

CS 161

Intro to CS I

Finish 1-D arrays/C-style string

Odds and Ends

- Last week to demo Assignment 4
- I'll be out of town Wed./Fri.
- Exam II next Wed.



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Class Exercise



- How do I initialize an array in a function?
- How can I print the contents of the array in a function?
- How about printing the address of the pointer to the array and the address of where the array begins in a function?
- How would I create an array in a function?

```
2
3 using namespace std;
4
5 void init_arrays(int *array, int array_heap[]) {
6     //initialize the elements in the arrays
7     for(int i=0; i<10; i++) {
8         array[i]=i;
9         array_heap[i]=i+1;
10    }
11 }
12
13 void print_pointer_addr(int (*array)[10], int **array_heap){
14
15     //print where the pointer to the array lives in memory
16     cout << "stack array pointer lives: " << array << endl;
17     cout << "heap array pointer lives: " << array_heap << endl;
18 }
19
20 int main() {
21
22     //create an integer array with 10 elements on stack and one on the heap
23     int array[10]={3}; //does not initialize all elements to 3, only 1st
24     int array1[]={1,2,3,4,5,6,7,8,9,10};
25     int *array_heap;
26     array_heap=new int[10];
27
28     init_arrays(array, array_heap);
29     print_pointer_addr(&array, &array_heap);
30
```

10x10
array

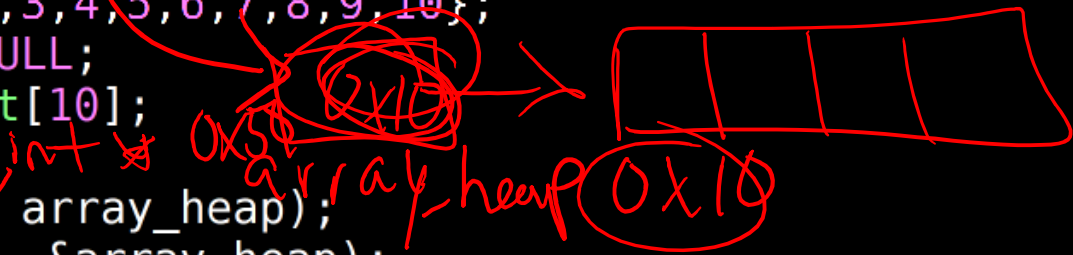
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```
3. ENGR
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10 }
11 void print_addr(int **array, int **array_heap) {
12     //print where the pointer to the array lives in memory
13     cout << "where pointer to stack array lives: " << array << endl;
14     cout << "where pointer to heap array lives: " << array_heap << endl;
15 }
16 int main() {
17
18     //create an integer array with 10 elements on stack and one on the heap
19     int array[10]={3}; //this doesn't initialize all elements
20     int array1[]={1,2,3,4,5,6,7,8,9,10};
21     int *array_heap=NULL;
22     array_heap=new int[10];
23
24     array_init(array, array_heap);
25     print_addr(&array, &array_heap);
26     //print where the array begins in memory
```

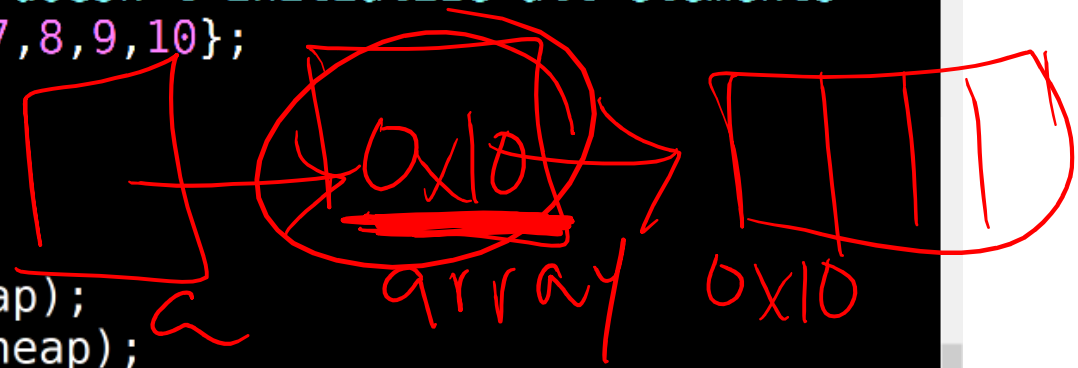
← doesn't work b/c it is an int **

0x50
array-heap



same thing - &array is an int*[10]

