CS 31 Discussion

Week 5
Office Hour Change Next Week

Office hour change next Thursday (Aug. 2)

I won’t be able to hold office hours on Thursday

Please come to me on Friday (Aug. 3) 8:00-10:00am at Boelter 2432 if you have any questions :)}
Outline

Arrays

  Introduction to array

  Array and function

  2D array

Project 4
Arrays

- An array is a series of elements of the same type placed in contiguous memory locations that can be individually referenced by adding an index to a unique identifier.

- In C++, indexing starts from 0.

- syntax:

  `<type>  <name>[size];`
Array

Array sizes must be defined at compile time and must be constant.

- Example:
  ```
  int grades[ 5 ];
  ```

Each Indexed Element Is An int

Indexes Start At Zero
Arrays

Indexes range from 0 to (array_size - 1)

Should always check if index is out of range

Notice that for array k[] of length n, k[n] is out of range
Array and Function

Pass the size of array as an extra argument

- **Formal Parameter Syntax:** `type name[]`
- **Actual Parameter Syntax:** `name`

```c
void fill_up( int items[], int length );

const int SIZE=3;
int a[SIZE]={1,10,100};

fill_up( a, SIZE );
```

No Index Value
#include <string>
using namespace std;

int main() {
    // declaration of a 2D array
    int myArray [3][5];

    // assign values (initialization)
    int foo [4][2] = {  
        {0, 1},
        {3, 2},
        {3, 5},
        {3, 8}  
    };

    // equivalently this: foo is equal to bar
    int bar [4][2] = {0, 1, 3, 2, 3, 5, 3, 8};
}
2D Array

- An element in an array is accessed by using the subscripts:

```java
int val_1 = my1dArray[3];
int val_2 = my2dArray[0][1];
```

- An element in an array is assigned value similarly:

```java
// 1D array initialization
for (int i = 0; i < SIZE; i++) {
    my1dArray[i] = 0;
}

// 2D array initialization
for (int j = 0; j < ROW_SIZE; j++) {
    for (int k = 0; k < COL_SIZE; k++) {
        my2dArray[j][k] = 0;
    }
}
Example

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

int main () {
    const int arr[3] = {1, 2, 3};

    // Is it ok?
    arr[1] = 5;
    cout << arr[1] << endl;
}
```
Project 4

A library is a collection of functions that developers can call instead of having to write them themselves.

Your assignment is to produce a library that provides functions for many common manipulations of arrays of strings.
Project 4

There are seven functions you should implement:

```c
int locateMinimum( const string array[], int n );

int findLastOccurrence( const string array[], int n, string target );

int flipAround( string array[], int n );

bool hasNoDuplicates( const string array[], int n );

void unionWithNoDuplicates( const string array1[], int n1, const string array2[], int n2, string resultingString[], int& resultingSize );

int shiftRight( string array[], int n, int amount, string placeholderToFillEmpties );

bool isInIncreasingOrder( const string array[], int n );
```
Project 4

Due: Wednesday, 1 August 2018, 9:00 PM

What you will turn in for this assignment is a zip file containing these two files and nothing more:

1. array.cpp
2. repot.doc / report.docx / report.txt

Your name and UCLA ID number