

Administrivia

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- Reminder: Midterm Wednesday. Sample solutions to first two quizzes online; third to be added later today / early tomorrow. Sample solutions to homeworks up through 4 online. I'll post one for Homework 5 later today or early tomorrow.
- Homework 4 grades mailed. Most people did very well!
- Quiz 3 grades again disappointing.
- Update on computers in 388: Our ITS expert is looking at them but no success as of Friday. You can try the `startx` trick mentioned in e-mail.

Homework 4 Essays

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- Some people found this assignment more difficult than previous ones, but not all — one person thought it was easier than Homework 3.
- Other than that, not much stood out. One person did mention having trouble figuring out how to check for non-integer input. Remember that the sample programs on the course Web site are meant to be helpful!

Midterm Review

- For number systems, I probably won't ask you to do a conversion; questions will more likely be about what kinds of data can be represented (e.g., an `int` can't represent 2.5).
- For other topics, questions will likely mostly be like those on quizzes that ask you "what does this code do?" or "write some code to ...".

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Tracing Through Code, Revisited

- To answer questions about what code does, usually useful to trace through its operation.
- Examples ...

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Tracing Code — Recursion Example

- Here is a recursive function (remember that `foobar` as the name of a function generally means that the person who wrote it for whatever reason didn't want to give it meaningful name):

```
int foobar(int m, int n) {  
    if (n == 0)  
        return m;  
    else  
        return 1 + foobar(m, n-1);  
}
```

- Asked what it does if called as `foobar(5, 2)`, you could proceed thus:

```
foobar(5, 2) = 1 + foobar(5, 1)  
             = 1 + 1 + foobar(5, 0)  
             = 1 + 1 + 5
```

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Tracing Code — Loop Example

- We could write one more loop example: a program to find the largest power of two less than an input number. (`power-of-two.c` example on "sample programs" page).
- Tracing through it we'd write down values for variables `power` and `two_to_power`, initially and then after each trip through the loop.

Programming Tip

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- When you declare a variable, think about what it represents and give it a name that reflects that. And then try to make sure the value(s) you assign reflect that. If you can't think of a good name, that *might* be a sign that you need to rethink?
- In the power-of-2 example, I chose `power` to mean the power of two to consider next and `two_to_power` to represent two to that power.

"Write Some Code" Questions

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- One thing to be clear on is whether you're being asked to write a "complete program" (which will probably prompt the user, get input, and then do something, probably printing some kind of output) or "write a function" (which might not get input or print anything, but if not will likely return a value).

Functions, Revisited

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- Functions are like math functions, except that they can have “side effects” — “black box” idea.
- Function declaration (and definition) give types of parameters (inputs) and return value (output).
- Calling a function is an expression; evaluating it involves copying actual parameters to parameters in function and executing the function. Value of the expression is what function returns. If function’s return type is `void`, no value is returned. (Might be useful for printing things, e.g.)
- `return` in function means “exit function with this return value”. In `main`, means “exit program”. Return value should be 0 if the program worked, nonzero if not (e.g., invalid input).

Loops — One More Example

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- In class last time I proposed that we try to write a program to convert tabs in input to spaces. That’s more complicated than we have time to do today, so a simpler example: Get text input, as many lines as desired, and convert all lowercase to uppercase and print.

Minute Essay

- None really — just tell me you were here, unless you have questions or concerns about the exam or homeworks?

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