Module 25: Numeric Arrays

Intro to Computer Science 1 - C++

Professor Scott Frees

Textbook

Arrays are introduced in sections 7.1 - 7.2

Motivation

Ask user to enter 5 numbers and then print in reverse order

10 numbers?

20 numbers?

How do we use a loop?

Arrays

- Programs often need to store collections of items (numbers, characters, etc)
- Keeping track of many variables is error-prone and a headache
- Allows us to use integer indexes to reference each variable in the collection
  - An integers can be incremented in loops!

Array Syntax

Arrays have a type, name, and size

Array Declaration:

```
int myArray[10] // 10 integers
double x[20] // 20 doubles
char y[1000]// 1000 characters
```

Initialization:

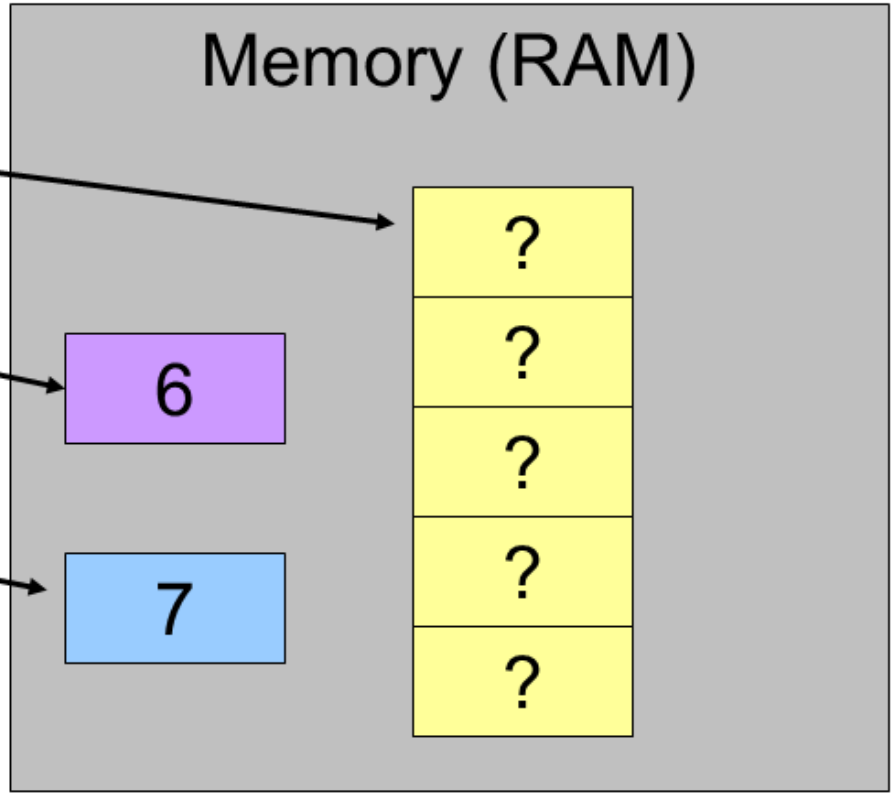
```
int array[3] = { 1, 12, 65 };
```

Arrays in Memory

```
int array[5];

int x = 6;

int y = 7;
```



Arrays in Memory

