Pre-Lab #5: Programming with Arrays

The last lab of Part 1!

L2A
March 1, 2021
Prepared by: Amanda

Code samples here (uploaded after Tuesday L2D):
https://github.com/amandalazar/apsc160-lab-lessons

Learning Goals

1. Write programs in C that use arrays
2. Write functions that take arrays as parameters

Example 1: *What is the output of this code?*

```
int data[5] = {1, 2, 3, 4, 5};
printf("%d", data[1]);
```

Remember - C arrays use zero-based indexing!

Example 2: *What is the purpose of this code?*

```
int data[5] = {1, 2, 3, 4, 5};
for (int i = 0; i < 5; i++) {
        data[i] += 10;
}
```

Example 3: *Is there anything wrong with this code?*

```
double testScores[NUM_STUDENTS] = {66.0, 90.0, 85.5, 68.5, 55.0,
                                   82.5, 45.0, 87.0, 75.0, 75.0};
double sum = 0.0;
double average;

for (int i = 0; i <= NUM_STUDENTS; i++) {
        sum += testScores[i];
}

average = sum / NUM_STUDENTS;
printf("Computed class average: %.2lf%%", average);
```

Example 3 Corrected

```
double testScores[NUM_STUDENTS] = {66.0, 90.0, 85.5, 68.5, 55.0,
                                   82.5, 45.0, 87.0, 75.0, 75.0};

double sum = 0.0;
double average;

for (int i = 0; i < NUM_STUDENTS; i++) {
        sum += testScores[i];
}

average = sum / NUM_STUDENTS;
printf("Computed class average: %.2lf%%", average);
```

Be careful to not overstep your array's boundaries, to avoid any unexpected behavior!

Which of the following are legal C array operations?

a. Having an array as a function's return type
b. Comparing two arrays using "=="
c. Both a and b
d. None of the above

Which of the following are legal C array operations?

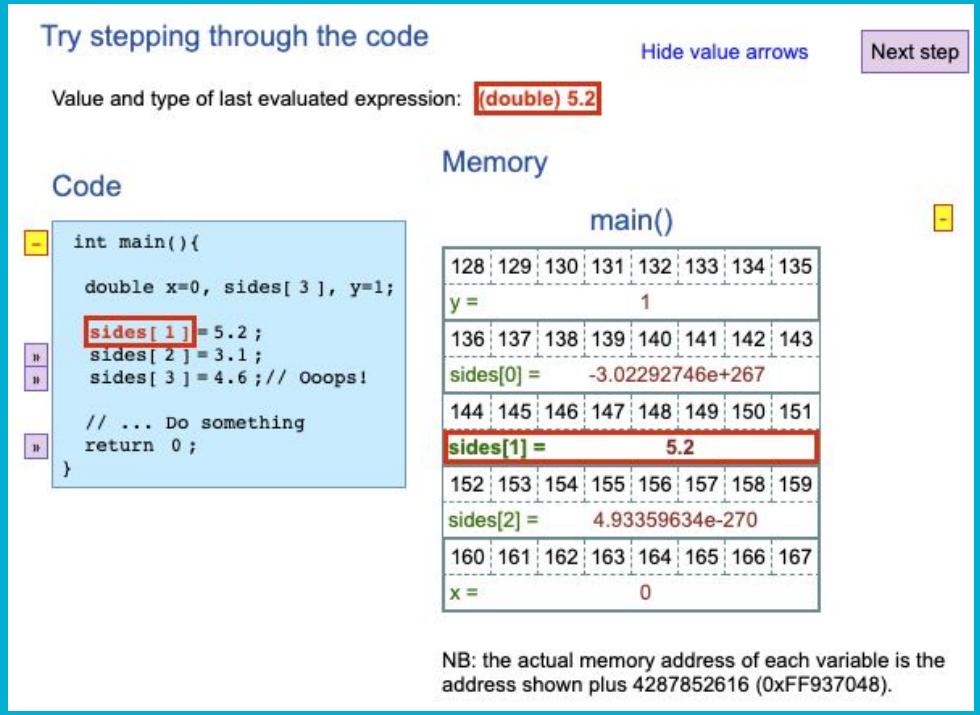
a. Having an array as a function's return type
b. Comparing two arrays using "=="
c. Both a and b
d. None of the above

Follow-up Question #1: *How could we return multiple values from a function?*

Follow-up Question #2: *How could we determine if two arrays are equivalent?*

Great Resource on Common Mistakes with Arrays

https://newton.ex.ac.uk/teaching/resources/jmr/6-goodbad.html

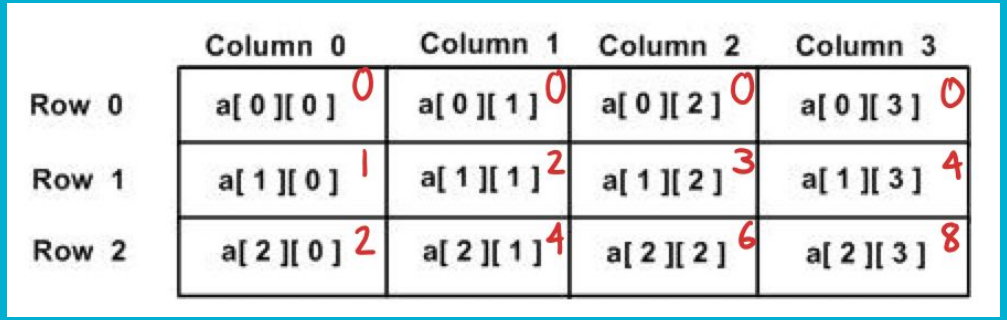


Preview of 2D Arrays

```
#define NUM_ROWS 3
#define NUM_COLS 4

// ...

int a[NUM_ROWS][NUM_COLS]
        = { {0,0,0,0}, {1,2,3,4}, {2,4,6,8}};
```

Preview of 2D Arrays

```
#define NUM_ROWS 3
#define NUM_COLS 4

// ...

int a[NUM_ROWS][NUM_COLS]
        = { {0,0,0,0}, {1,2,3,4}, {2,4,6,8}};
```



Steps for Writing Programs

1. Understand the problem
2. Think through your algorithm
3. Come up with a test suite (both valid inputs and edge cases)
4. Code your algorithm
5. Test your algorithm

Thanks for listening! 😊

Feel free to ask any Pre-Lab #5 related questions,
or really any other questions you might have!