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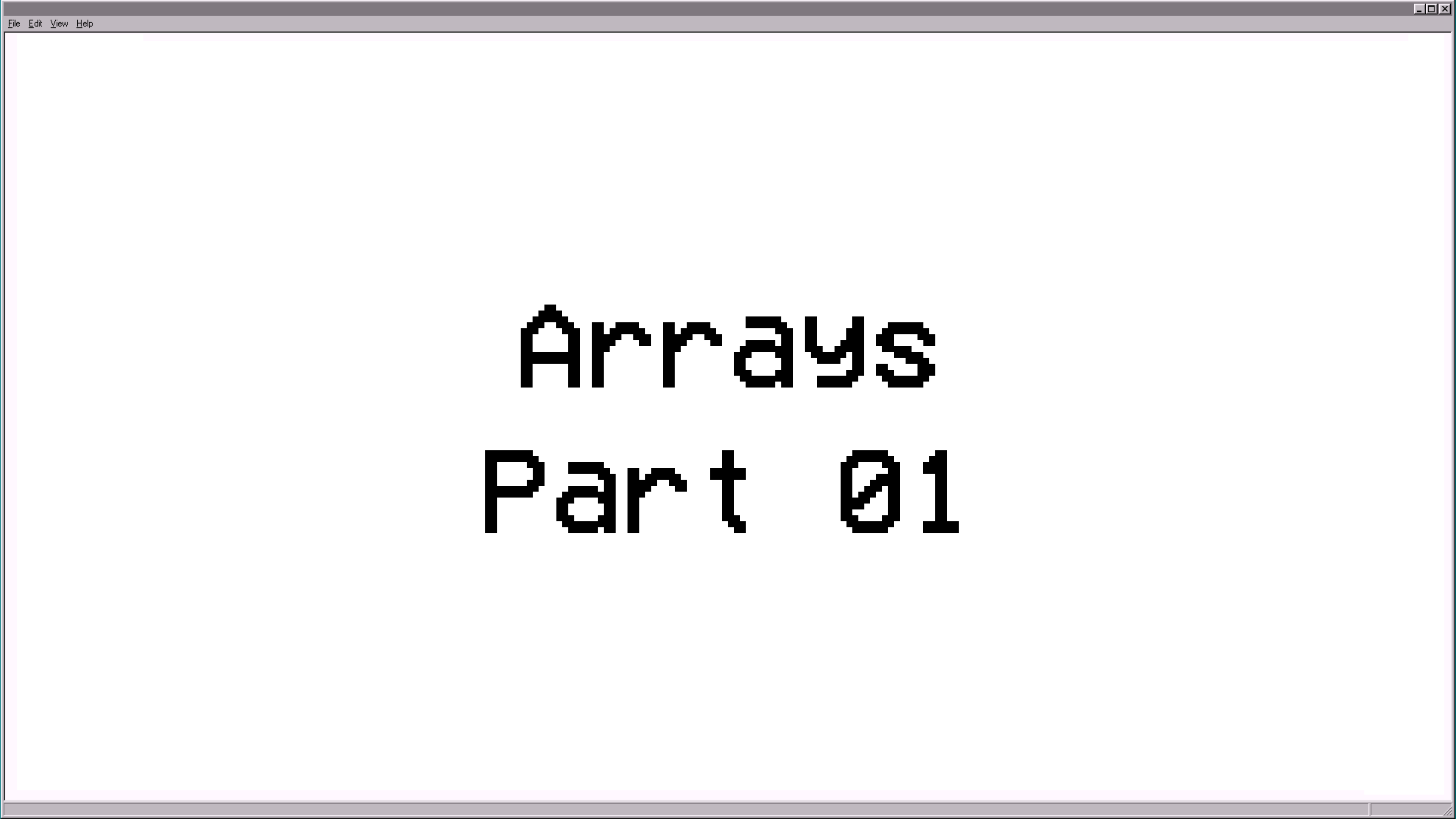
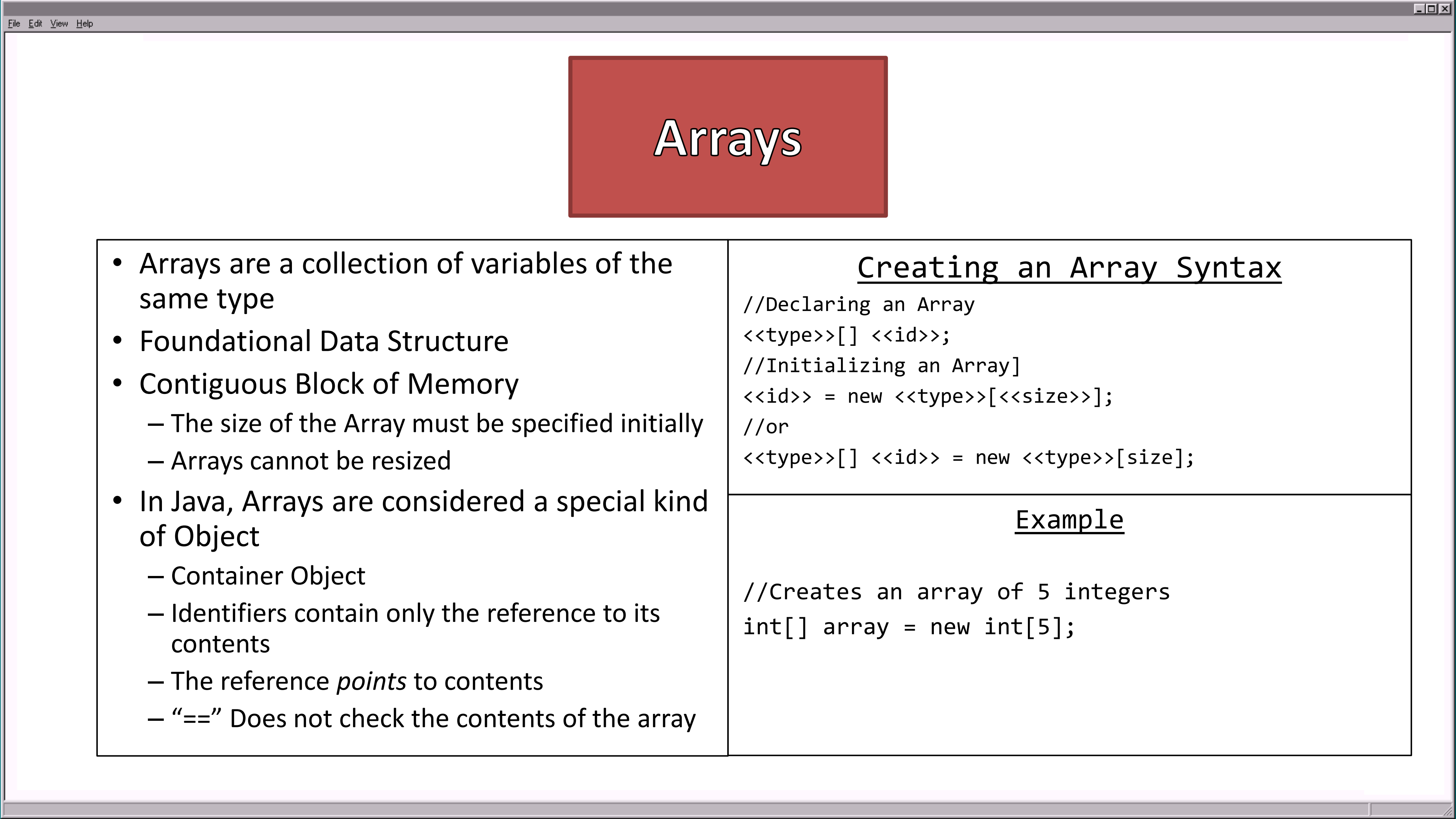


Arrays
Part 01



Arrays

- Arrays are a collection of variables of the same type
- Foundational Data Structure
- Contiguous Block of Memory
  - The size of the Array must be specified initially
  - Arrays cannot be resized
- In Java, Arrays are considered a special kind of Object
  - Container Object
  - Identifiers contain only the reference to its contents
  - The reference *points* to contents
  - "==" Does not check the contents of the array

Creating an Array Syntax

```
//Declaring an Array
<<type>>[] <<id>>;
//Initializing an Array]
<<id>> = new <<type>>[<<size>>];
//or
<<type>>[] <<id>> = new <<type>>[size];
```

Example

```
//Creates an array of 5 integers
int[] array = new int[5];
```

Arrays

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Memory

Identifier	Contents	Byte Address
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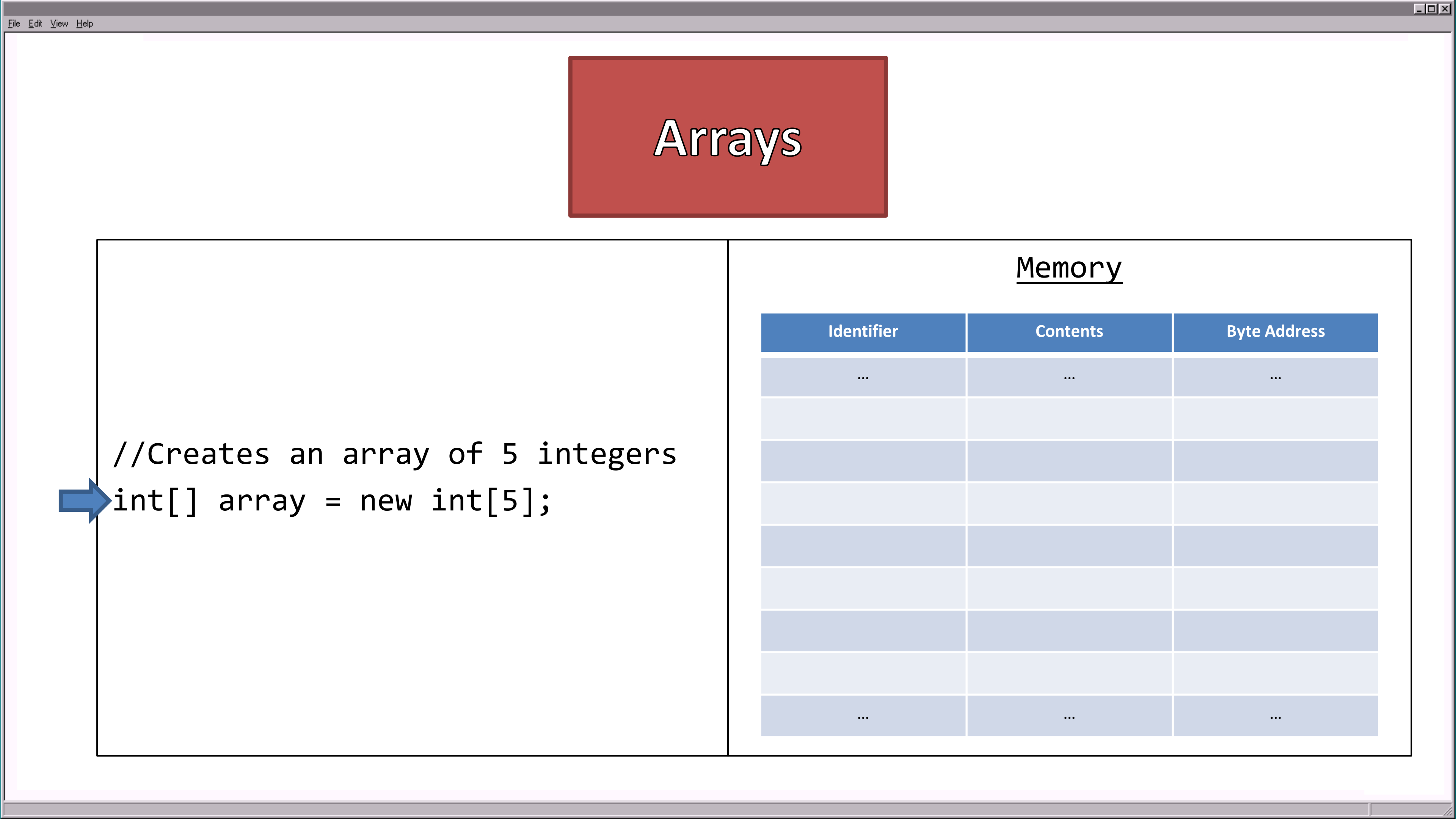
…	…	…



