CMSC 216
Introduction to Computer Systems
GDB/Miscellaneous
Project #3a

• Let’s discuss hashing
  – Close addressing with linked list chaining to handle collisions

• What you need to implement for this project
GDB/Emacs

• You can access dgb in a non-graphical way (see below reference)

• You can also access it via the provided GUI (see next slides)
GDB/Emacs (via GUI)

- Remember you need to run Xming
- You need to compile your program with \-g option
  - gcc \-g prog.c
- Start emacs with file to debug
  - emacs prog.c
- Select Tools \(\rightarrow\) Debugger (GDB)
  - You will notice at the bottom
    - Run gdb (like this): gdb \-annotate=3 a.out
- Press enter
- Now you are in the debugger
- Select Gud \(\rightarrow\) GDB-UI \(\rightarrow\) Display Other Windows
  - Now you will see panes for gdb commands (top left), code (middle), stack (bottom left) and breakpoints (bottom right)
- Options at the top allows you to run the program (GO), step (e.g., \{ \}) and move between stacks
  - You can also perform these operations and more using the (gdb) command line (see next slide)
Some GDB Commands

- **Setting break points**
  - `(gdb) b main`
    - Sets breakpoint in function main
  - `(gdb) b 18`
    - Sets breakpoint in line 18
    - Notice you can also set/clear a breakpoint by clicking the gray area to the left of a statement

- **Running program**
  - `(gdb) r`
    - You need to have a breakpoint to examine data

- **Continue running program after breakpoint** (will stop in next breakpoint or finishes program execution)
  - `(gdb) c`

- **Execute next statement** (for a function call it will execute function without stepping in)
  - `(gdb) n`
Some GDB Commands

- **Stepping into a function**
  - (gdb) sbt

- **Displaying stack trace**
  - (gdb) bt
  - You can also see the stack trace in the bottom left pane

- **Changing stack frame**
  - Click on the appropriate entry in the bottom left pane

- **Printing values**
  - (gdb) p y /* y is a variable */
  - (gdb) p/x y /* printing y as hexadecimal */
  - Notice you can see value on top right pane

- **Finish function**
  - (gdb) fin /* continue until current function has returned */
Miscellaneous

• Reviewing pointers
• Reviewing dynamic memory allocation
• String literals and modifications
• Quick overview of two-dimensional arrays
• What is core dump?
• atoi function
• Why you should not use gets