```cpp
#include <iostream>
#include <cstring>
using namespace std;

const int directory_Size = 10;

const char *names[directory_Size] = { "John", "James", "Tom" };  // 看成二維陣列

const char *phoneNumbers[directory_Size] = { "0912345678", "0995638527", "0965748396" };

void printDirectory();
void findPhoneNumber(const char *name);
void updatePhoneNumber(const char *name, const char *newNumber);
```

```cpp
int main ()
{

    int options;
    cout << "Search for the phone number (enter 0) \nupdate phone number(enter 1) \nlook up the directory(enter 2): ";
    cin >> options;
    cin.ignore();

    if (!options)
    {
        char name_search[80];

        cout << "Whose phone number do you want to search? : ";
        cin.getline(name_search, 80, '\n');

        int find_counter = 0;
        for (const char **name_ptr = names; *name_ptr; name_ptr++)
        {

            if (!strcmp(*name_ptr, name_search))
            {
               find_counter++;
            }

        }
        if (!find_counter)
        {
            cout << "No " << name_search << " in the directory." << endl;
            return 0;
        }

        findPhoneNumber(name_search);
    }
```

```cpp
    else if (options == 1)
    {
        char name[80];
        char newNumber[11];

        cout << "Whose phone number do you want to update?: ";
        cin.getline(name, 80, '\n');

        int find_counter = 0;
        for (const char **name_ptr = names; *name_ptr; name_ptr++)
        {

            if (!strcmp(*name_ptr, name))
            {
               find_counter++;
            }

        }
        if (!find_counter)
        {
            cout << "No " << name << " in the directory." << endl;
            return 0;
        }

        cout << "New number: ";
        cin.getline(newNumber, 11, '\n');

        updatePhoneNumber(name, newNumber);
    }
    else if (options == 2)
    {
        printDirectory();
    }

    return 0;

}
```

```
86  void printDirectory (){
87
88      cout << endl;
89
90      for (int i = 0; names; i++)
91      {
92          cout << *(names + i) << ": " << *(phoneNumbers + i) << endl;
93      }
94
95  }
96
97  void findPhoneNumber (const char *name){
98
99      cout << endl;
100
101     const char **phone_ptr = phoneNumbers;
102
103     for (const char **name_ptr = names; *name_ptr; name_ptr++)
104     {
105
106         if (!strcmp(*name_ptr, name))
107         {
108             cout << name << ": " << *phone_ptr << " ";
109             break;
110         }
111         phone_ptr++;
112
113     }
114
115 }
116
```

```
117 void updatePhoneNumber (const char *name, const char *newNumber){
118
119     const char **phone_ptr = phoneNumbers;
120
121     for (const char **name_ptr = names; *name_ptr; name_ptr++)
122     {
123
124         if (!strcmp(*name_ptr, name))
125         {
126             *phone_ptr = newNumber;
127             break;
128         }
129         phone_ptr++;
130
131     }
132
133     printDirectory();
134
135 }
136
```

```
Search for the phone number (enter 0)
update phone number(enter 1)
look up the directory(enter 2): 2

John: 0912345678
James: 0995638527
Tom: 0965748396
```

```
Search for the phone number (enter 0)
update phone number(enter 1)
look up the directory(enter 2): 0
Whose phone number do you want to search? : John

John: 0912345678
```

```
Search for the phone number (enter 0)
update phone number(enter 1)
look up the directory(enter 2): 1
Whose phone number do you want to update?: John
New number: 0978654321

John: 0978654321
James: 0995638527
Tom: 0965748396
```