

ACMS 20210 - Scientific Computing -Help information on computing.

You must be registered for this course. If you are planning to register but have not done so see me.

Until either the registrar or I know about you, you will be unable to do any work specific to this course.

You should have an active ND email account.

You must have an AFS password.

Both your email and your AFS account contain sensitive information with regard to this course.

It is your responsibility to protect your password for your NetID (AFS password).

If at anytime during the semester **you suspect that your password is known to others, change it immediately.**

- You need access to a computer to do your homework. It can be your own machine or any of the lab machines. Indeed it can be any machine from which you can access AFS space.
 - To access your AFS space you need some version of ssh on your machine.
 - LINUX or any other flavor of UNIX has ssh from the command line any terminal window.
 - Mac OS X has ssh from any terminal window: type **ssh darrow.cc.nd.edu -l yourafs_id** in the terminal window.
 - Windows users will need to install [F-secure SSH](#) (or any other ssh client you prefer).
 - You *may* need to move files from the machine on which you are working to your AFS space.
 - LINUX or any other flavor of UNIX has sftp from the command line any terminal window.
 - Mac OS X has sftp from any terminal window. For a better interface you can install [Fetch 5.0.5](#) (or any other sftp client you prefer).
 - Windows users can use F-secure SSH to run sftp.
 - In any OS you can use [webfile](#).
 - You can use the vi editor. Login to darrow.cc.nd.edu using ssh, cd to the relevant homework directory and start up vi by typing **vi file.cpp** (where file.cpp is the name of the file you want). Then hit enter/return; then type **i** (for insert); then copy the contents of the file on your computer and paste them into the terminal window. Finally type, ESC, then **:wq** and your file is uploaded.
 - **If you have a problem installing OIT software please contact OIT at 631-8111. OIT is very helpful on these matters.** You may contact me, however, I may not have the expertise to solve your problem.
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- Some acquaintance with UNIX is needed. At a minimum you need to know how to
 - Login to darrow.cc.nd.edu using ssh.
 - Add and delete files to your AFS space.
 - Edit files in your AFS space.
 - Change directories in your AFS space.
 - OIT's document, [U1010 UNIX for beginners](#), is a good basic introduction. Much of the specific

information about the actual setup at Notre Dame is out of date, but the sections on basic UNIX are still good.

- **To create your homework directory and set up your account for this course,**
 - Login to your AFS account using ssh to **darrow.cc.nd.edu**. Copy the following path to the prompt **/afs/nd.edu/coursep.11/acms/acms20210.01/bin/20210setup** and then hit the return key. (If you are not registered for this course you will get a message telling you so and nothing else will happen).
 - If all goes well, logoff and then login again.
 - Now type **20210OK** at the prompt and you should get a message that all is well.
 - Please leave the directory acms20210hw where the script created it.
 - **Keep your homework in the folder acms20210hw so that others cannot copy from you.**
 - If something happens that you do not understand or can not fix, send me an email message at yzhang10@nd.edu Try to be as specific as possible as to what is wrong.

 - There is a text editor **vi** in AFS space that you can use to create or fix files. It is a modal editor meaning that different things happen when you type, depending on which mode you are in. There are two modes, **Command mode** and **Typing mode**.
 - Use **vi filename** to open a file. It opens in **Command mode**.
 - Use **vi** (without a filename to get a copy of the Vim manual - Vim is vi).
 - Use **arrows** to go left and right, up and down in either mode.
 - Use **o** in **Command mode** to go to **Typing mode** and open a new line.
 - Use **"ESC"** to go back to **Command mode** from **Typing mode**.
 - Use **:w** to save your file from the **Command mode** (remain in Command mode).
 - Use **:q** from the **Command mode** to quit (**:wq** saves and then quits with one command).
 - Use **x** in the **Command mode** to delete (remain in Command mode).
 - Use **i** in the **Command mode** to go into **Typing mode**.
 - Similar to **x**, there is also **dd** for deleting an entire line in Command mode (remain in Command mode); **5 dd** deletes the next 5 lines.
 - Similar to **i**, there **a** for append (change to Typing mode).
 - If the cursor is over a brace, bracket or parenthesis in Command mode, the **%** key will jump it to the matching brace, bracket or parenthesis (the utility of this will become apparent as the course develops).
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This short introduction will get you started on the **vi** editor. Of course there are a lot of powerful commands in this editor and it would take a long time to learn them all. Fortunately you can get by in this course with just the above. For those who wish additional information, here is a [link](#).

- To do a particular homework assignment proceed as follows. Suppose for example you are working on

assignment 8.

- Create the file(s) in any program you like on your computer *as long as you can save the file as a text file*.
If you are working directly in AFS space make sure you are in your acms20210 directory.
- Next be sure your files have the correct names and extension.
You will be told the name(s) for the files as part of the homework assignment. The extension is always **.cpp**.
- If your files are not already in the correct directory in AFS space, move them there. For assignment 8 the files need to be in acms20210hw/hw8.
There should already be a folder with the correct name in acms20210hw/. See [above](#) for suggestions on how to move your files.
- Login to darrow.cc.nd.edu via ssh. Then cd to the homework directory (cd acms20210hw/hw8 in the example). After you have the necessary file(s) in this folder you should compile (see below) your project(s) to be sure they work. Then run the script **20210submit**. It will upload all the assignment files in this folder. You can then run **20210submitted**. This will check that all the files you should have submitted have indeed been submitted. It makes no guarantees about correctness - it is just promising that all files it expects to be there are there. (Or it will print out a message about which files are missing, so it is fine to upload the files as you finish them. You can run 20210submit as many times as you like - just remember that it uploads the current versions in your directory.)
- **Keep your homeworks in the folder acms20210hw so that others cannot copy from you.**

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- **Compiling:** Use the g++ compiler on the UNIX machines.
 - Create your program using a text editor on your computer system. The program should be saved as a **text** file with an extension of .cpp. Remember that any unix operating system is **case-sensitive**.
 - Now you are ready to compile your program, **file.cpp**, into an executable file. At the prompt you give the command (assuming this is the only file that you want to compile):

```
g++ file.cpp
```

This compiles your source file, **file.cpp**, into an executable program. On unix-based systems, the executable program is automatically named **a.out**. If any errors occur in the program the g++ compiler will report these errors. You must correct any errors and compile the program again.

- To execute the program itself, the command is:

```
a.out
```

This should execute your program on your unix system.

- If you have multiple files for a single program, you can use

```
g++ file1.cpp file2.cpp file3.cpp file4.cpp
```

This will generate the executable file **a.out**. (Later in the semester we will have such assignments.)

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- Here are useful commands at the UNIX prompt:

```
20210help:      print these commands.
```

```
20210submit:    submit homework to the correct folder; you can  
                re-submit a homework using this command. Only works  
                after the homework is assigned and before the due date.
```

```
20210submitted: check whether a homework is correctly submitted.
```

20210run: compile all your submitted homeworks for your grader.
An error message is generated if there is an error;
in this case, you should correct the errors and
re-submit and re-compile the code.

20210score: check the homework and test scores after the homework/test is graded.

20210hw: check the comments from the grader about a homework assignment.

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