# CS 161
# Intro to CS I

2d arrays and Command-Line Arguments

# Odds and Ends…

- Last week to demo Assignment 4
- Test next Wed., 11/22

OSU Oregon State University

# Static 2-D arrays...

*constant, self-ref*

*contingous*

~~*fast*~~

*Pointer to the row pointers*

*row of pointers*

**array[0]**  0

0  **array[0][0]**   32  **array[0][1]**   64  **array[0][2]**

0

96

**array[1]**  96

96  **array[1][0]**   128  **array[1][1]**   **array[1][2]**

0
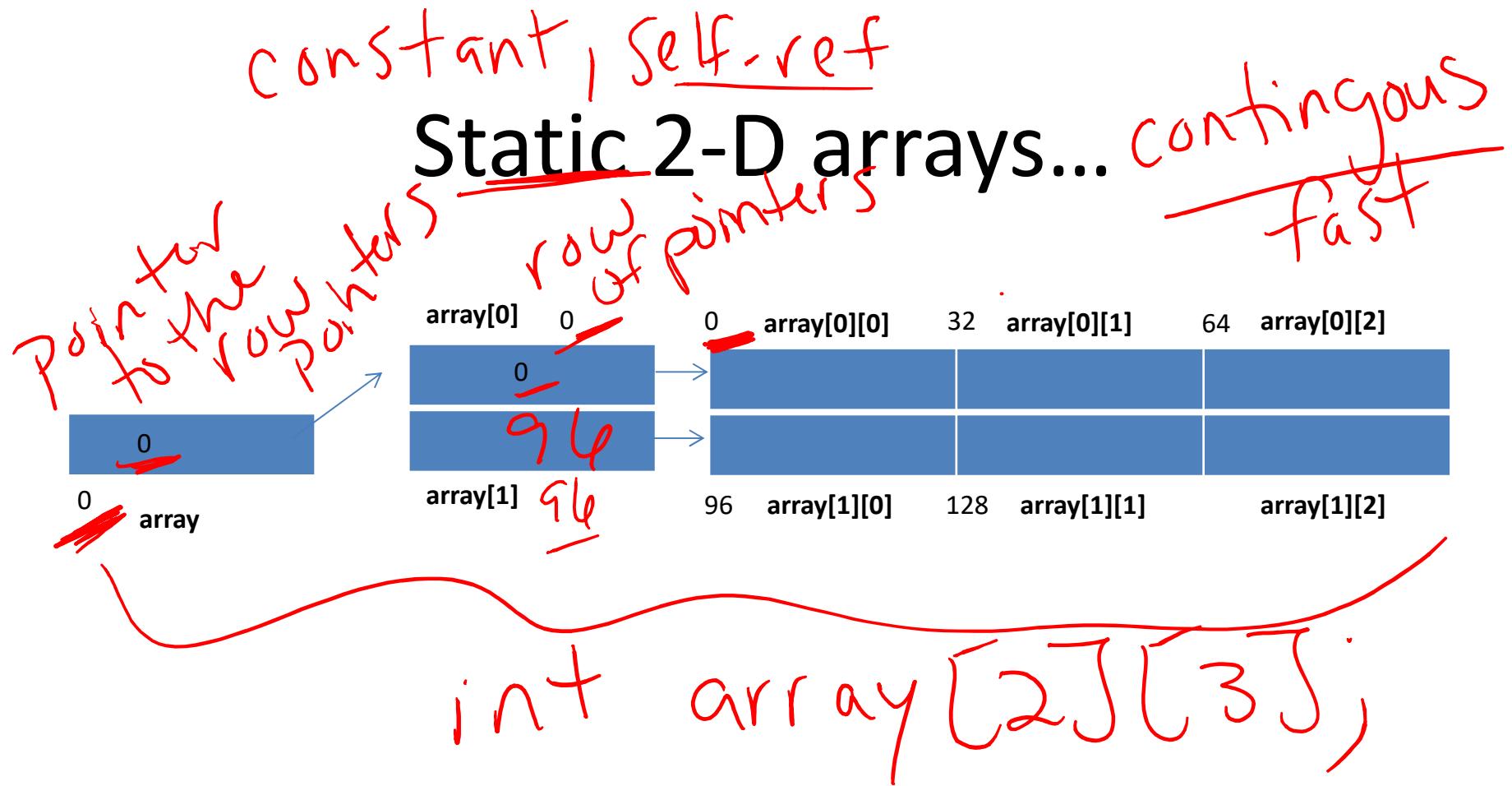
0  **array**

int array[2][3];