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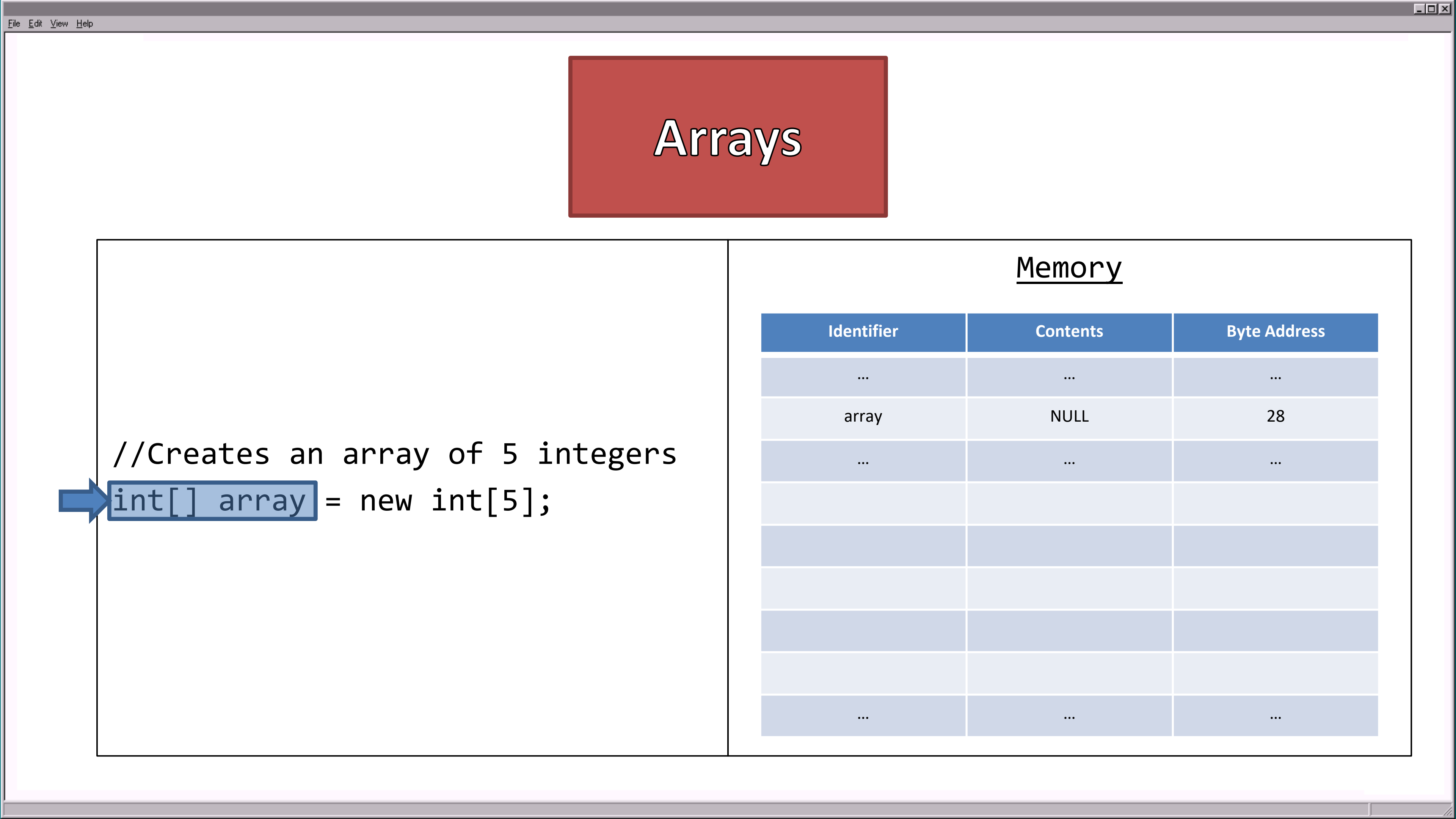
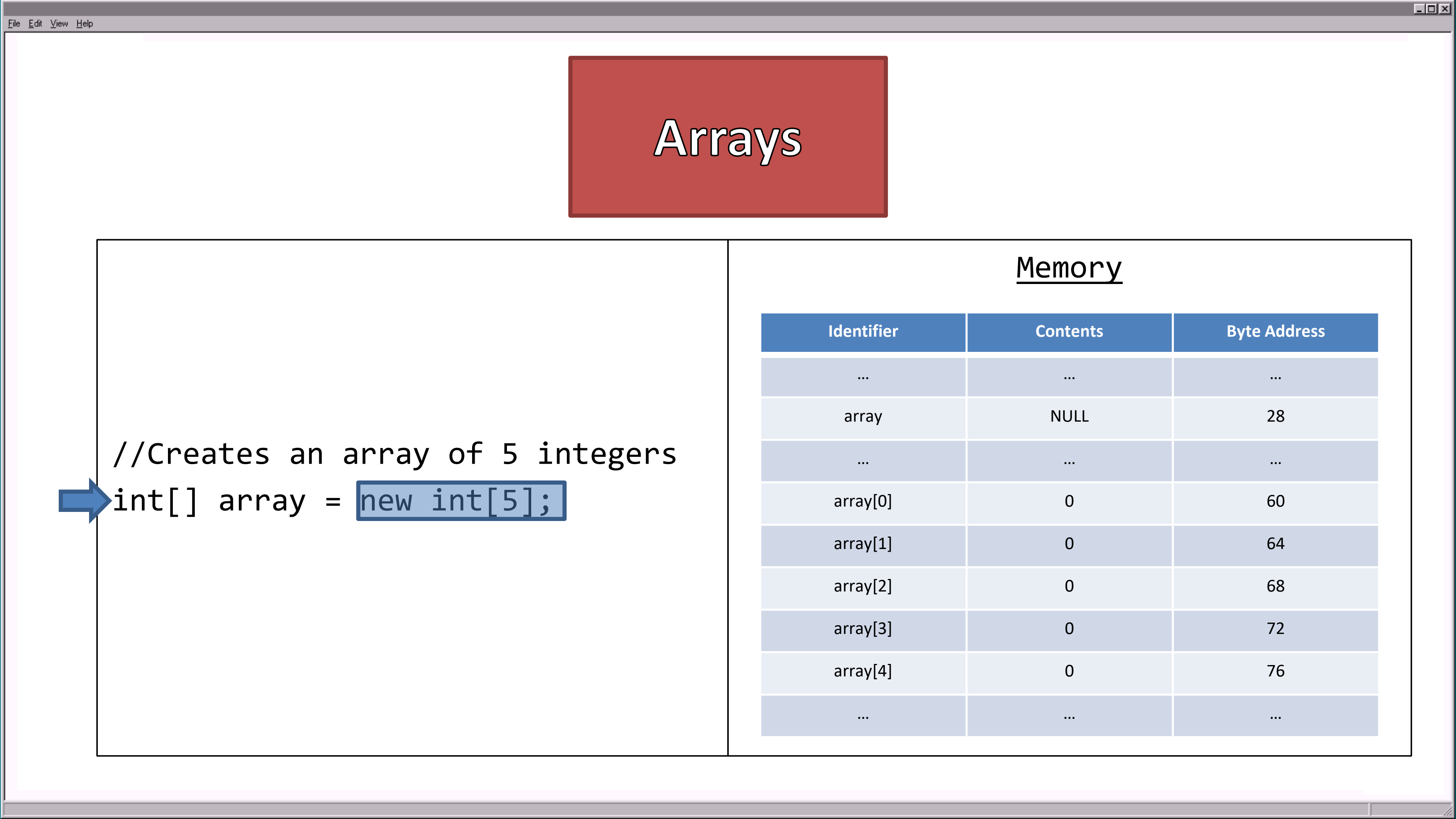


Arrays

```
//Creates an array of 5 integers
int[] array = new int[5];
```

Memory

Identifier	Contents	Byte Address
…	…	…
array	NULL	28
…	…	…
…	…	…



Arrays

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//Creates an array of 5 integers
int[] array = new int[5];
```

Memory

Identifier	Contents	Byte Address
…	…	…
array	NULL	28
…	…	…
array[0]	0	60
array[1]	0	64
array[2]	0	68
array[3]	0	72
array[4]	0	76
…	…	…

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```
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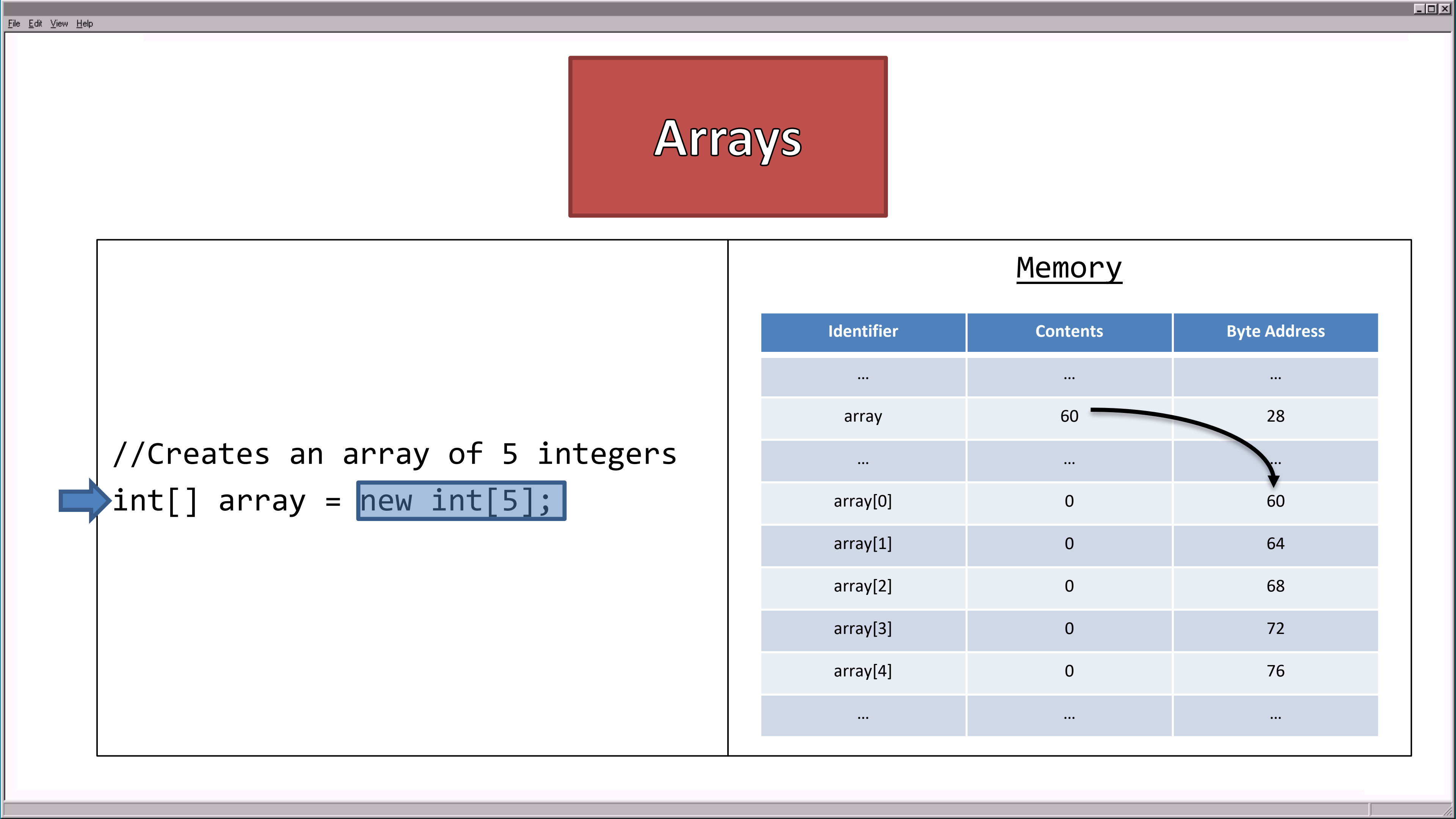

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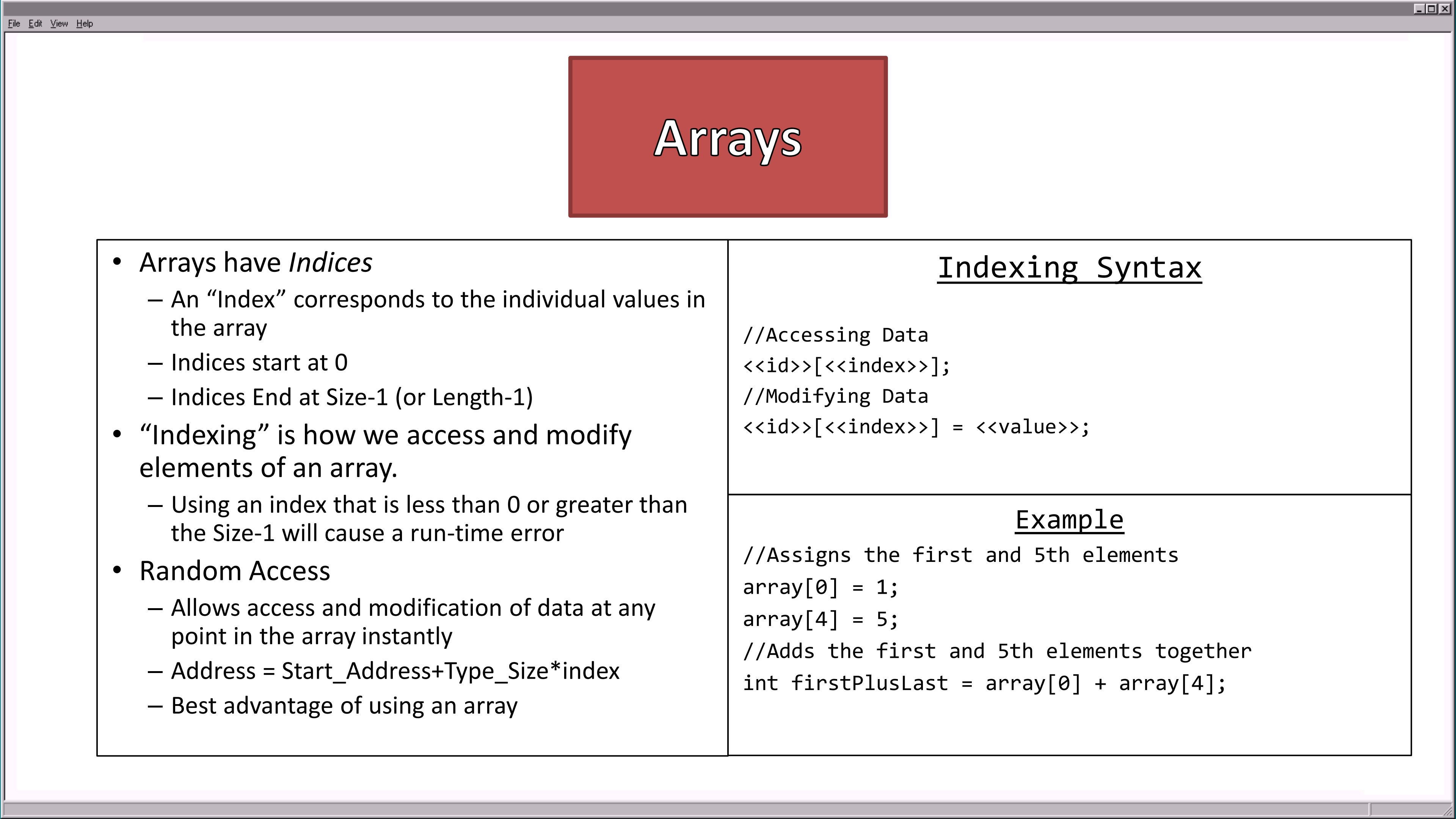


Arrays

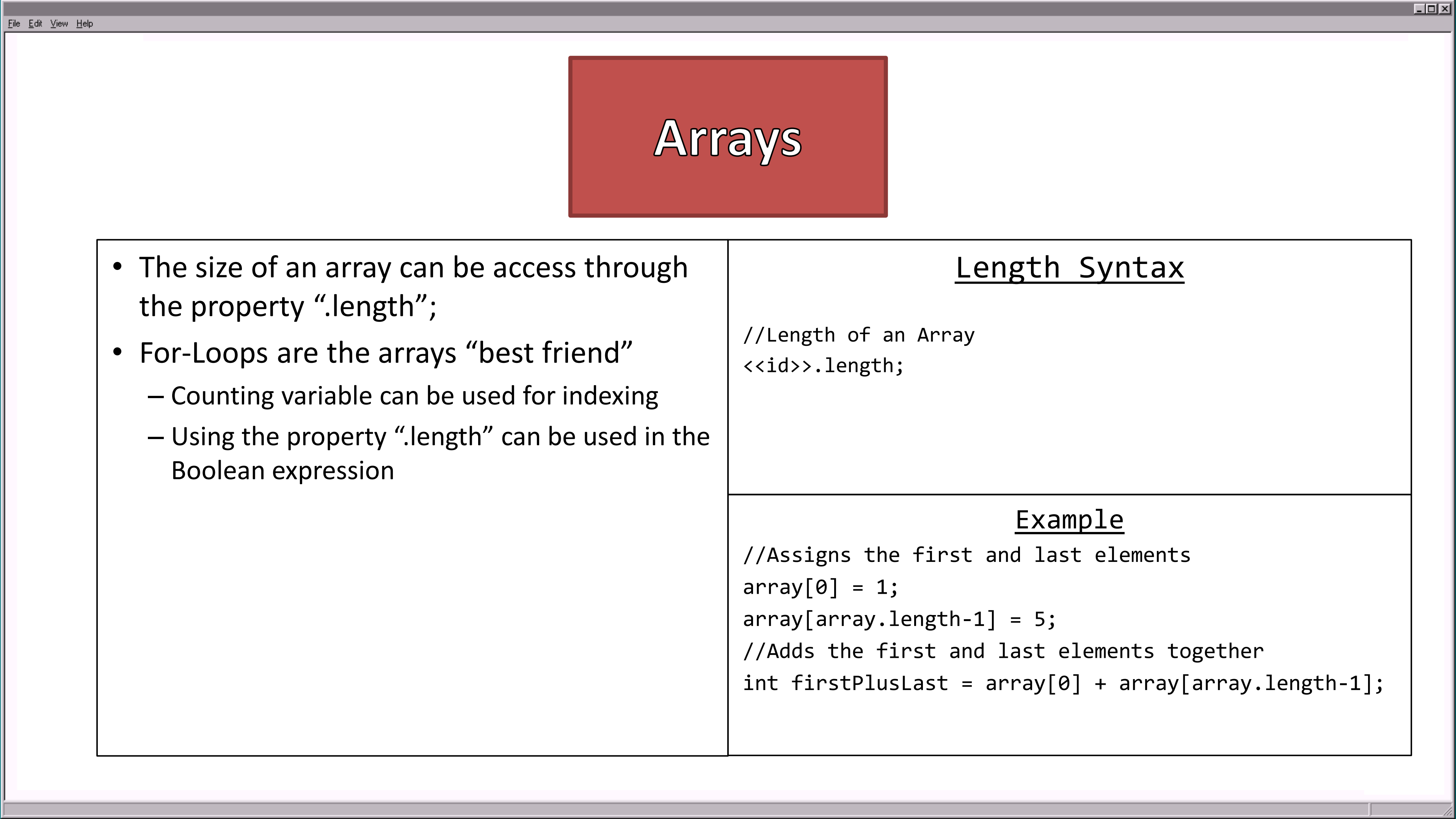
- Arrays have *Indices*
  - An “Index” corresponds to the individual values in the array
  - Indices start at 0
  - Indices End at Size-1 (or Length-1)
- “Indexing” is how we access and modify elements of an array.
  - Using an index that is less than 0 or greater than the Size-1 will cause a run-time error
- Random Access
  - Allows access and modification of data at any point in the array instantly
  - Address = Start_Address+Type_Size*index
  - Best advantage of using an array

Indexing Syntax

