
Obfuscated C

Even C's most ardent admirers admit that C code can be hard to read. The annual International Obfuscated C Code Contest actually encourages contestants to write the most confusing C programs possible. The winners are truly baffling, as 1990's "Best Small Program" shows:

```
v,i,j,k,l,s,a[99];
main()
{
    for(scanf("%d",&s);*a-s;v=a[j*=v]-a[i],k=i<s,j+=(v=j<s&&
(!k&&!printf(2+"\n\n%c"-(!l<=!j)," #Q"[l^v?(l^j)&1:2])&&
++l||a[i]<s&&v&&v-i+j&&v+i-j))&&!(l%=s),v||(i==j?a[i+=k]=0:
++a[i])>=s*k&&++a[--i])
        ;
}
```

This program, written by Doron Osovlanski and Baruch Nissenbaum, prints all solutions to the Eight Queens problem (the problem of placing eight queens on a chessboard in such a way that no queen attacks any other queen). In fact, it works for any number of queens between four and 99. For more winning programs, visit www.ioccc.org, the contest's web site.

Effective Use of C

Using C effectively requires taking advantage of C's strengths while avoiding its weaknesses. Here are a few suggestions:

Q&A

- **Learn how to avoid C pitfalls.** Hints for avoiding pitfalls are scattered throughout this book—just look for the \triangle symbol. For a more extensive list of pitfalls, see Andrew Koenig's *C Traps and Pitfalls* (Reading, Mass.: Addison-Wesley, 1989). Modern compilers will detect common pitfalls and issue warnings, but no compiler spots them all.
- **Use software tools to make programs more reliable.** C programmers are prolific tool builders (and users). One of the most famous C tools is named `lint`. `lint`, which is traditionally provided with UNIX, can subject a program to a more extensive error analysis than most C compilers. If `lint` (or a similar program) is available, it's a good idea to use it. Another useful tool is a debugger. Because of the nature of C, many bugs can't be detected by a C compiler; these show up instead in the form of run-time errors or incorrect output. Consequently, using a good debugger is practically mandatory for C programmers.
- **Take advantage of existing code libraries.** One of the benefits of using C is that so many other people also use it; it's a good bet that they've written code you can employ in your own programs. C code is often bundled into libraries (collections of functions); obtaining a suitable library is a good way to reduce errors—and save considerable programming effort. Libraries for common