# Passing a 2-D Array (Static)

```cpp
int main() {
    int array[5][5];
    ...
    pass_2darray(array);
    ...
}
void pass_2darray(int a[5][5]) {
    cout << "Array at zero: " << a[0][0] << endl;
}
```
**OR**
```cpp
void pass_2darray(int a[][5]) {
    cout << "Array at zero: " << a[0][0] << endl;
}
```

*stride (how many cols)*

*a[ i ][ i ]*

*| * stride + |*

*row*
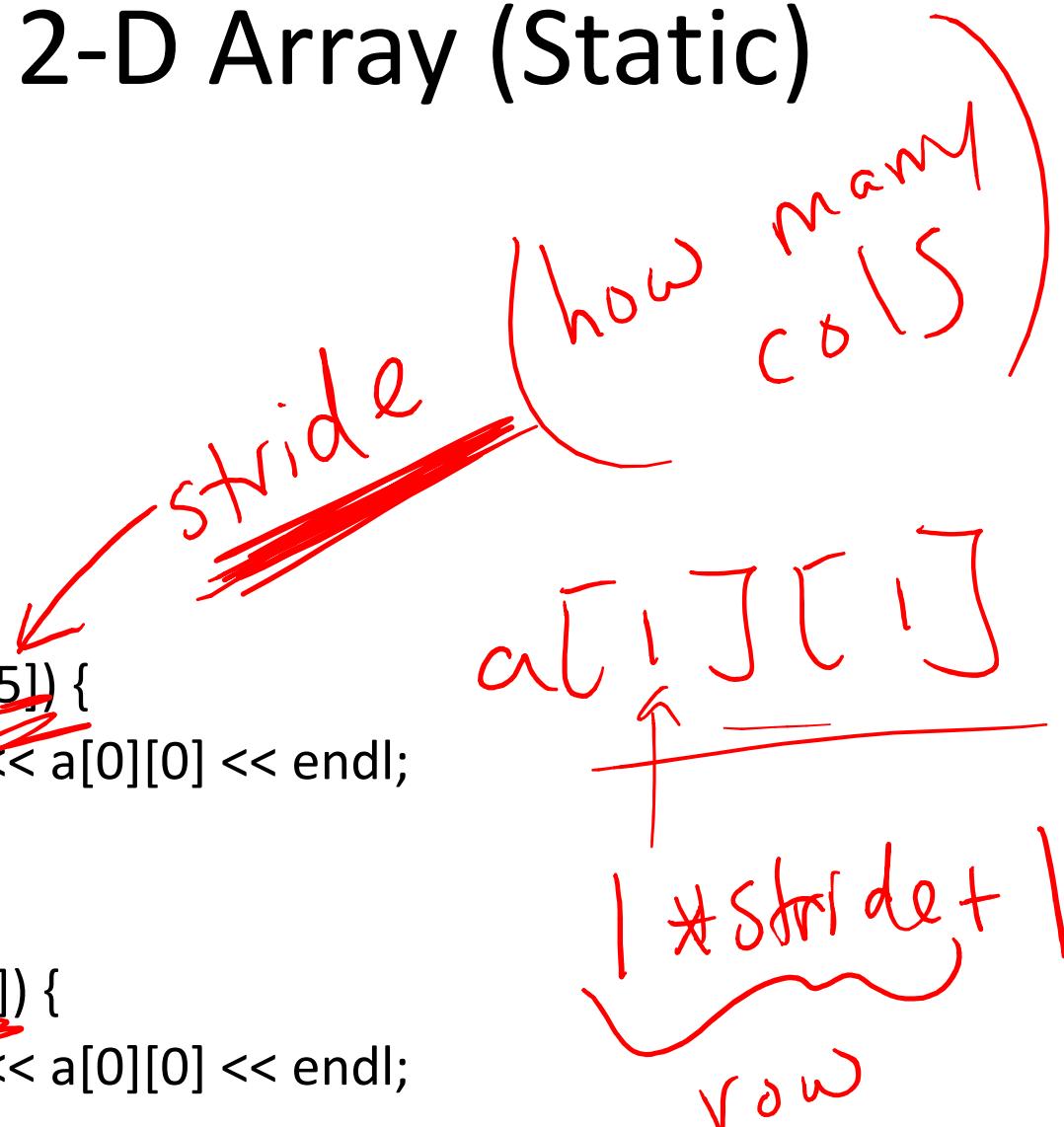
```cpp
1 #include <iostream>
2 using namespace std;
3 void fun(int a[][3], int rows, int cols) {
4     for(int i=0; i<rows; i++)
5         for(int j=0; j<cols; j++)
6             a[i][j]=10;
7 }
8 int main(int argc, char *argv[]) {
9     //how do I create a 2-d array (3 x 3) on stack?
10    int array[3][3]={{1,2,3}, {4,5,6}, {7,8,9}};
11    fun(array, 3, 3);
12    //how do I print address of pointer to 1st row pointer?
13    cout << &array << endl;
14
15    //how do I print address of 1st row pointer?
16    cout << array << endl;
17    cout << &(array[0]) << endl;
18
19    //how do I print address of the 1st element in 1st row?
20    cout << array[0] << endl;
21    cout << &(array[0][0]) << endl;
22
23    //how do I print address of the 1st element in 2nd row?
24    cout << array[1] << endl;
25    cout << &(array[1][0]) << endl;
26
27    //print contents of 2nd element in 2nd row?
28    cout << array[1][1] << endl;
29    cout << *(*(array+1)+1) << endl;  //works on dynamic/static
30    cout << *(*array+1*3+1) << endl;  //only works on static
```