```
//Accessing Data
<<id>>[<<index>>];
//Modifying Data
<<id>>[<<index>>] = <<value>>;
```

Example

```
//Assigns the first and 5th elements
array[0] = 1;
array[4] = 5;
//Adds the first and 5th elements together
int firstPlusLast = array[0] + array[4];
```



Arrays

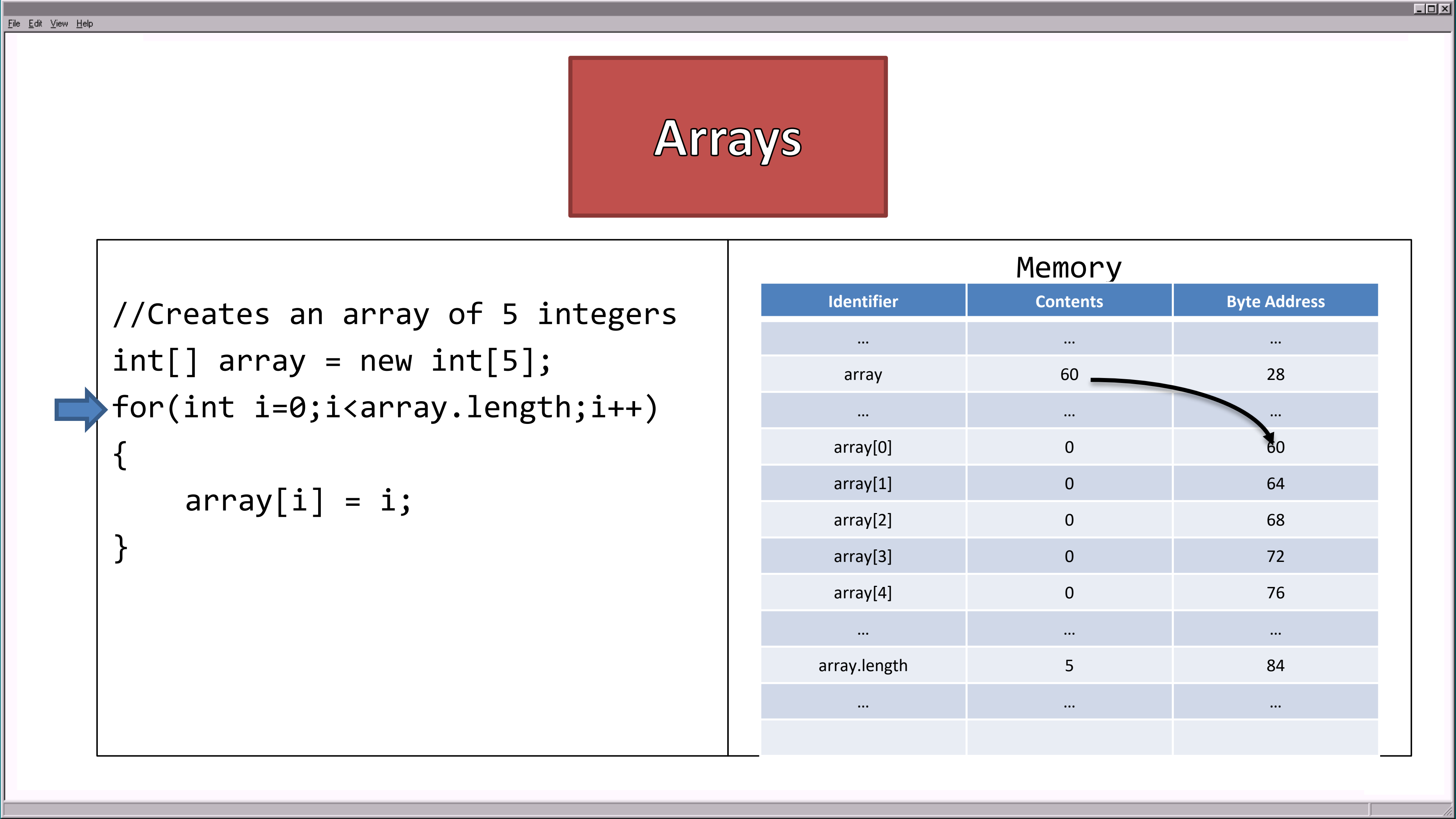
- The size of an array can be access through the property “.length”;
- For-Loops are the arrays “best friend”
  - Counting variable can be used for indexing
  - Using the property “.length” can be used in the Boolean expression

Length Syntax

