Easy, Only basic programming syntax and structure are required.
- ☒ Medium, Multiple programming grammars and structures are required.
- ☐ Hard, Need to use multiple program structures or complex data types.

Expected solving time:

30 minutes

Other notes: