

# GOOGLE CLOUD SHELL DEMO

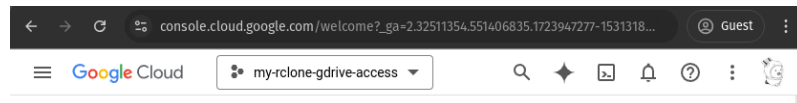
Data Structures with C++ / CSC 240 / Fall 2024

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## Using Emacs + C in Google Cloud Shell

1. Go to [cloud.google.com/shell/](https://cloud.google.com/shell/) and register with your Lyon Google account. This is completely free for up to 50 hours per week.
2. Open a terminal (aka command-line, aka shell, aka Console). Emacs and GCC are already installed. Click on the ">\_" symbol:



3. Get the `.emacs` configuration file with the following command:

```
wget -O .emacs http://tinyurl.com/lyon-emacs
```

4. To check, start a terminal (non-GUI) Emacs with the command:

```
emacs -nw
```

5. The configuration file should now be read and used. You can push Emacs in the background to return to the command-line with `C-z`. Do this now, then return to Emacs by typing `fg` on the command-line.
6. Back in Emacs, create an Org-mode file `test.org`: type the command `C-x C-f test.org RET`
7. An empty buffer named `test.org` opens. Enter the following at the top of the file - achieve indentation with `<TAB>`.

\* Testing C

Print the size of an integer number in bytes:

```
#+begin_src C
#include <stdio.h>

int main(void)
{
    printf("Size of integer: %zu byte.\n", sizeof(int));
    return 0;
}
#+end_src
```

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8. Save the file with `C-x C-s`. Run the program by putting the cursor anywhere on or between `#+begin_src` and `#+end_src` and typing `C-c C-c`.
  9. Now remove everything in the code except the `printf` function call, and add `:main yes :includes <stdio.h>` to the code block header.
  10. Run the code again with `C-c C-c`. The result should be the same.
  11. Lastly, add `:tangle sizeof.c` to the code block header:
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\* Testing C

Print the size of an integer number in bytes:

```
#+begin_src C :main yes :includes <stdio.h> :tangle sizeof.c
    printf("Size of integer: %zu byte.\n", sizeof(int));
#+end_src
```

12. Tangle the source code to file with the command `M-x org-babel-tangle`. You should get the message `Tangled 1 code block from test.org`. Save the file with `C-x C-s` then quit Emacs altogether with `C-x C-c`.
13. On the command-line, type `ls` to list all files, and you should now see `sizeof.c`. Compile it as an executable called `size`, and run it:

```
gcc sizeof.c -o size
./size
```

14. To shut the application down, enter `exit` at the command-line. If you still have a job running (like an open Emacs), type it twice.

## Summary

1. Literate programming combines documentation, source code, and output in one file. You can tangle the source code and weave the documentation.
2. The `wget` program allows you to download files using the Web URL.
3. You can use the Emacs editor in GUI or in terminal (`-nw` or "no windows") mode. In Google Cloud Shell, only the terminal Emacs will work.
4. An Org-mode file is a literate program. Inside Org-mode, code blocks begin with `#+begin_src` and end with `#+end_src`. To run, a code block has to have a language (e.g. `C`), and the Emacs configuration file (`~/.emacs`) has to have been loaded.
5. In Org-mode files, you can run code with `C-c C-c`. For `C` programs, the header of a code block substitutes `#include` directives and the `main` function.