```
//Length of an Array
<<id>>.length;
```

Example

```
//Assigns the first and last elements
array[0] = 1;
array[array.length-1] = 5;
//Adds the first and last elements together
int firstPlusLast = array[0] + array[array.length-1];
```



Arrays

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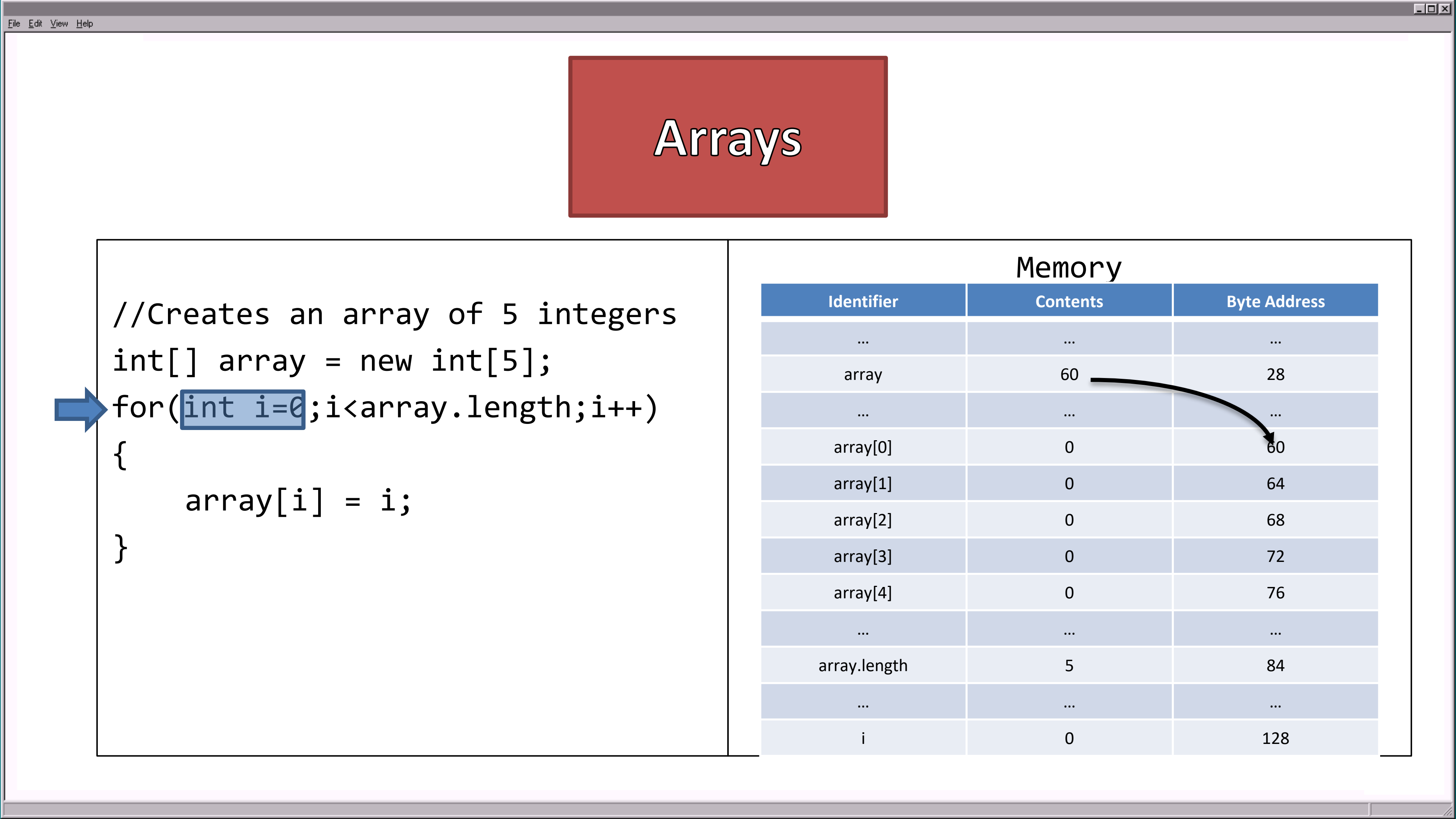

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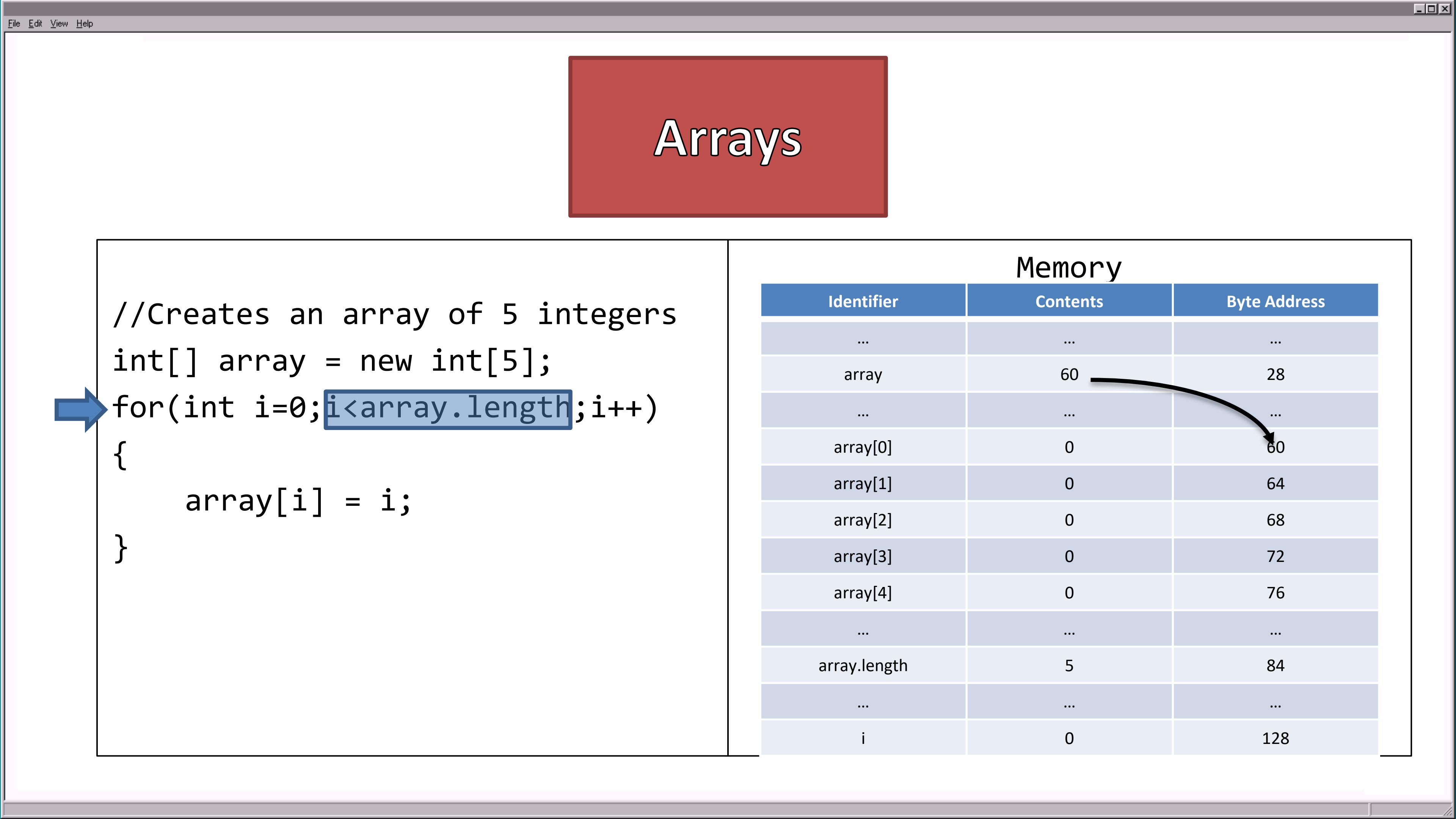

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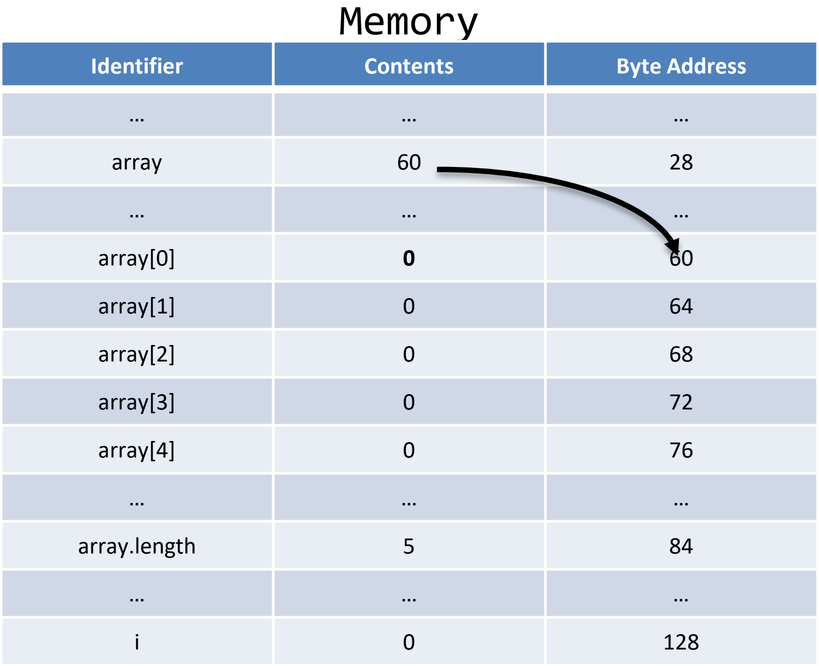

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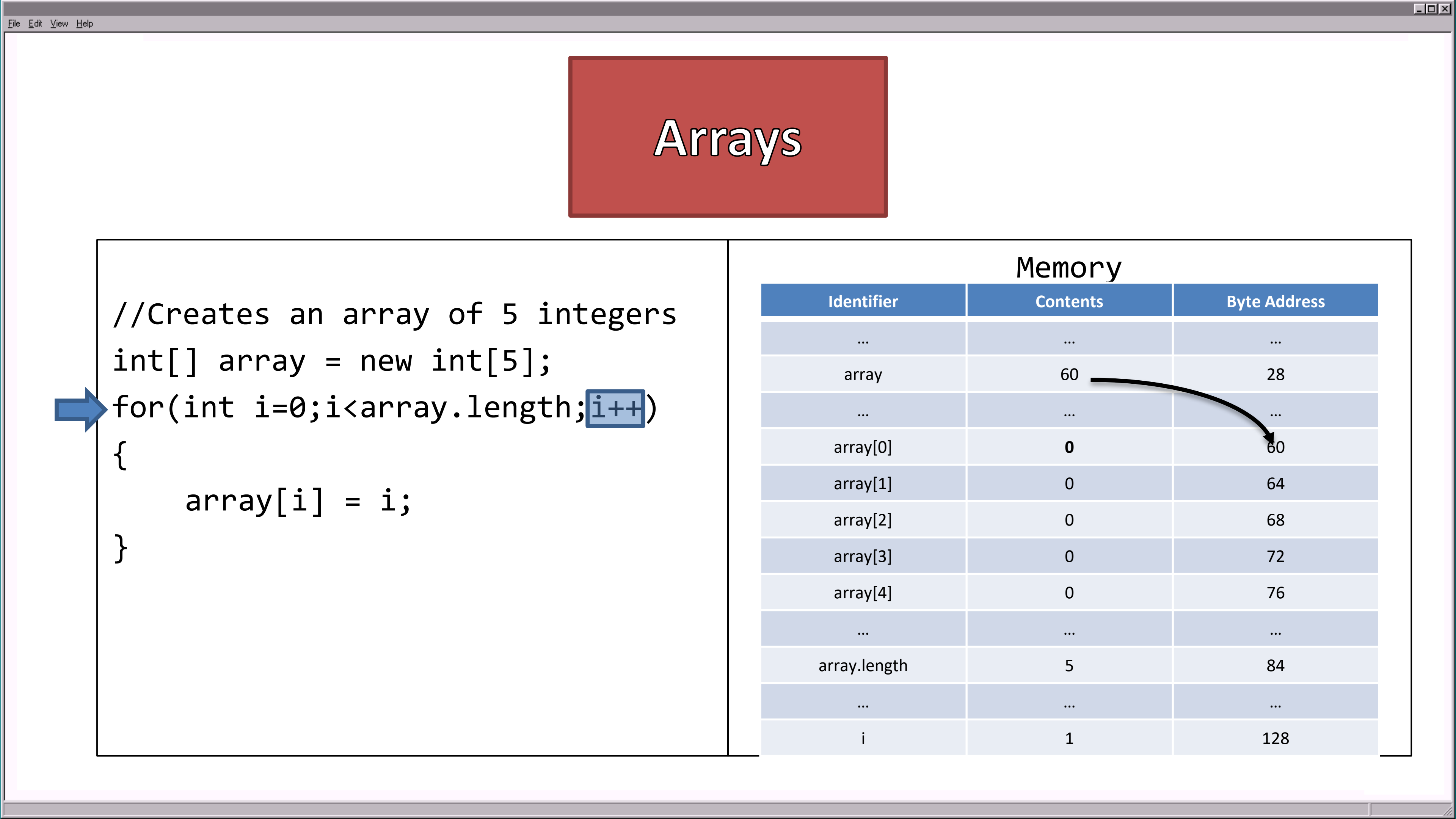
