Interactive c

I'm not robot!

main.c // Online C compiler to run C program online #include int main() { // Write C code here printf("Hello world"); return 0; } Interactive CDeveloper(s)KISS Institute for Practical RoboticsInitial release1997, 24–25 years agoStable release8.0.2 (March 31, 2008) [±]Preview releaseNon [±] Operating systemWindows, macOS, Linux, IRIX, Solaris,
SunOSAvailable inEnglishLicenseDistributed without charge by KISS Institute for Practical Robotics, a 501(c)3 nonprofit organizationWebsitewww.newtonlabs.com/ic Interactive CStable release8.0.2 (March 31, 2008) [±]Preview releaseNon [±] Websitewww.botball.org/ic/,%20 byC Interactive C is a program which uses a modified version of ANSI C
with several libraries and features that allow hobbyists to program small robotics platforms. Version by Newton Research Labs Newton Research Labs developed Interactive C as a compiling environment for robots using the Motorola 6811 processor. The MIT LEGO Robot Design Contest (6.270) was the original purpose for the software.[1] It became
popular, however, due to its ability to compile on the fly rather than taking time to compile beforehand as other languages had done. The programming environment's newest version is IC Version 8.0.2, which supports these operating systems: Microsoft Windows XP, 2000, Vista Macintosh Unix and Unix-like: IRIX, Solaris, SunOS; Linux The
screenshot to the right shows Interactive C running on a Windows operating system. The program features an Interaction Window where one-line C commands can be sent to the connected controller as well as an editing window, here titled main.c, where a program file is being edited and can be sent to the attached controller. Here is the basic "Hello
World" example for IC programming: void main() { printf("Hello World"); } Here is another example using motor ports 1 and 3: void main() { motor(1,100); motor(3,100); sleep(2.0); ao(); } A basic infinite loop that will beep for ever: void main() { while(1) { beep(); } } Interactive C is used by Ohio State University to program MIT Handy Boards in its
Fundamentals of Engineering for Honors Program. [1] Version by KISS Institute for Practical Robotics KISS Institute for Practical Robotics developed a third-party alternative to the Newton Labs version of Interactive C for their Botball Educational Robotics Program. The latest version of Interactive C by KISS Institute for Practical Robotics is IC
8.0.2, which supports these operating systems: Windows 2000, XP, Vista Mac OS X 10.3, 10.4, 10.5 Linux (with gcc 3.3) IC8 supports the following robotics controllers: Xport Botball Controller (XBC) versions 1, 2, and 3 Xport Botball Controller (XBC) with iRobot Create MIT Handy Board with Expansion Board Lego RCX using the serial IR tower
References ^ MIT's Autonomous Robot Design Competition External links Botball IC page KISS Institute for Practical Robotics IC Beta page Newton Labs IC page Interactive C Manual from handyboard.com Retrieved from " Interactive C was a programming environment used by robotic controllers such as the rev. 2.21 6.270 controller and the Handy
Board. It gave users the ability to control a robot by using C commands and additional functions tailored specifically for robotics (i.e.: actuator control, sensor inputs). Interactive C allowed users to either enter commands interactively or load the program in as a file. The heart of Interactive C is a compiler that converts C commands into pseudocode
for a custom stack machine implemented for the controller board. The current version of Interactive C was written in C and has not been updated for several years. This project focused on the re-implementation of this compiler to port it to Java and to enhance its current features�opening the door for future improvements in the hardware Interactive
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implementation of this compiler to port it to Java and to enhance its current features�opening the door for future improvements in the hardware Interactive C can support. Interactive Programming in C A demo of interactive programming in C. Run the main program, edit game.c, run make to recompile it, see your updates appear in the running
program. Welcome to the learn-c.org free interactive C tutorial. Whether you are an experienced programmer or not, this website is intended for everyone who wishes to learn the C programming language. There is no need to download anything - Just click on the chapter you wish to begin from, and follow the instructions. Good luck! learn-c.org is
still under construction - If you wish to contribute tutorials, please click on Contributing Tutorials down below. Learn the Basics Advanced Contributing Tutorials Read more here: Contributing Tutorials December 23, 2014 nullprogram.com/blog/2014/12/23/ I'm a huge fan of interactive programming (see: JavaScript, Java, Lisp, Clojure). That is,