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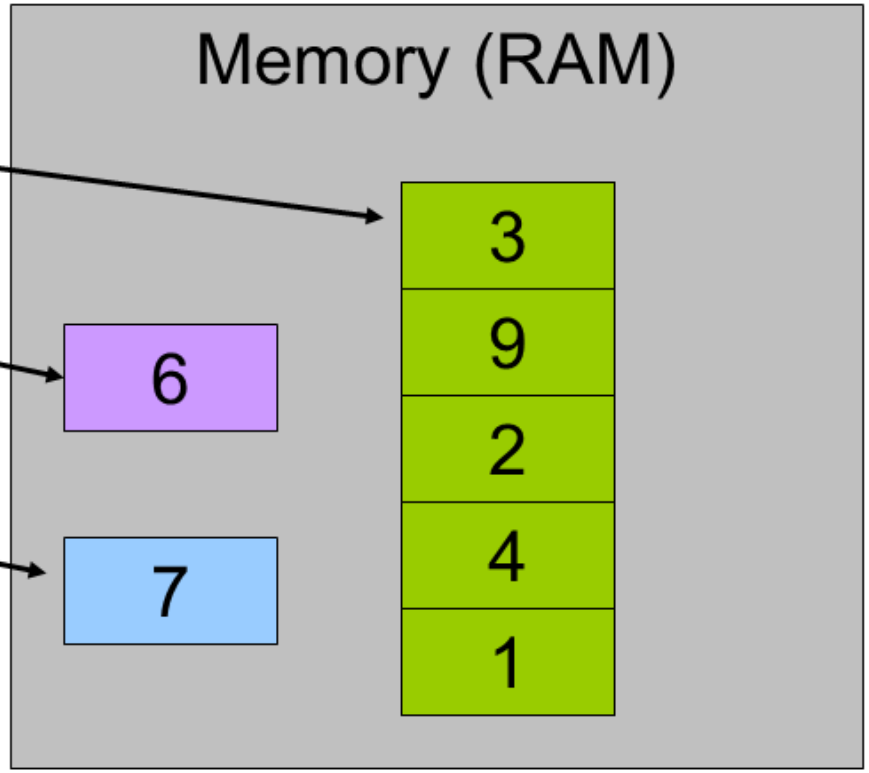
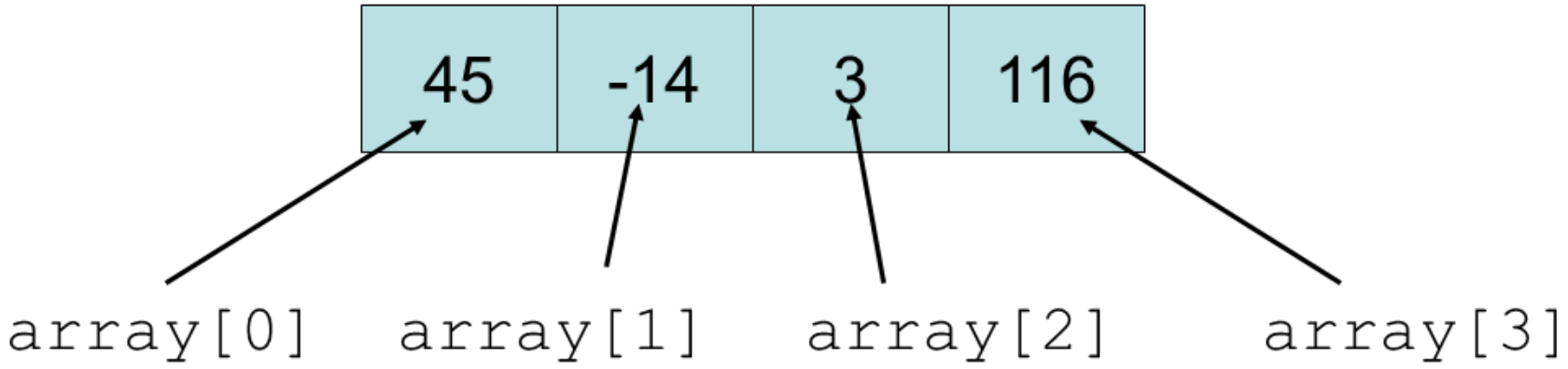



```
int array[5] = {3, 9, 2, 4, 1 };
```

Using Arrays

- You can access an individual *element* in an array using its ***index***.

```
int array[4] = {45, -15, 3, 116};
```



- The index **ALWAYS** starts at 0

Syntax Rules

```
const int SIZE = 6;
int x = 5;
int array1[3];      // OKAY
int array2[x];     // NOT OKAY!
int array3[SIZE];   // GOOD
int array4[0];   // NO!

array1 = 5;   // VERY BAD!
array1[0] = 5;   // OK
array1[3] = 6;   //   ?
```

Programming Exercise 29

- Write a program that reads in **10** numbers from the user.
- Once all have been read, allow the user to enter an **index.**
- If the index is within the bounds of the array print out the number stored in that index.
  - If not, print out a warning.
- Allow user to enter as many indexes as the want until they enter **-1**.