Address = 60+4*i



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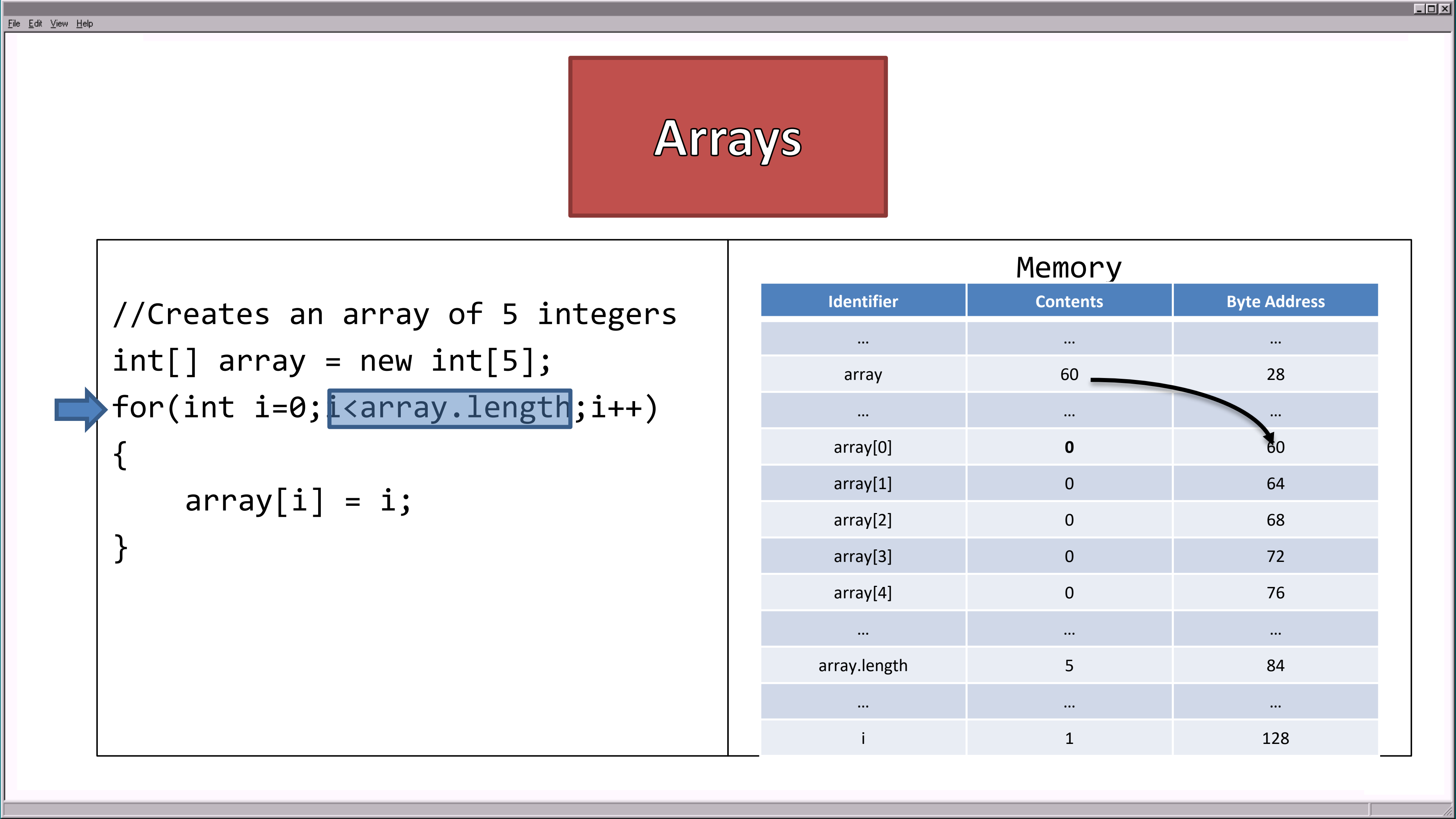

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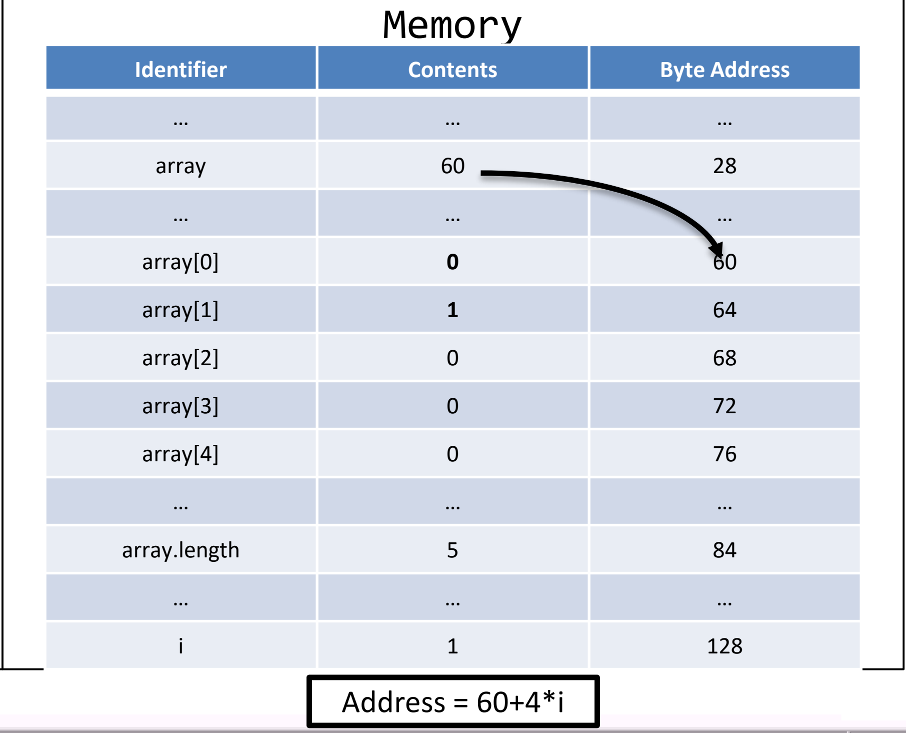

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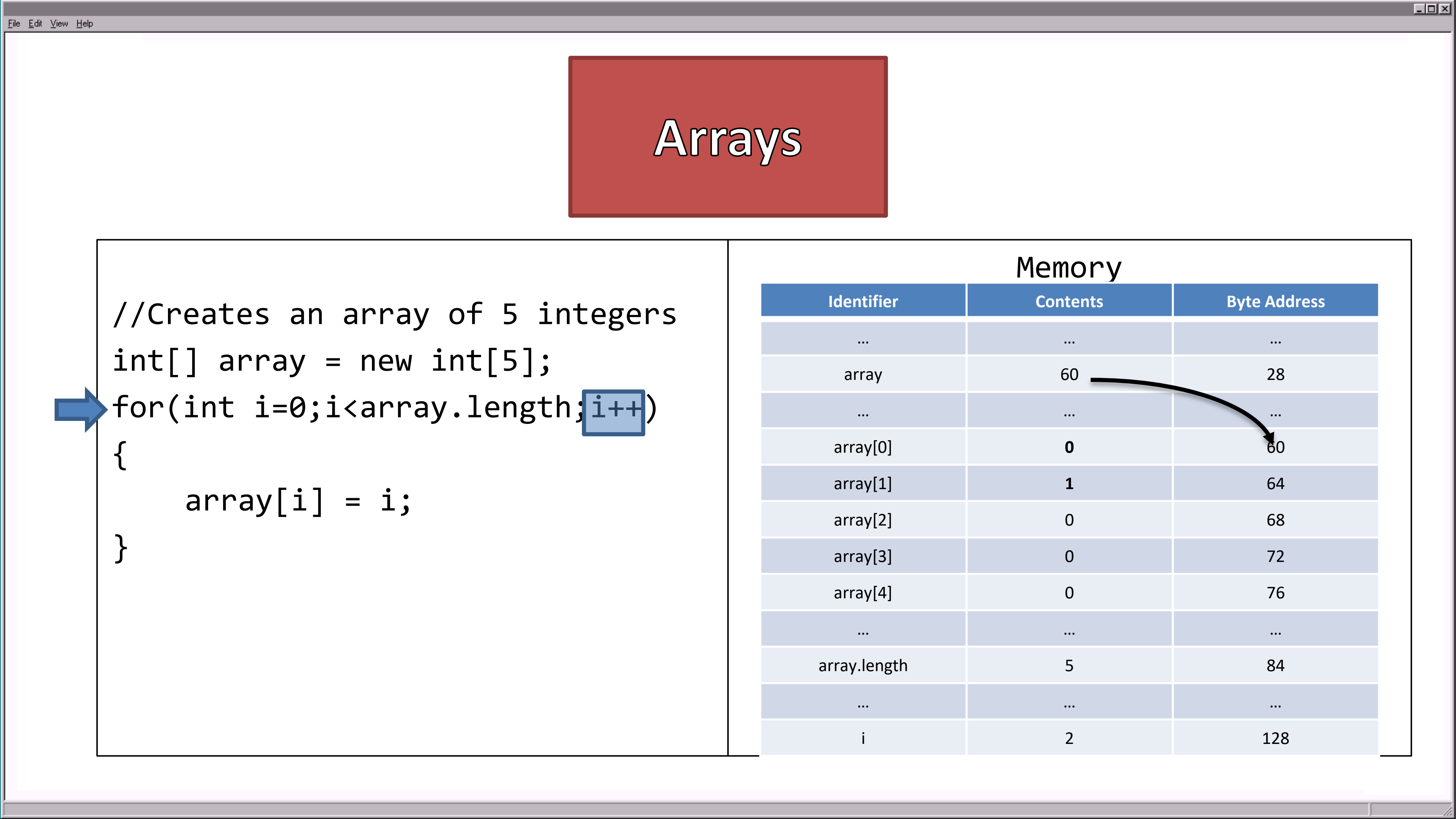

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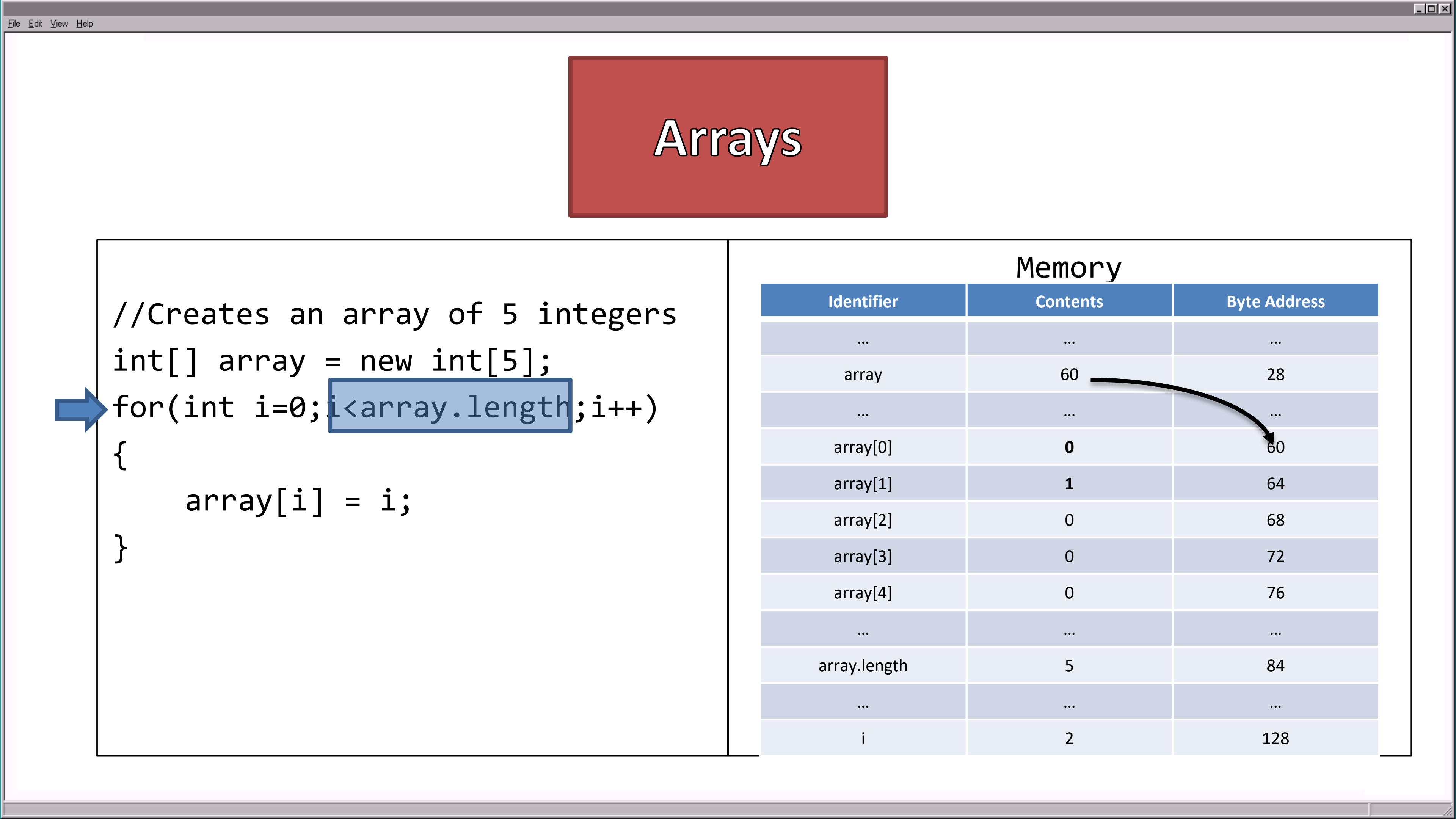

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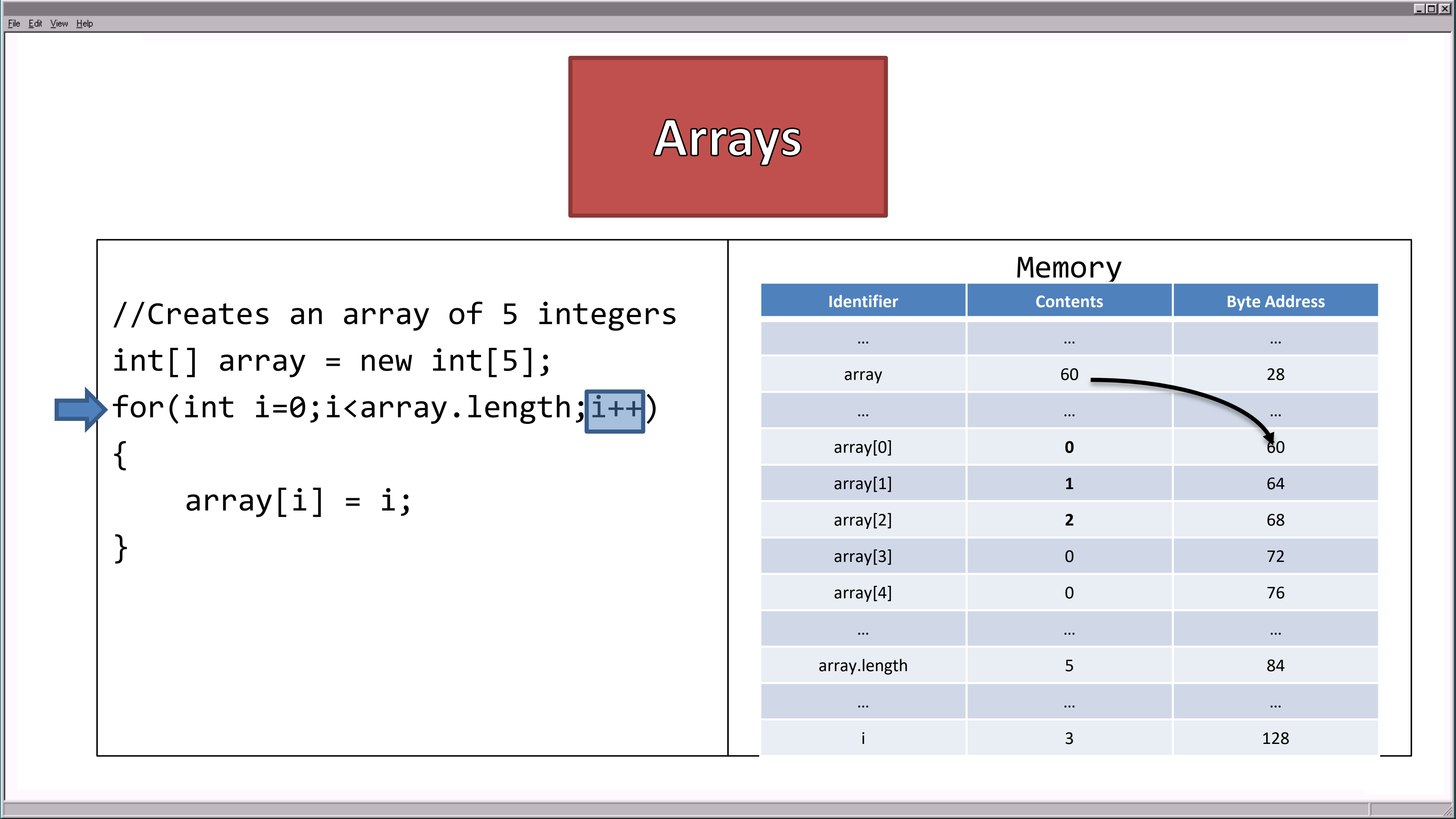