modifying and extending a program while it's running. For certain kinds of non-batch applications, it takes much of the tedium out of testing and tweaking during development. Until last week I didn't know how to apply interactive programming to C. How does one go about redefining functions in a running C program? Last week in Handmade Hero
(days 21-25), Casey Muratori added interactive programming to the game engine. This is especially useful in game development, where the developer might want to tweak, say, a boss fight without having to restart the entire game after each tweak. Now that I've seen it done, it seems so obvious. The secret is to build almost the entire application as a
shared library. This puts a serious constraint on the design of the program: it cannot keep any state in global or static variables, though this should be avoided anyway. Global state will be lost each time the shared library is reloaded. In some situations, this can also restrict use of the C standard library, including functions like malloc(), depending on
how these functions are implemented or linked. For example, if the C standard library is statically linked, functions with global state may introduce global state into the shared library. It's difficult to know what's safe to use. This works fine in Handmade Hero because the core game, the part loaded as a shared library, makes no use of external
libraries, including the standard library. Additionally, the shared library must be careful with its use of function pointers. The functions being pointed at will no longer exist after a reload. This is a real issue when combining interactive programming with object oriented C. An example with the Game of Life To demonstrate how this works, let's go
through an example. I wrote a simple ncurses Game of Life demo that's easy to modify. You can get the entire source here if you'd like to play around with it yourself on a Unix-like system. Quick start: In a terminal run make then ./main. Press r randomize and q to quit. Edit game.c to change the Game of Life rules, add colors, etc. In a second terminal
run make. Your changes will be reflected immediately in the original program! As of this writing, Handmade Hero is being written on Windows, so Casey is using a DLL and the Win32 API, but the same technique can be applied on Linux, or any other Unix-like system, using libdl. That's what I'll be using here. The program will be broken into two
parts: the Game of Life shared library ("game") and a wrapper ("main") whose job is only to load the shared library, reload it when it updates, and call it at a regular interval. The wrapper is agnostic about the operation of the "game" portion, so it could be re-used almost untouched in another project. To avoid maintaining a whole bunch of function
pointer assignments in several places, the API to the "game" is enclosed in a struct. This also eliminates warnings from the C compiler about mixing data and function pointers. The layout and contents of the game_state struct is private to the game itself. The wrapper will only handle a pointer to this struct. struct game_state; struct game_api { struct
game_state *(*init)(); void (*finalize)(struct game_state *state); void (*reload)(struct game_state *state); void (*unload)(struct game_state *state); bool (*step)(struct game_state *state); }; In the demo the API is made of 5 functions. The first 4 are primarily concerned with loading and unloading. init(): Allocate and return a state to be passed to every
other API call. This will be called once when the program starts and never again, even after reloading. If we were concerned about using malloc() in the shared library, the wrapper would be responsible for performing the actual memory allocation. finalize(): The opposite of init(), to free all resources held by the game state. reload(): Called
immediately after the library is reloaded. This is the chance to sneak in some additional initialization in the running program. Normally this function will be empty. It's only used temporarily during development. unload(): Called just before the library is unloaded, before a new version is loaded. This is a chance to prepare the state for use by the next
version of the library. This can be used to update structs and such, if you wanted to be really careful. This would also normally be empty. step(): Called at a regular interval to run the game. A real game will likely have a few more functions like this. The library will provide a filled out API struct as a global variable, GAME_API. This is the only exported
