Security Injections @Towson

Welcome, Marilyn Soyars!

Security Injections, Java CS1 - Buffer Overflow

Code Responsibly-- How Can I Avoid Buffer Overflow And Out of Bounds Problems?

1. Mind your Indices!
   - Validate your input. Always check values that are input as an array index.
   - Check your loops! Especially watch the limit, beware of off-by-one errors.
   - Check any methods that may modify an array index.
2. *Make sure you have enough space:* Before copying data to a fixed size block, make sure it is large enough to hold the data that you are going to copy. If it is not large enough, do not copy more data than your available space can hold. If your program is not able to continue properly after filling the available space, you may have to find some way to recover from the error.
3. *Validate indices:* If you have an integer variable, verify that it is within the proper bounds before you use it as an index to an array. This validation is particularly important for any values that might have been provided as user input or other untrusted input, such as information that might be read from a file or from a network connection.
4. *When possible, use buffer-size accessors:* Loops that iterate over arrays need to know the size of the array. Using a variable with the wrong value – or the incorrect constant value – can lead to buffer overflows. Some languages - such as Java – provide operators that can be used to retrieve the size of an array. Using these operators can help you avoid some of these problems.
5. *Use alternative data structures that reduce the risk of overflows:* Many buffer overflow vulnerabilities can be avoided by using vectors or other structures instead of traditional arrays. When possible, use vectors and iterators instead of arrays and integer-indexed loops. Note that these tools will not prevent you from running into trouble: you will still have to write your code carefully and correctly. However, they can reduce your risk of buffer overflow vulnerabilities.

Answer the following questions:

Question 1

A variable used for an array index could be obtained from:

- [x] ✓ A file
- [x] ✓ A network
- [x] ✓ User input

(hint: Read summary and description sections to answer this question.)

Question 2

Given the following array:

```
int scores[100];
```

Specify the legal range or bounds for an array index i:

- [ ] 0 < i < 100
- [ ] 0 < i <= 100
- [x] ✓ 0 <= i < 100
- [ ] 0 <= i <= 100

(hint: Read Risk and Real-world Examples sections to answer this question.)

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This project is supported by the National Science Foundation under grants DUE-1241738 and DUE -0817267. Any opinions, findings, conclusions, or recommendations expressed are those of the authors and do not necessarily reflect the views of the National Science Foundation.

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