```
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11 void print_addr(int **array, int **array_heap) {
12     //print where the pointer to the array lives in memory
13     cout << "where pointer to stack array lives: " << array << endl;
14     cout << "where pointer to heap array lives: " << array_heap << endl;
15 }
16 int main() {
17
18     //create an integer array with 10 elements on stack and one on the heap
19     int array[10]={3}; //this doesn't initialize all elements
20     int array1[]={1,2,3,4,5,6,7,8,9,10};
21     int *array_heap=NULL;
22     array_heap=new int[10];
23     int **a=&array;
24
25     array_init(array, array_heap);
26     print_addr(&array, &array_heap);
27     //print where the array begins in memory
-- (insert) VISUAL --
16 23,4 41%
10,1 40%
```



Pic

```
2. ENGR
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1 #include <iostream>
2
3 using namespace std;
4 void array_init(int *array, int array_heap[]) {
5     //initializethe elements in the arrays
6     for(int i=0; i<10; i++){
7         array[i]=i;
8         array_heap[i]=i+1;
9     }
10 }
11 void print_addr(int (*array)[10], int **array_heap) {
12     //print where the pointer to the array lives in memory
13     cout << "where pointer to stack array lives: " << array << endl;
14     cout << "where pointer to heap array lives: " << array_heap << endl;
15 }
16
17 void array_begins(int *array, int *array_heap) {
18     //print where the array begins in memory
19     cout << "where stack array begins: " << &(array[0]) << endl;
20     cout << "where stack array begins: " << array << endl;
21     cout << "where heap array begins: " << &(array_heap[0]) << endl;
22     cout << "where heap array begins: " << array_heap << endl;
23     cout << "3rd element stack: " << array[2] << endl;
24     cout << "3rd element stack: " << *(array+2) << endl;
25     cout << "3rd element heap: " << array_heap[2] << endl;
26     cout << "3rd element heap: " << *(array_heap+2) << endl;
27 }
-- INSERT -- 1,20 Top
```

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```
3. ENGR
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29 void fun(int **a) {
30     //int array1[]={1,2,3,4,5,6,7,8,9,10};
31     *a=new int[10];
32 }
33
34 int main() {
35     //create an integer array with 10 elements on stack and one on the heap
36     int array[10]={3}; //this doesn't initialize all elements
37     int *array_heap=NULL;
38     //array_heap=new int[10]; //we are going to create array in a function
39
40     //can't do this because array is a constant pointer to a static array
41     //of 10 elements
42     //int **a=&array;
43
44     fun(&array_heap);
45     cout << array_heap[2] << endl;
46
47     array_init(array, array_heap);
48     print_addr(&array, &array_heap);
49     array_begins(array, array_heap);
50
51     //print the contents of the 3rd element
52     delete [] array_heap;
53     return 0;
29,4 96%
```

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What are C-style strings?

- Ended by '\0' character
- Need to include `<cstring>`



3. ENGR

Re-attach

Fullscreen

Stay on top

Duplicate

Close

```
1 #include <iostream>
2 #include <cstring>
3 using namespace std;
4
5 int main() {
6     char sentence[10]; //make it big
7
8     cout << "Enter a string: ";
9     cin.getline(sentence,100); //don't ever make this bigger than the array'
10
11     cout << sentence << endl;
12
13     cout << "Enter a string: ";
14     cin.getline(sentence,10); //read until seeing a newline or 9 characters
    to leave room for the null character '\0'
15
16     cout << sentence << endl;
17
18     return 0;
19 }
```

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