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Operations on Arrays

ELEC1006: ENGINEERING COMPUTING

Increment & Decrement Operations on an Array

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- Array elements can be treated as ordinary variables of the same type as the array.

- When using ++, −− operators, don't confuse the element with the subscript:

```
tests[i]++; // add 1 to tests[i]
tests[i++]; // increment i, no
            // effect on tests
```

Summing & Averaging Array Elements

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- Use a simple loop to add together array elements:

```
int tnum;
double average, sum = 0;
for(tnum = 0; tnum < SIZE; tnum++)
      sum += tests[tnum];
```

- Once summed, the average can be calculated immediately outside the loop:

```
average = sum / SIZE;
```

Finding the Highest Value in an Array

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```
int count;
int highest;
highest = numbers[0];
for (count = 1; count < SIZE; count++)
{
   if (numbers[count] > highest)
      highest = numbers[count];
}
```

When this code execution is finished, the `highest` variable will contain the largest value from the `numbers` array.

Finding the Lowest Value in an Array

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```
int count;
int lowest;
lowest = numbers[0];
for (count = 1; count < SIZE; count++)
{
   if (numbers[count] < lowest)
      lowest = numbers[count];
}
```

When this code is finished, the `lowest` variable will contain the smallest value in the `numbers` array.

Comparing Arrays

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- To compare two arrays, you must compare element-by-element:

```
const int SIZE = 5;
int firstArray[SIZE] = { 5, 10, 15, 20, 25 };
int secondArray[SIZE] = { 5, 10, 15, 20, 25 };
bool arraysEqual = true; // Flag variable
int count = 0;           // Loop counter variable
// Compare the two arrays.
while (arraysEqual && count < SIZE)
{
   if (firstArray[count] != secondArray[count])
      arraysEqual = false;
   count++;
}
if (arraysEqual)
   cout << "The arrays are equal.\n";
else
   cout << "The arrays are not equal.\n";
```

Partially-Filled Arrays

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- If it is unknown how much data an array will be holding:
  - Make the array large enough to hold the largest expected number of elements.
  - Use a counter variable to keep track of the number of items stored in the array.

More info

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[1] cplusplus.com: Arrays
https://www.cplusplus.com/doc/tutorial/arrays/

[2] leanrcpp.com: 6.1 – Arrays (Part I)
https://www.learncpp.com/cpp-tutorial/61-arrays-part-i/

[3] learncpp.com: 6.2 – Arrays (Part II)
https://www.learncpp.com/cpp-tutorial/62-arrays-part-ii/

[4] learncpp.com: 6.3 – Arrays and loops
https://www.learncpp.com/cpp-tutorial/63-arrays-and-loops/