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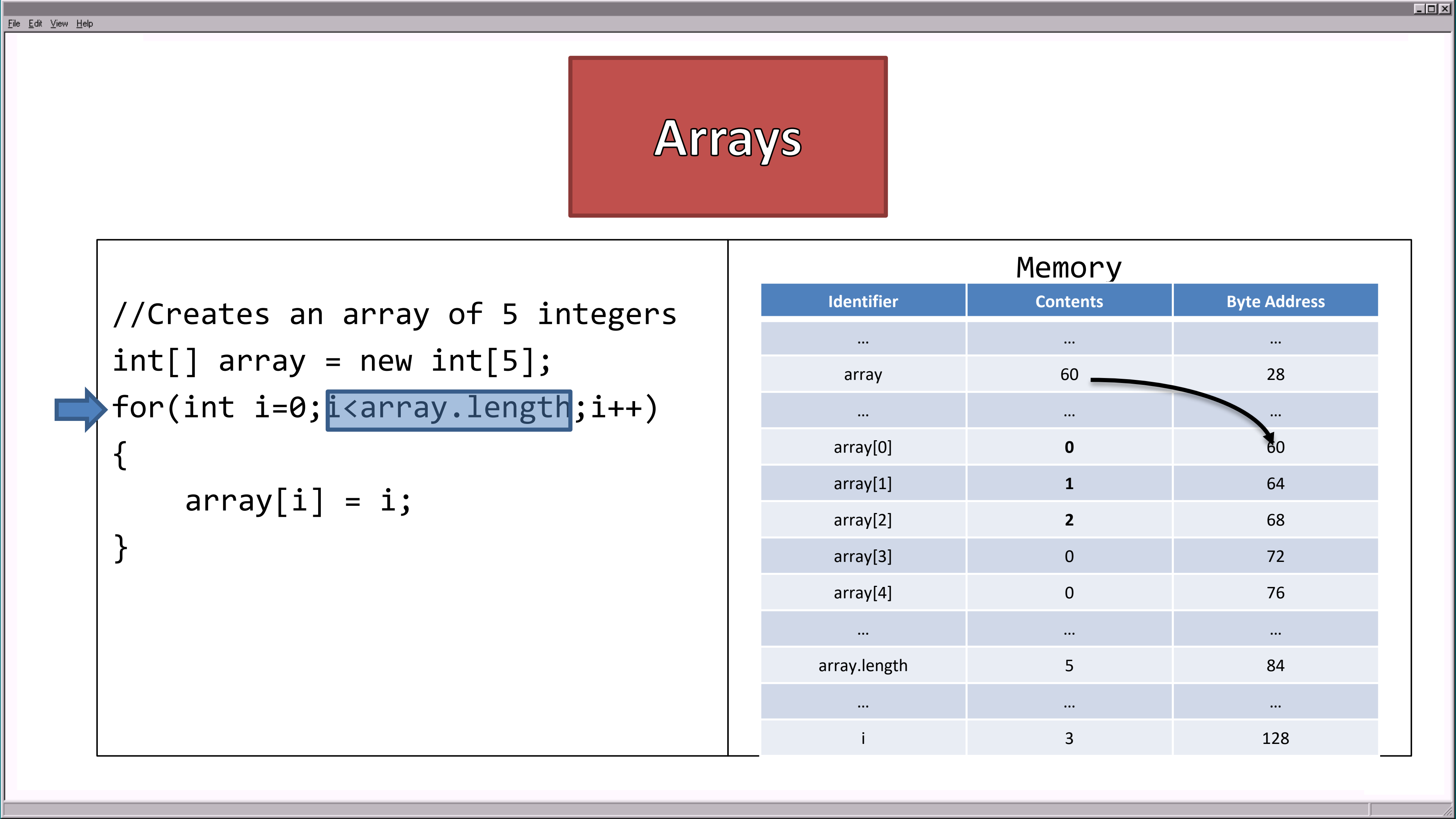

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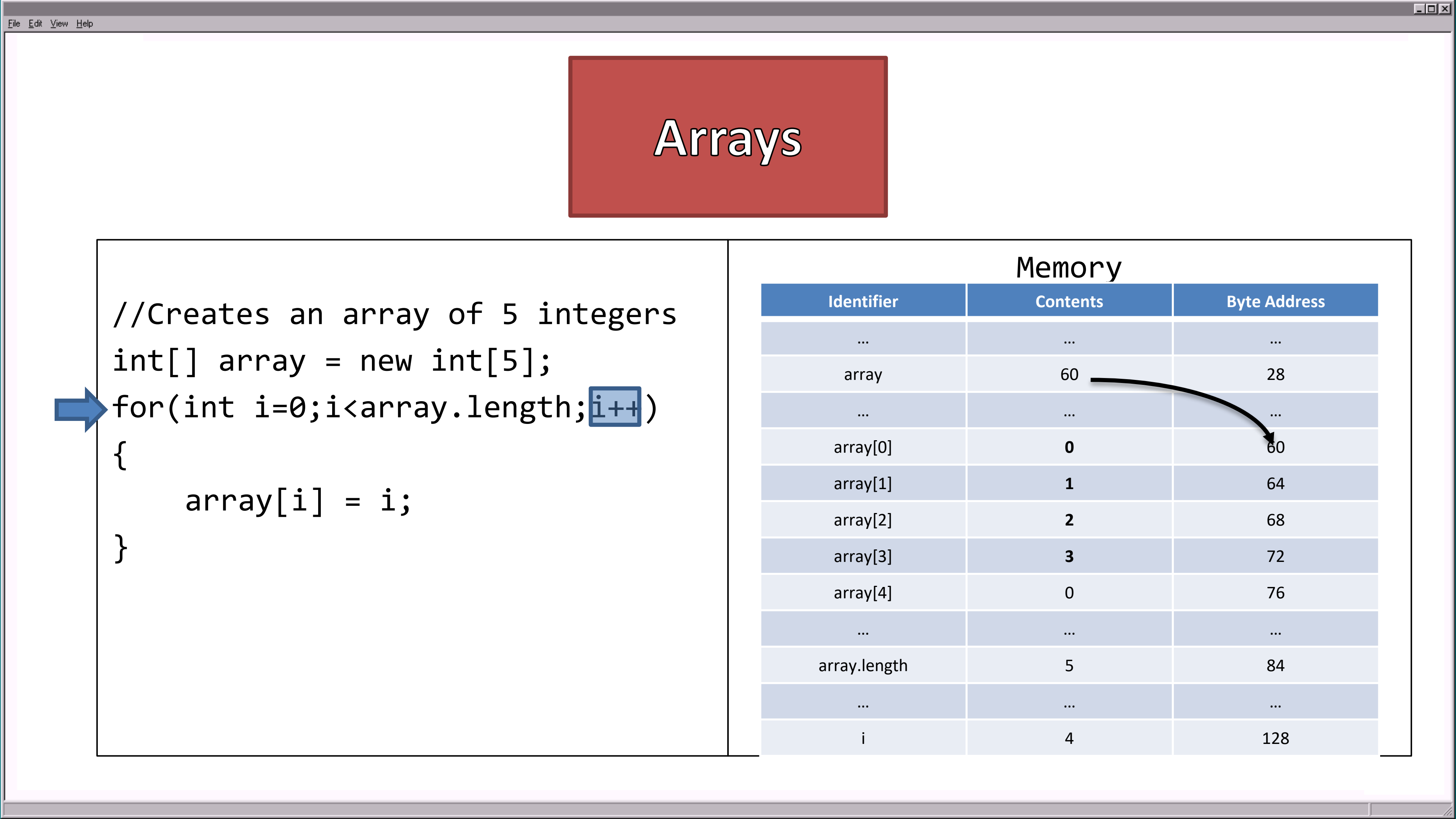

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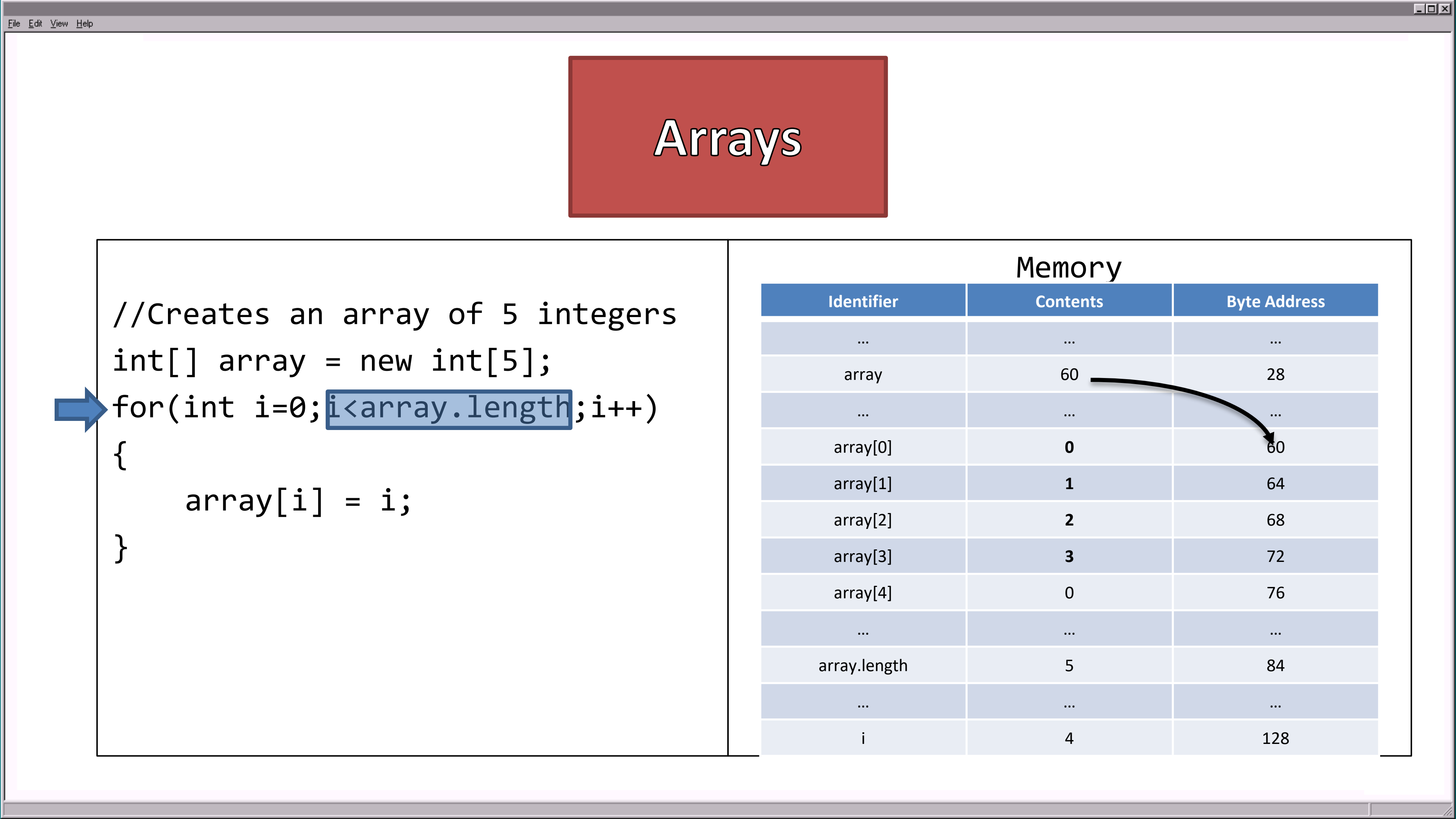

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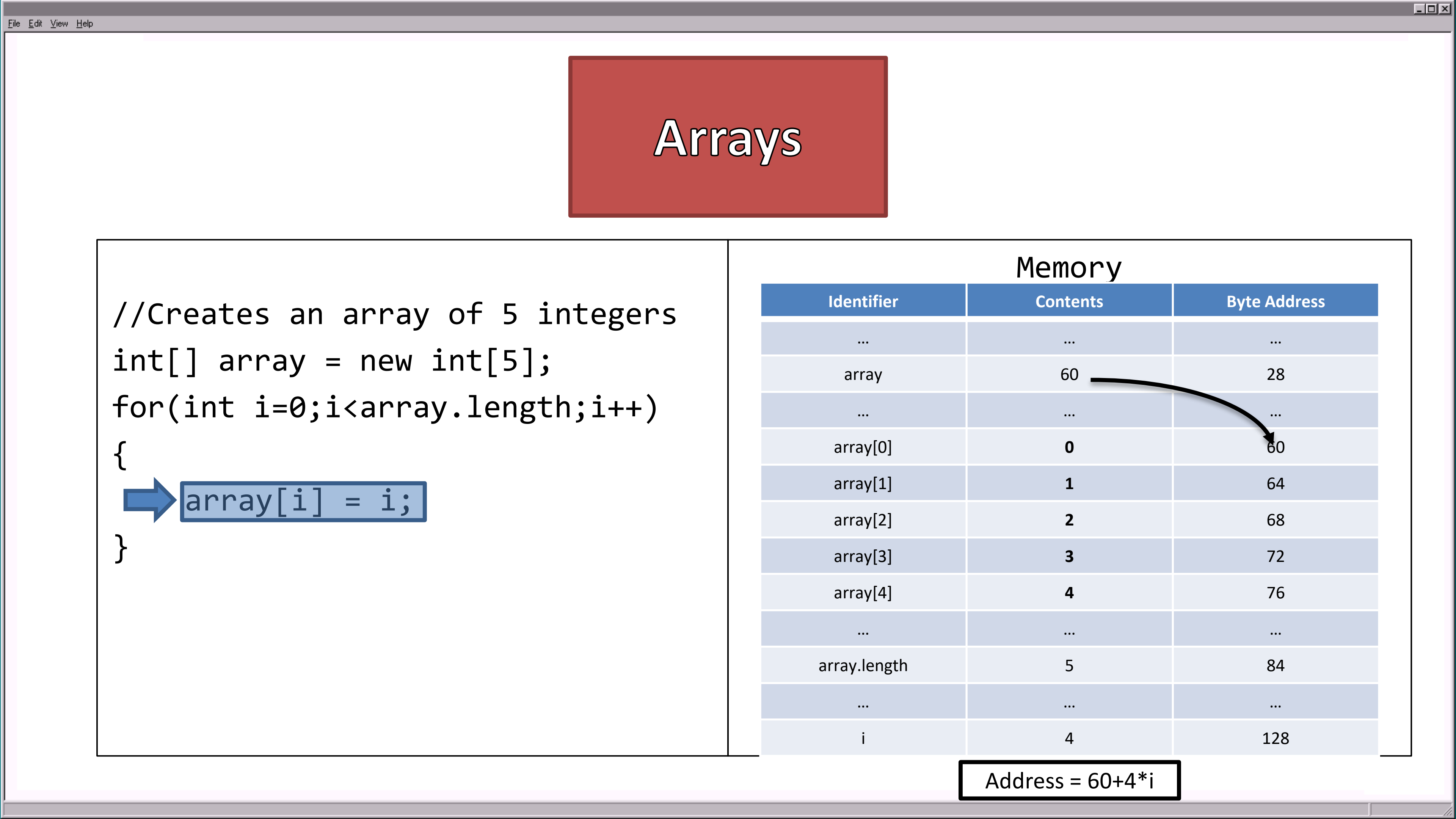

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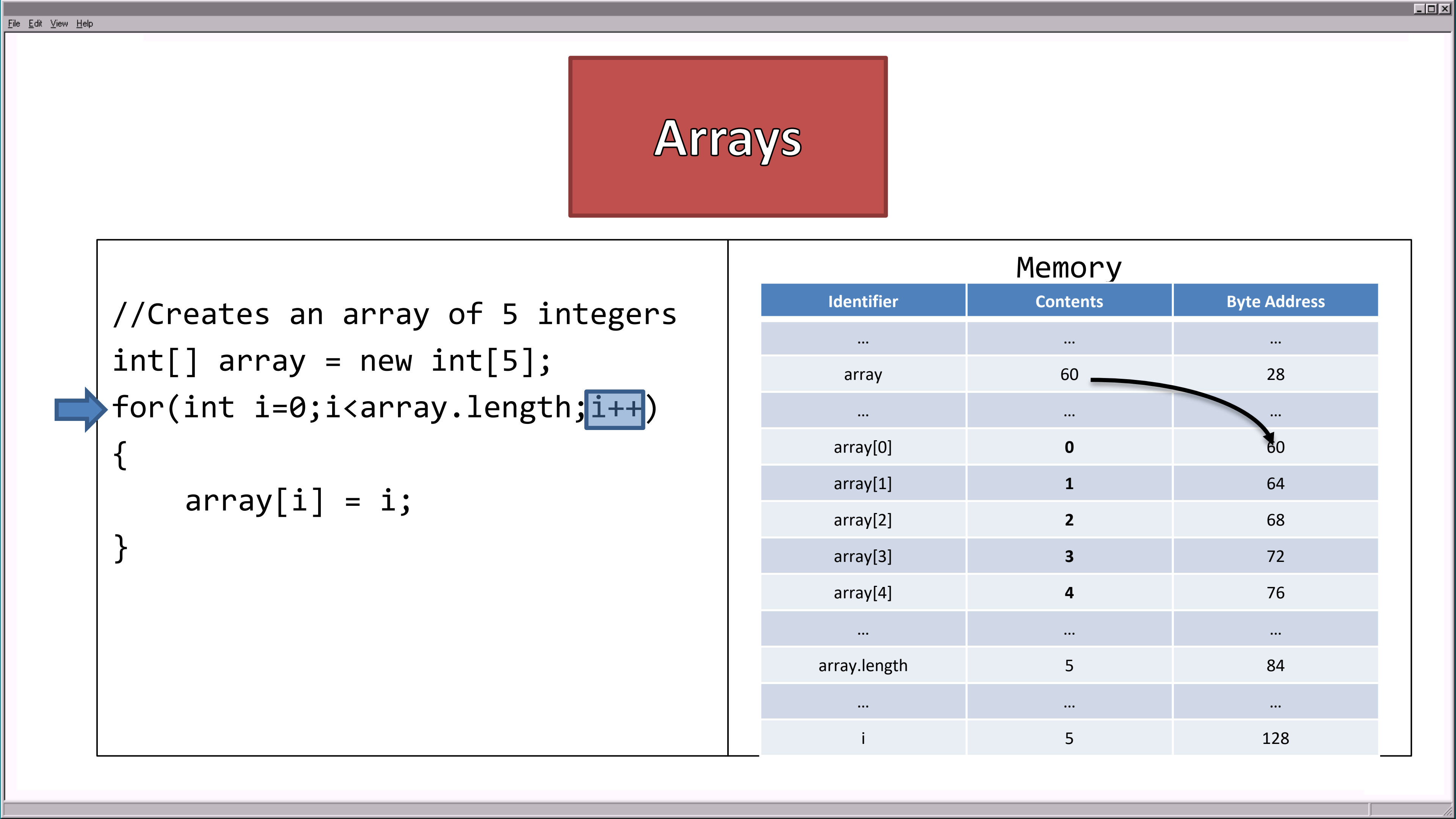

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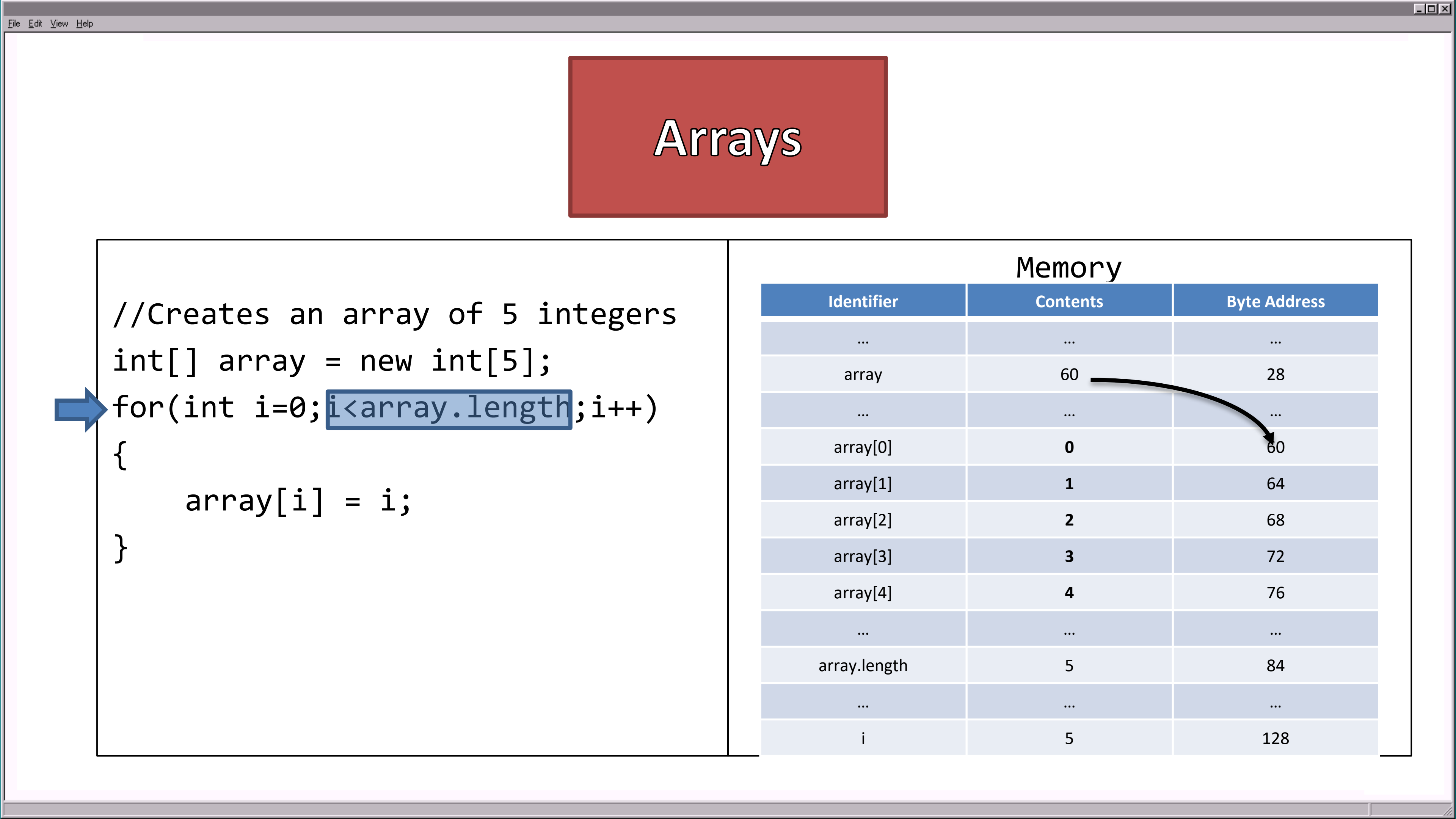

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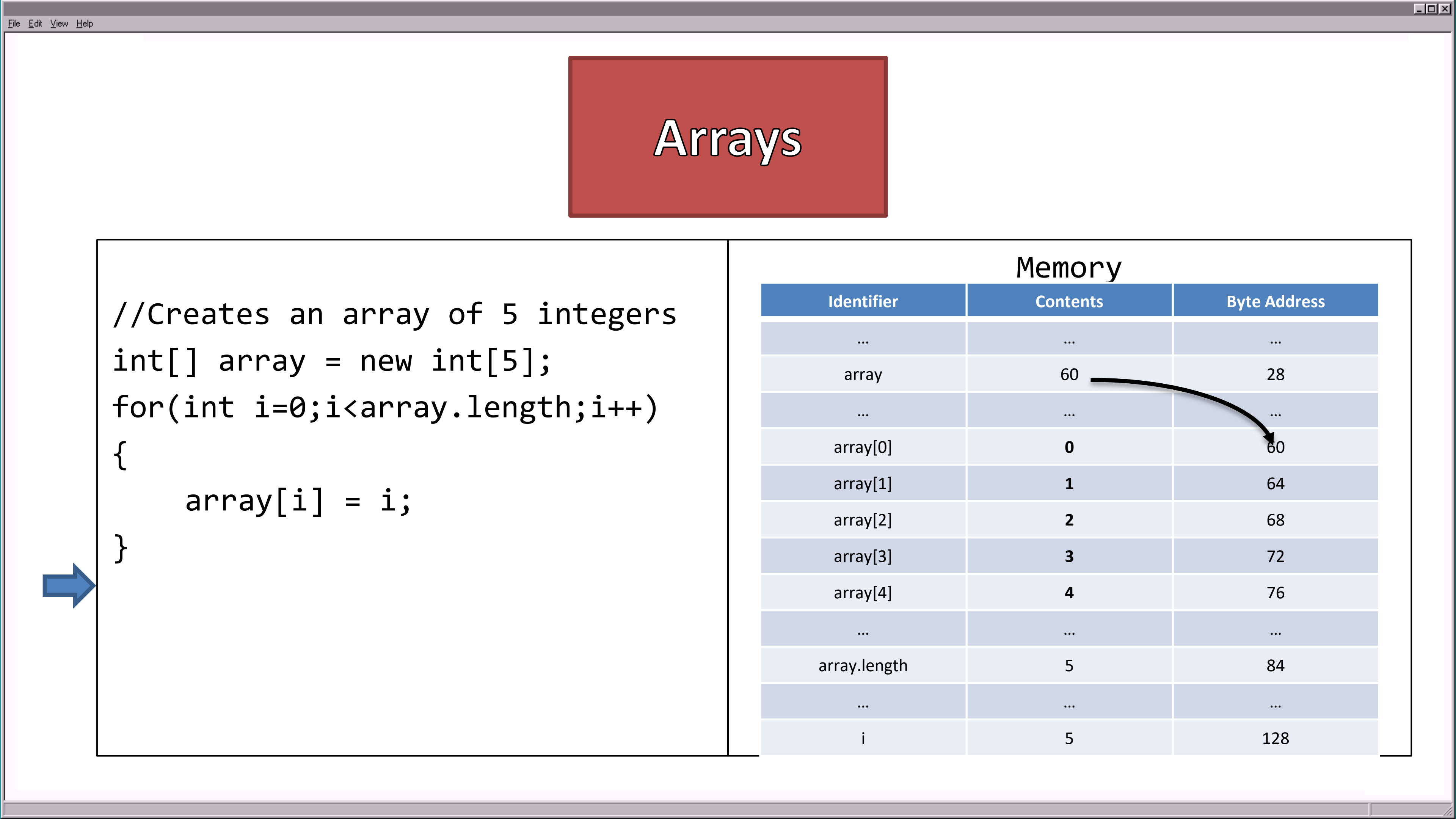

