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5 Security Considerations When Coding

By Bryce Whitty

1. Input Checking

Always check user input to be sure that it is what you expected. Make sure it doesn't contain characters or other data which may be treated in a special way by your program or any programs called by your program.

This often involves checking for characters such as quotes, and checking for unusual input characters such as non-alphanumeric characters where a text string is expected. Often, these are a sign of an attack of some kind being attempted.

2. Range Checking

Always check the ranges when copying data, allocating memory or performing any operation which could potentially overflow. Some programming languages provide range-checked container access (such as the `std::vector::at()` in C++, but many programmers insist on using the unchecked array index `[]` notation. In addition, the use of functions such as `strcpy()` should be avoided in preference to `strncpy()`, which allows you to specify the maximum number of characters to copy. Similar versions of functions such as `snprintf()` as opposed to `sprintf()` and `fgets()` instead of `gets()` provide equivalent length-of-buffer specification. The use of such functions throughout your code should prevent buffer overflows. Even if your character string originates within the program, and you think you can get away with `strcpy()` because you know the length of the string, that doesn't mean to say that you, or someone else, won't change things in the future and allow the string to be specified in a configuration file, on the command-line, or from direct user input. Getting into the habit of range-checking everything should prevent a large number of security vulnerabilities in your software.

3. Principle Of Least Privileges

This is especially important if your program runs as root for any part of its runtime. Where possible, a program should drop any privileges it doesn't need, and use the higher privileges for only those operations which require them. An example of this is the Postfix mailserver, which has a modular design allowing parts which require root privileges to be run distinctly from parts which do not. This

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form of privilege separation reduces the number of attack paths which lead to root privileges, and increases the security of the entire system because those few paths that remain can be analysed critically for security problems.

4. Don't Race

A race condition is a situation where a program performs an operation in several steps, and an attacker has the chance to catch it between steps and alter the system state. An example would be a program which checks file permissions, then opens the file. Between the permission check the `stat()` call and the file open the `fopen()` call an attacker could change the file being opened by renaming another file to the original file's name. In order to prevent this, `fopen()` the file first, and then use `fstat()`, which takes a file descriptor instead of a filename. Since a file descriptor always points to the file that was opened with `fopen()`, even if the filename is subsequently changed, the `fstat()` call will be guaranteed to be checking the permissions of the same file. Many other race conditions exist, and there are often ways

to prevent them by carefully choosing the order of execution of certain functions.

5. Register Error Handlers

Many languages support the concept of a function which can be called when an error is detected, or the more flexible concept of exceptions. Make use of these to catch unexpected conditions and return to a safe point in the code, instead of blindly progressing in the hope that the user input won't crash the program, or worse!

Bryce Whitty owns and runs

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. A website that provides

technical how-to's for repairing your computer. Technibble also has many guides for getting into the computer business

or managing your existing one. We also cover other side topics such as Security and Software.

So You Want To Be A Coder

By Katelyn Thomas

What exactly is coding?

Coding is basically data entry. You will be looking at documents that someone else has scanned into the computer and taking certain information from each document and entering it in the provided database so that people looking for a certain document can find it quickly. For example, a legal document usually has special numbers that specify the first and last page of documents, the date, the writer of the document, who it is addressed to, what it is about, and additional helpful information entered into the database. There are coders for other fields, as well. Coding is not the same as medical coding and billing, which is a very different field that deals with insurance.

Would you make a good coder?

You will need to be patient enough to scan many documents that can be quite dry for important bits of information. (Frankly, I'd make a terrible coder. I was surprised at how difficult it was for me to sit there and attempt this when I am used to poring over census and vital record documents for hours in search of one tiny piece of a genealogy puzzle.) You will also need to be very accurate. Your work will be checked by a quality control agent, who will make sure your coding is correct. You will need to look at documents that sometimes are blurry or hard to see, so you should have good eyesight.

Can I become a coder without experience?

It is certainly a lot harder. There are companies that hire new coders, though. Try thinking creatively when you apply to these companies. Sometimes you have some experience with something else that will help you stand out from the mob of people applying to the few companies that accept inexperienced coders. Did you create or update any databases for previous jobs? For instance, I created a job log and entered information about each job from the billing files for an employer. I also once volunteered to create a database of vital records using newspapers from the early 1900's. If I was applying for a coding position, I would highlight these jobs in my cover letter.

What equipment do I need to code?

You will need a newer computer and high speed internet access. Most coding companies provide any software you need.

Katelyn Thomas is the owner of Working In Pj's, the work from home support site for Mid-Atlantic moms. For more great work from home information, visit

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