

601.220 Intermediate Programming

Summer 2022, Meeting 2 (June 8th)

Today's agenda

- Academic ethics for individual homeworks
- Exercise 2 review
- “Day 3” material
 - Git and Emacs
 - Exercises 3-A and 3-B
- “Day 4” material
 - C logical operators and control flow
 - Exercise 4

Academic ethics for individual homeworks

- The individual homeworks (HW0, HW1, HW3, HW5, HW7) must be completed *individually*
- Do not look at anyone else's code
- Do not allow anyone (other than course staff) to look at your code
- Do not use code from the internet, students who have taken the course previously, etc.
- We will run a similarity comparison on submissions
- Violations will be reported to the student conduct office

Exercise 2 review

Reading two integers:

```
int a, b;  
printf("Enter two integers: ");  
scanf("%d", &a);  
scanf("%d", &b);
```

Another possibility:

```
int a, b;  
printf("Enter two integers: ");  
scanf("%d %d", &a, &b);
```

Exercise 2 review

The user might not enter a valid integer. You can detect this by checking the return value of `scanf`, which returns a count of how many values were read successfully.

```
int a;
printf("Enter an integer: ");
if (scanf("%d", &a) != 1) {
    printf("invalid input\n");
}
```

This technique will be useful for HW1.

Exercise 2 review

Computations on input values a and b:

```
int sum, diff, prod, quot, rem;  
sum  = a + b;  
diff = a - b;  
prod = a * b;  
quot = a / b;  
rem  = a % b;
```

Exercise 3 review

Printing results of computations:

```
printf("%d + %d = %d", a, b, sum);  
printf("%d - %d = %d", a, b, diff);  
printf("%d * %d = %d", a, b, prod);  
printf("%d / %d = %d", a, b, quot);  
printf("%d %% %d = %d", a, b, rem);
```

Note %% in a printf format string means “print a literal % character.”

Day 3 recap questions

- ❶ Why do we use version control system like **git**?
- ❷ Name six common **git** commands?
- ❸ What are the files that must be included in your submission?
- ❹ How do you save and quit on *emacs* editor?
- ❺ How do you search and replace on *emacs*?

1. Why do we use version control system like **git**?

Version control systems record and archive a history of “snapshots” the files in a project. (Git calls these snapshots “commits”).

Advantages:

- Know exactly how code changed, be able to revert to working code if a bug is introduced or if a file is lost/corrupted
- Serves as a backup when you push commits to a remote repository (i.e., on Github)
- Team members can share changes with each other. (This is essential for team projects.)
- Synchronize files between multiple computers

2. Name six common **git** commands?

- ❶ `git init`: initialize the current directory as a new Git repository
- ❷ `git add`: specify file(s) that should be part of the next commit
- ❸ `git commit`: create a new commit with all of the modifications staged using `git add`, with a meaningful log message
- ❹ `git status`: show which files have been modified are haven't yet been added to the repository
- ❺ `git diff`: show file modifications (relative to the previous commit)
- ❻ `git push`: send commit(s) to the remote "origin" repository
- ❼ `git pull`: receive commit(s) from the origin repository

How Git works

3. What are the files that must be included in your submission?

- All source files (e.g., .c, .h files)
- gitlog.txt: summarizes your Git commits
- Possibly: README
- Possibly: a Makefile (once we've covered make)

Create a zip file with all of these files, copy it to your local computer, then upload the zip file to Gradescope. E.g.:

```
cd ~/my220repo/homework/hw0  
zip -9r my_hw0.zip *.c gitlog.txt
```

On your local machine

```
scp USERNAME@ugradx.cs.jhu.edu:my220repo/homework/hw0/my_hw0.zip .
```

4. How do you save and quit on *emacs* editor?

Save: Control-X followed by Control-S

Quit: Control-X followed by Control-C

Pro tip: use multiple terminal windows! Keep your editor (e.g., Emacs) open in one terminal, then use another terminal to run compiler commands, run the program, etc.

5. How do you search and replace on *emacs*?

Meta-% (a.k.a. ESC followed by %)

Work on Exercises 3-A and 3-B

Exercise 3-A: clone your personal Github repo, practice creating a zipfile and transferring it to your local computer (assignment submission workflow)

Exercise 3-B: Clone the course public Git repo and copy starter code from it (workflow for starting an exercise or homework assignment)

Breakout rooms 1–10 are “social”, breakout rooms 11+ are for individual or small group work.

Day 4 recap questions

- ❶ Which one is the logical “and” operator in C, `&&` or `&` or both?
- ❷ Which one is the logical “negation” operator in C, `~` or `!` or both?
- ❸ What is the result of evaluating `(34 + 2) / 40 || 80 > 'A' && 15 % 4` ?
- ❹ What does the keyword **break** do in a control structure?
- ❺ What does the keyword **continue** do in loops?
- ❻ How many times is the *initialize* statement in a *for loop* executed?

1. Which one is the logical “and” operator in C, `&&` or `&` or both?

`&&` is the logical “and” operator.

`&` is the *bitwise* “and” operator.

If you’re expressing a condition (for an if, if/else, or loop) then you want `&&`.

2. Which one is the logical “negation” operator in C, `~` or `!` or both?

`!` is the logical negation operator.

`~` is bitwise complement, a.k.a. bitwise negation.

3. What is the result of evaluating `(34 + 2) / 40 || 80 > 'A' && 15 % 4` ?

Key ideas:

- 0 is false, and all other integer values are true
- all logical operators are guaranteed to produce either 0 or 1 as a result

4. What does the keyword **break** do in a control structure?

`break` jumps to the code that follows the control structure.

So, it can be used to terminate a loop early.

Important: `break` (and `continue`) can make loops harder to understand. They should be used very sparingly, and only when they truly simplify the code.

break and switch statements

break is also used to end a case (or group of cases) in a switch statement. This is a *necessary* use of break (as opposed to break in the body of a loop, which is never strictly necessary.)

5. What does the keyword **continue** do in loops?

`continue` jumps to the top of the loop.

Again, this can make the loop harder to understand, so use sparingly.

6. How many times is the *initialize* statement in a *for loop* executed?

Once, before the loop starts.

Assume *i* is an `int` variable. These loops are equivalent:

```
// while loop
```

```
i = 1;
while (i <= 10) {
    printf("%d\n", i);
    i++;
}
```

```
// for loop
```

```
for (i = 1; i <= 10; i++) {
    printf("%d\n", i);
}
```

Exercise 4

GPA calculator program: practice

- starting an exercise using code in the public repository
- input using `scanf`
- output using `printf`
- loops
- `switch` statements

Breakout rooms 1–10 are “social”, breakout rooms 11+ are for individual or small group work.

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