

COMP 11 Class 07 Outline

Topics: Arrays and Loops

Approach: Discussion, Explanation, Discussion

Main Ideas: Arrays and manipulation of arrays

1. Admin
 - a) Assignment due on Wednesday!
 - b) Reading: chapter 7.1
 - c) Submission of Assignment 3 temporarily halted
 - d) Posting of assignment 1 solutions online
 - e) CS 22 (Discrete Math) renamed to CS 61
2. Recap on previous lectures
 - a) Function syntax
 - b) Variable scope
 - i. Why don't we use global variables?
3. Problem:
 - a) Ask the user to type in 3 numbers, print out the numbers in reverse order (rev_num1.cpp)
 - i. Although there is repetition, we can't use a function...
 - ii. What if we want the user to type in 10 numbers? What about 100?
 - b) Given a list of names (see name list below)
 - i. What names appear more than once, what is the count?
 - ii. Which name is most common?
 - iii. Print the names in reverse alphabetical order
 - c) Introducing arrays – storing large number of variables of the same type and meaning (rev_num2.cpp)
4. Key concepts:
 - a) Array is a numbered list of variables
 - b) Array is a *Data Structure*, not *Data Type*
 - c) Mental image: sequence of boxes
5. Array syntax
 - a) Declaring an array
 - i. Array size must be resolved at declaration time!
 - b) Accessing an array
 - i. Starting with 0
 - c) Using arrays with loops (rev_num3.cpp)
 - d) Manipulating the values within an array (rev_num4.cpp)
 - e) “Dead Squirrel” – initializing values in an array
 - i. `int numbers[3] = {5, 10, 15};`
 - f) Array index out of bounds
 - g) Using `CONST int` for array size
6. Exercise:
 - a) What do the numbers 5 and 4 mean respectively below?
 - i. `float numbers[5];`
 - ii. `numbers[4] = 2;`
 - b) months.cpp

```
..... rev_num1.cpp .....
```

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

int main() {
    int    a,b,c;

    cout << "Input value 1: ";
    cin  >> a;
    cout << "Input value 2: ";
    cin  >> b;
    cout << "Input value 3: ";
    cin  >> c;

    cout << "List reversed is: ";
    cout << c << " " << b << " " << a << endl;
}

```

```
..... rev_num2.cpp .....
```

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

int main() {
    int    numbers[3];

    cout << "Input value 1: ";
    cin  >> numbers[0];
    cout << "Input value 2: ";
    cin  >> numbers[1];
    cout << "Input value 3: ";
    cin  >> numbers[2];

    cout << "List reversed is: ";
    cout << numbers[2] << " " << numbers[1] << " " << numbers[0] << endl;
}

```

```
..... rev_num3.cpp .....
```

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

int main() {
    int numbers[3];
    int    i;

    for(i=0; i<3; i++) {
        cout << "Input number " << i << ": ";
        cin  >> numbers[i];
    }

    cout << "List reversed is: ";
    for(i=2; i>=0; i--) {
        cout << numbers[i] << " ";
    }
    cout << endl;
}

```

```
.....: rev_num4.cpp .....:
#include <iostream>
using namespace std;

const int LEN = 3;

int main() {
    int numbers[LEN];
    int    i;

    for(i=0; i<LEN; i++) {
        cout << "Input number " << i << ": ";
        cin  >> numbers[i];
    }

    for(i=0; i<LEN; i++) {
        numbers[i] = numbers[i] * 2;
    }

    cout << "The list, doubled and reversed is: ";
    for(i=LEN-1; i>=0; i--) {
        cout << numbers[i] << " ";
    }
    cout << endl;
}
}
```

```

:..... months.cpp :.....
#include <iostream>
using namespace std;

const int NUM_MONTHS = 12;

int main() {
    string mnames[NUM_MONTHS] = {"Jan", "Feb", "Mar", "Apr", "May", "Jun",
                                "Jul", "Aug", "Sep", "Oct", "Nov", "Dec"};
    int    mlens[NUM_MONTHS]  = { 31, 28, 31, 30, 31, 30,
                                31, 31, 30, 31, 30, 31 };

    int    i;
    string month;
    int    len;

    for(i=0; i<NUM_MONTHS; i++) {
        cout << mnames[i] << " has " << mlens[i] << " days\n";
    }

    cout << "Month number: ";
    cin  >> i;
    cout << "Month " << mnames[i-1] << " has " << mlens[i-1] << " days\n";

    cout << "Name a month, I'll tell you its length: ";
    cin  >> month;
    // your code here

    cout << "Name a length, I'll list months that long: ";
    cin  >> len;
    // your code here

}

```