symbol in the entire shared library! All functions will be declared static, including the ones referenced by the structure. const struct game_api GAME_API = { .init = game_init, .finalize = game_finalize, .reload = game_reload, .unload = game_unload, .step = game_step }; dlopen, dlsym, and dlclose The wrapper is focused on calling dlopen(), dlsym(),
and dlclose() in the right order at the right time. The game will be compiled to the file libgame.so, so that's what will be loaded. It's written in the source with a ./ to force the name to be used as a filename. The wrapper keeps track of everything in a game struct. const char *GAME_LIBRARY = "./libgame.so"; struct game { void *handle; ino_t id; struct
game_api api; struct game_state *state; }; The handle is the value returned by dlopen(). The id is the inode of the shared library, as returned by stat(). The rest is defined above. Why the inode? We could use a timestamp instead, but that's indirect. What we really care about is if the shared object file is actually a different file than the one that was
loaded. The file will never be updated in place, it will be replaced by the compiler/linker, so the timestamp isn't what's important. Using the inode is a much simpler situation than in Handmade Hero. Due to Windows' broken file locking behavior, the game DLL can't be replaced while it's being used. To work around this limitation, the build system
and the loader have to rely on randomly-generated filenames. void game_load(struct game *game) The purpose of the game_load() function is to load the game API into a game struct, but only if either it hasn't been loaded yet or if it's been updated. Since it has several independent failure conditions, let's examine it in parts. struct stat attr; if
((stat(GAME_LIBRARY, &attr) == 0) && (game->id != attr.st_ino)) { First, use stat() to determine if the library's inode is different than the one that's already loaded. The id field will be 0 initially, so as long as stat() succeeds, this will load the library the first time. if (game->handle) { game->api.unload(game->state); dlclose(game->handle); } If a
library is already loaded, unload it first, being sure to call unload() to inform the library that it's being updated. It's critically important that dlclose() happens before dlopen(). On my system, dlopen() looks only at the string it's given, not the file behind it. Even though the file has been replaced on the filesystem, dlopen() will see that the string
matches a library already opened and return a pointer to the old library. (Is this a bug?) The handles are reference counted internally by libdl. void *handle = dlopen(GAME_LIBRARY, RTLD_NOW); Finally load the game library. There's a race condition here that cannot be helped due to limitations of dlopen(). The library may have been updated again
since the call to stat(). Since we can't ask dlopen() about the inode of the library it opened, we can't know. But as this is only used during development, not in production, it's not a big deal. if (handle) { game->handle = handle; game->id = attr.st_ino; /* ... more below ... */ } else { game->handle = NULL; game->id = 0; } If dlopen() fails, it will return
NULL. In the case of ELF, this will happen if the compiler/linker is still in the process of writing out the shared library. Since the unload was already done, this means no game will be loaded when game_load returns. The user of the struct needs to be prepared for this eventuality. It will need to try loading again later (i.e. a few milliseconds). It may be
worth filling the API with stub functions when no library is loaded. const struct game_api *api = dlsym(game->handle, "GAME_API"); if (api != NULL) { game->api = *api; if (game->state == NULL) game->state = game->api.init(); game->api.reload(game->state); } else { dlclose(game->handle); game->handle = NULL; game->id = 0; } When the
library loads without error, look up the GAME_API struct that was mentioned before and copy it into the local struct. Copying rather than using the pointer avoids one more layer of redirection when making function calls. The game state is initialized if it hasn't been already, and the reload() function is called to inform the game it's just been reloaded.
If looking up the GAME_API fails, close the handle and consider it a failure. The main loop calls game_load() each time around. And that's it! int main(void) { struct game game = {0}; for (;;) { game_load(&game); if (game.handle) if (!game.api.step(game.state)) break; usleep(100000); } game_unload(&game); return 0; } Now that I have this technique
in by toolbelt, it has me itching to develop a proper, full game in C with OpenGL and all, perhaps in another Ludum Dare. The ability to develop interactively is very appealing. « How to build DOS COM files with GCC » Generic C Reference Counting

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