15,1                                                    Top

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5

Re-attach　Fullscreen　Stay on top　Duplicate　Close

```
flip2 ~/cs161/private 155% g++ 2d.cpp
flip2 ~/cs161/private 156% a.out
1
a.out
a
error
flip2 ~/cs161/private 157% a.out 2
2
a.out
a
2
flip2 ~/cs161/private 158% a.out 1 2
3
a.out
a
error
flip2 ~/cs161/private 159%
```

*(handwritten annotations in red)*

argv[0][0]

□ → □ → | a | . | o | u | t | \0 |

argv　argv[0]
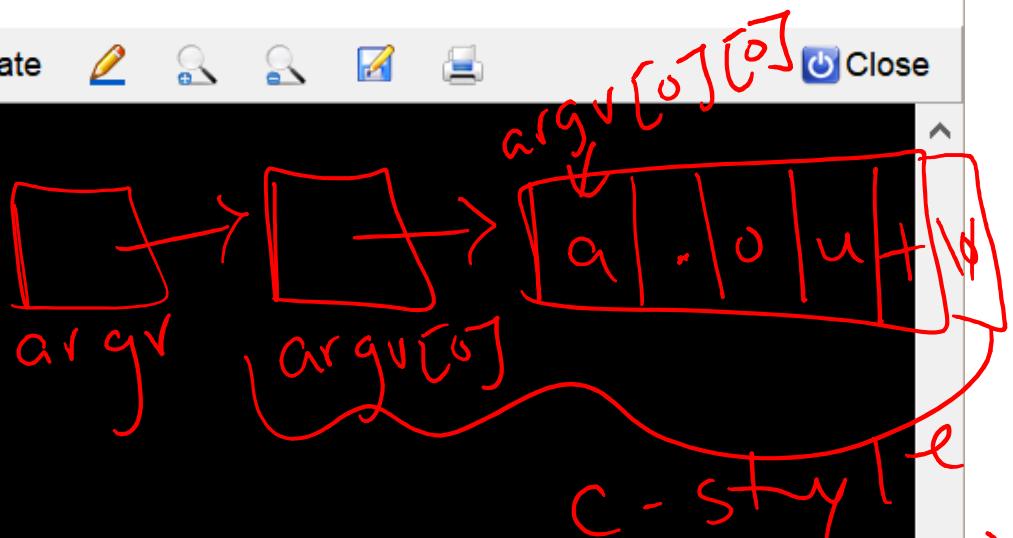
c-style
strlen(argv[0])
atoi(argv[0])

argv[0]
| | → □ → | a | . | o | u | t | \0 |

argv　argv[1] → | 1 | \0 |

argv[2] → | 2 | \0 |