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Running Parallel Programming Data-Acquisition Scripts from a Windows Powershell

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Change the NUMT and NUMTRIES to Global int Variables

Right now, if your code is using defined constants, like this:

```
#ifndef NUMT
#define NUMT            2
#endif

#ifndef NUMS
#define NUMS            32
#endif
```

Change it to use global variables, like this:

```
int NUMT =   2;

int NUMS = 32;
```

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argc and argv

When you write in C or C++, your *main* program, which is really a special function call, looks like this:

```
int main( int argc, char *argv[ ] )
{
        . . .
```

These arguments describe what was entered on the command line used to run the program.

The **argc** is the number of arguments (the arg **C**ount)

The **argv** is a list of argc character strings that were typed (the arg **V**ector).
The name of the program counts as the 0th argv (i.e., argv[0])

So, for example, when you type

```
ls  –l
```

in a shell, the *ls* program sees argc and argv filled like this:

```
argc = 2
argv[0] = "ls"
argv[1] = "-l"
```

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argc and argv

So, if NUMT and NUMTRIALS are global int variables:

```
int NUMT =   2;
int NUMS = 32;
```

and you want to set them from the command line, like this:

```
./prog   1   64
```

Then, *inside your main program*, you would say this:

```
if( argc >= 2 )
        NUMT = atoi(  argv[1]  );

if( argc >= 3 )
        NUMS = atoi(  argv[2]  );
```

The if-statements guarantee that nothing bad happens if you forget to type values on the command line.

The *atoi* function converts a string into an integer ("ascii-to-integer"). If you ever need it, there is also an *atof* function for floating-point.

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shared( ) in the *#pragma omp* Line

Also, remember, since NUMTRIALS is a variable, it needs to be declared as *shared* in the *#pragma omp* line:

```
#pragma omp parallel for default(none) shared(NUMS,xcs,ycs,rs,tn) reduction(+:numHits)
```

NUMT does not need to be declared in this way because it is not used in the for-loop that has the *#pragma omp* in front of it.

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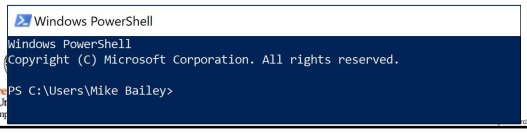
Windows Powershell

Windows comes with a shell program called *Powershell*. It might not be as familiar to most of us as some of the Linux shells are (bash, csh), but it can still be used to run multiple combinations of your program parameters in one shot.

There are a number of ways to get Powershell running. Either:

- Click on the Microsoft icon. Then scroll down to **Windows Powershell** and run **Windows Powershell.**
- *Shift right-click* in the directory you want to work in and select **Open Powershell Window**.
- Hold down the Windows key and hit the 'x' key, then select **Windows Powershell.**

The resulting window should look like this:



Change Directory to Where Your .exe File Lives

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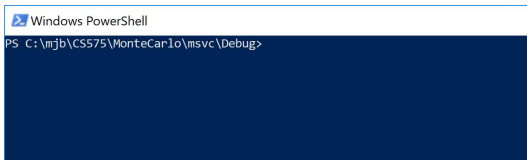
Then:

1. *cd* (change directory) to your home directory.
2. Then *cd* to the folder with your project
3. Then *cd* to the folder with your executable (*.exe)



The prompt will always tell you where you are in the file system.

Running an Executable

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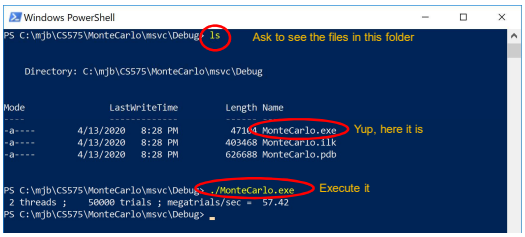
So, if you have *cd*'ed to where your executable (.exe) file lives, you can run it from the command line like this:



Running a Loop

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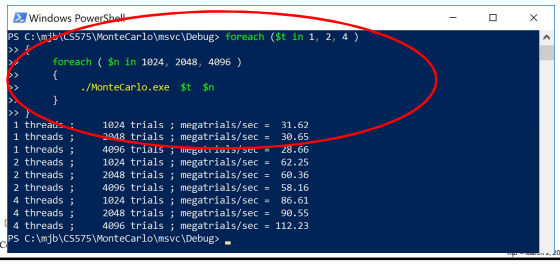
But, here's the cool part. Type:

```
foreach ( $t in 1, 2, 4 )
{
        foreach ( $n in 1024, 2048, 4096)
        {
                ./MonteCarlo.exe  $t  $n
        }
}
```

followed by Enter:



Running a Loop from a File

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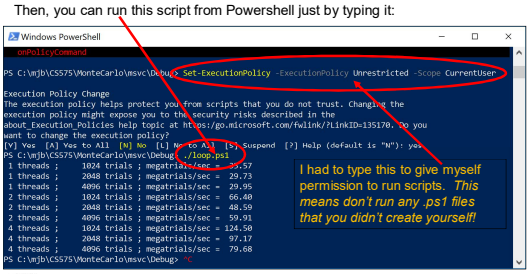
You can also use a text editor like *notepad* or *notepad++* and put these lines into a file called, say, l**oop.ps1** (ps1 is the Powershell file extension).

Then, you can run this script from Powershell just by typing it:



Instead of printing these lines to the screen, you probably want to print them to a text file that can then by imported by Excel.

Diverting Output to a File from Powershell

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To divert the printf's to a file, do this:

./loop.ps1 > out.csv

or this:

./loop.ps1 1> out.csv

To divert *both* printf's and fprintf(stderr,…)'s together, do this:

./loop.ps1 2>&1> out.csv