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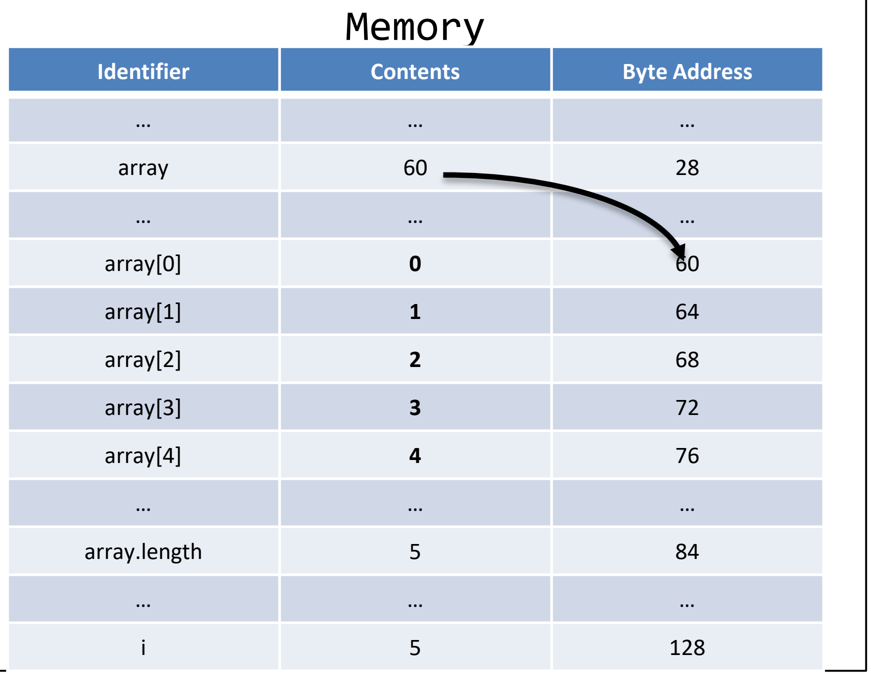

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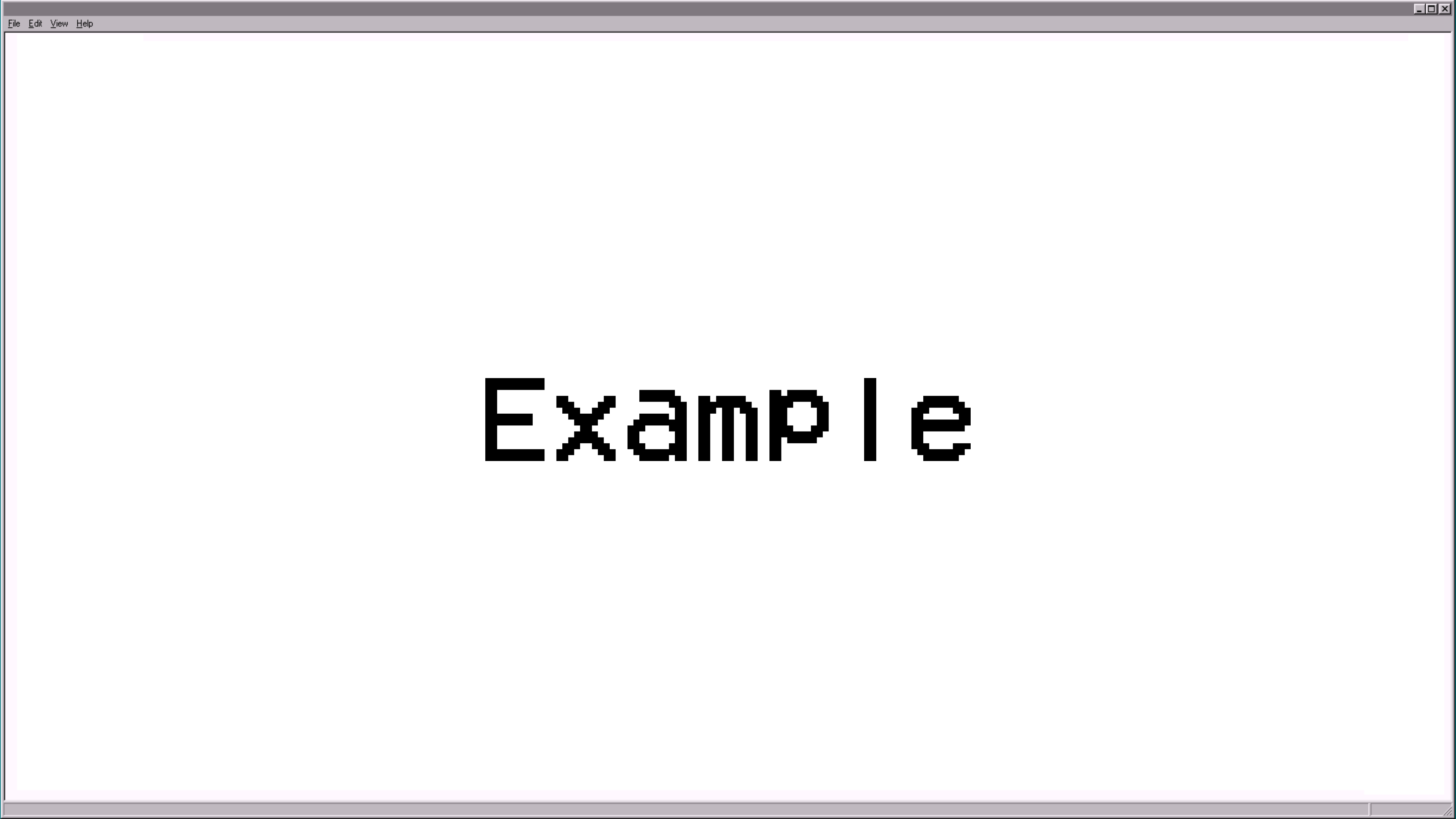

Example

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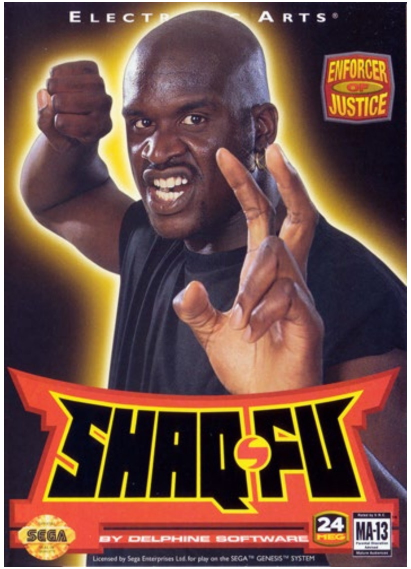

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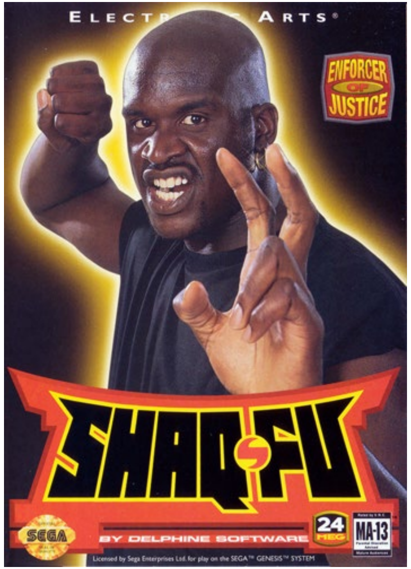
$13.00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ENFORCER OF JUSTICE
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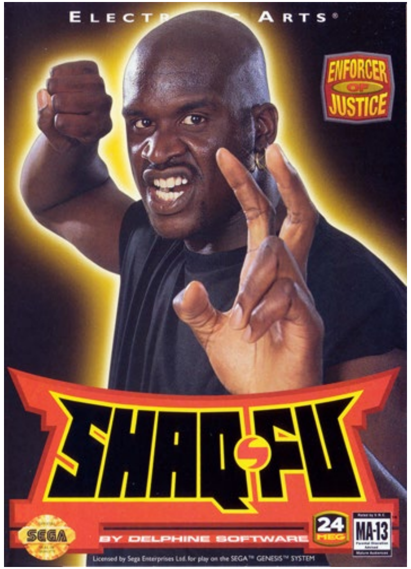

