

Example Problem: This is an example MP exam problem to show the format of the problems. The actual problems will involve system concepts coming from a list of topics that will be available on Piazza.

MP Description

Consider a program that must calculate the n -th Fibonacci number. Recall from high school or discrete math that the n -th Fibonacci number, F_n , is defined (recursively) as:

$$\begin{aligned}F_n &= F_{n-1} + F_{n-2} \\F_1 &= 1 \\F_0 &= 0\end{aligned}$$

You will find we have already pre-populated your home directory with files for this MP. This includes `mpx.c`, the only file which you should modify. Inside `mpx.c`, you will find a single function:

```
int fibonacci(int n)
```

The `int n` argument is the Fibonacci number you should calculate. You must return the result as an integer from the function.

MP Requirements

To complete this MP, you must:

- Compute the n -th Fibonacci number
- Return the Fibonacci number you calculated from your function

Additionally, in computing the Fibonacci number, your program must not re-compute any Fibonacci number it has computed in the past. That is, a first call to `fibonacci(19)` may take some time to compute, but a subsequent call to `fibonacci(19)`, or `fibonacci(9)` since it's a sub-problem of 19, should return instantaneously.

You can assume that the maximum Fibonacci number you will be asked to compute will be less than 1000.

MP Testing

To test your program, run the following commands in a terminal window inside your MP directory:

```
$ make clean
$ make
$ ./mpx
```

You can find the test cases that the `./mpx` command is running on your MP in `tester.c`. You can edit this file to add new test cases, but this file will not be used when we do the final grading of your MP.

MP Submission

To submit your MP, make sure your `mpx.c` file remains in the location you found it. We will grab the file from your home directory.