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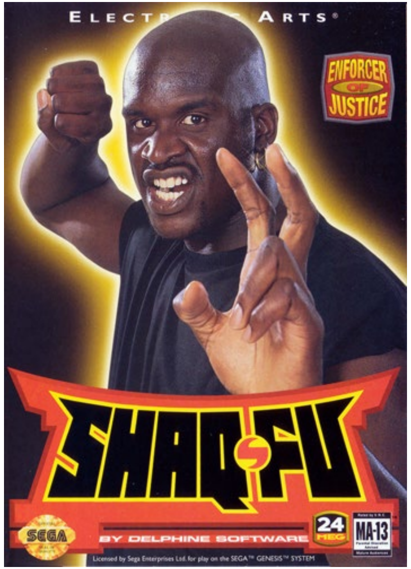

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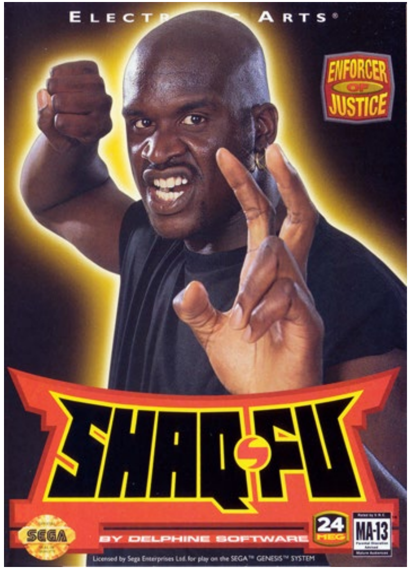

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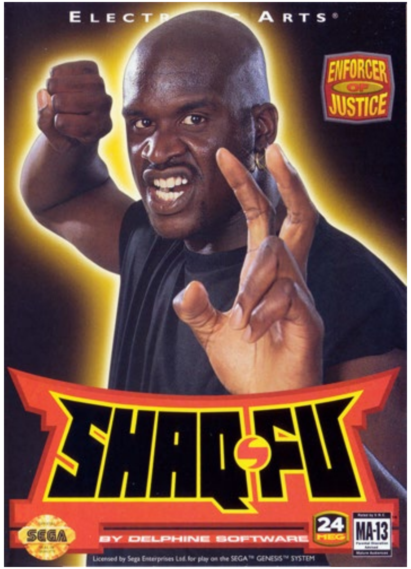

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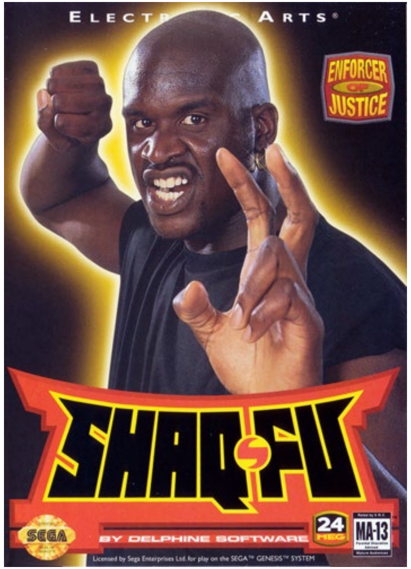

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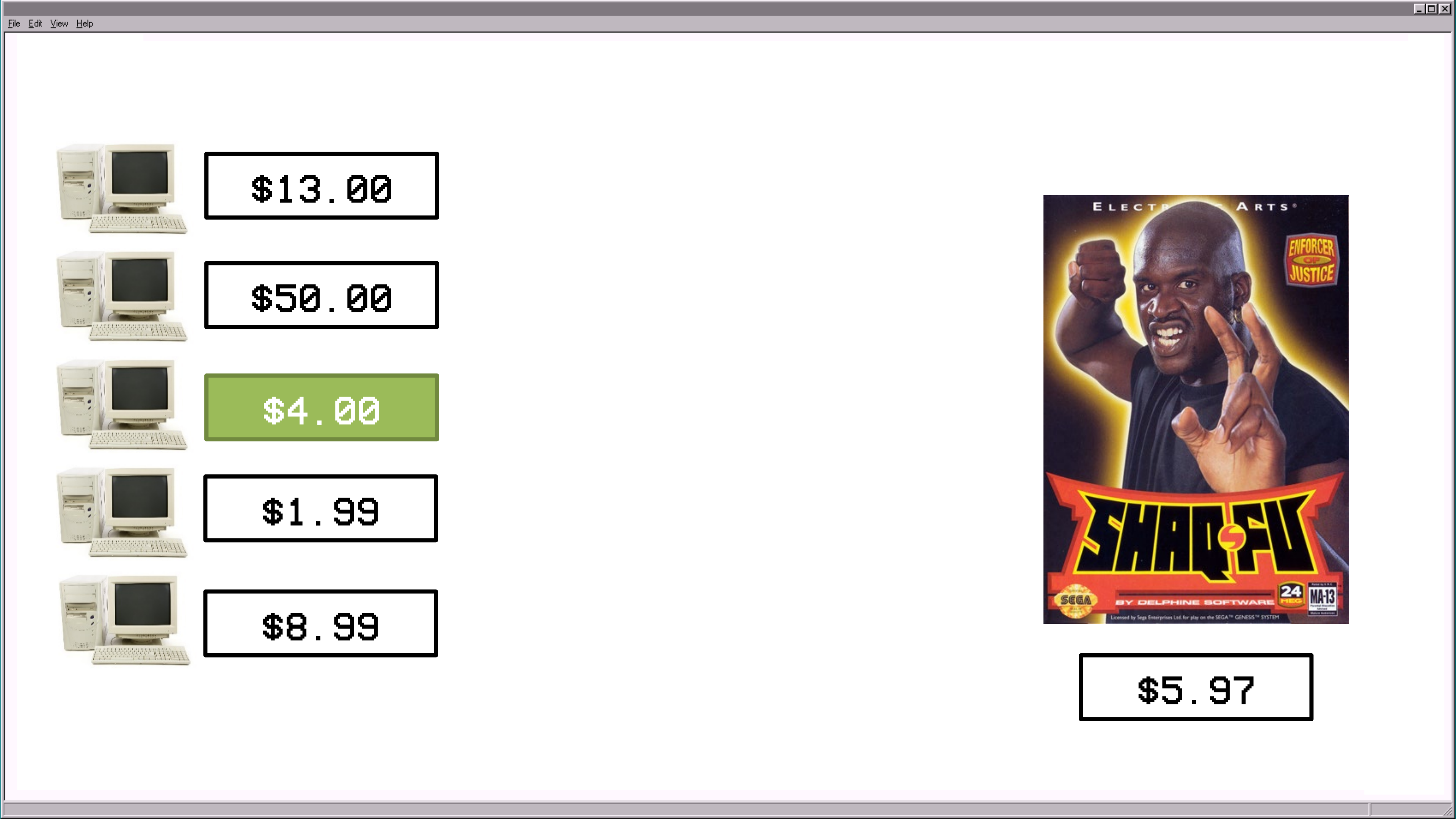
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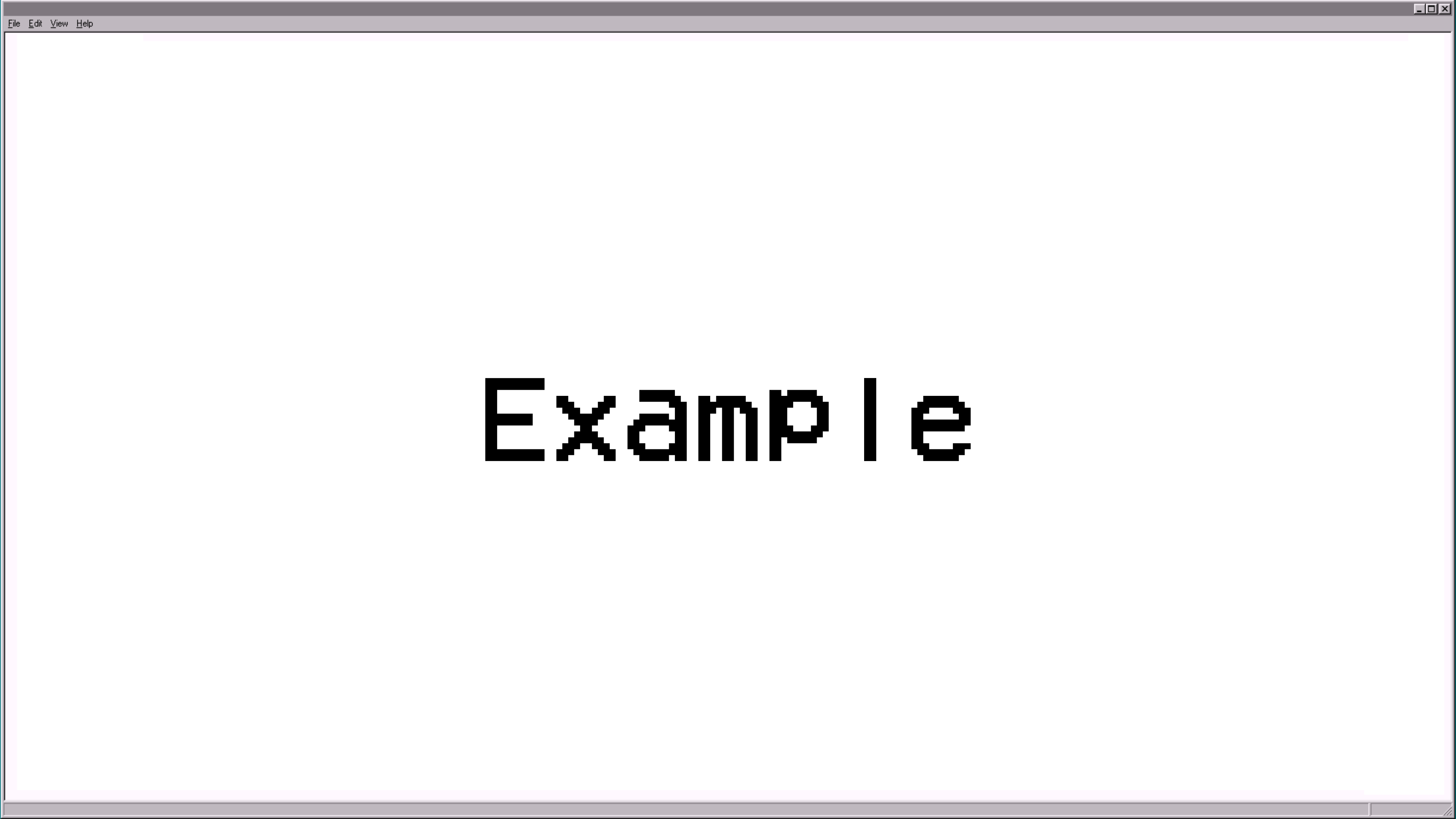

Example