

Assignment 4

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Roll no 422136

Assignment 4

Debug different c programs using GDB utility in linux

Debugging:identifying logical errors Default debugger- GNU debug :GDB

\$gcc -g -o test test.c -test

\$gdb./test-it does debug

\$gdb l-list the code

\$(gdb) -b5createabreakpointatline5

\$(gdb) p a -prints variable a value

\$(gdb) p b - prints variable b value

\$(gdb) n-moves to the next Lone of the code

\$(gdb) r(or)run-runstheabovecode

\$(gdb) disableb-disables breakpoint

\$(gdb) enable b -enables breakpoint

\$info b -list out breakpoint

\$(gdb) clear-remove all break point

```
Activities Terminal Mar 14 10:21 student@ai-HP-ProDesk-600-G4-MT: ~/422136unix

student@ai-HP-ProDesk-600-G4-MT:~/422136unix$ gcc -g -o test test.c
student@ai-HP-ProDesk-600-G4-MT:~/422136unix$ gdb ./test
GNU gdb (Ubuntu 9.2-0ubuntu1~20.04.1) 9.2
Copyright (C) 2020 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
Type "show copying" and "show warranty" for details.
This GDB was configured as "x86_64-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<http://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
<http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from ./test...
(gdb) b 4
Breakpoint 1 at 0x1155: file test.c, line 4.
(gdb) p a
No symbol "a" in current context.
(gdb) n
The program is not being run.
(gdb) run
Starting program: /home/student/422136unix/test

Breakpoint 1, main () at test.c:4
4   int a = x;
(gdb) n
5   int b = x;
(gdb) n
6   int c = a+b;
(gdb) r
The program being debugged has been started already.
Start it from the beginning? (y or n) n
Program not restarted.
(gdb) b b
Function "b" not defined.
Make breakpoint pending on future shared library load? (y or [n]) y
Breakpoint 2 (b) pending.
(gdb) disable b
(gdb) enable b
(gdb) info
"info" must be followed by the name of an info command.
List of info subcommands:
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List of info subcommands:
info address -- Describe where symbol SYM is stored.
info all-registers -- List of all registers and their contents, for selected stack frame.
info args -- All argument variables of current stack frame or those matching REGEXPs.
info auto-load -- Print current status of auto-loaded files.
info auxv -- Display the inferior's auxiliary vector.
info bookmarks -- Status of user-settable bookmarks.
info breakpoints -- Status of specified breakpoints (all user-settable breakpoints if no argument).
info checkpoints -- IDs of currently known checkpoints.
info classes -- All Objective-C classes, or those matching REGEXP.
info common -- Print out the values contained in a Fortran COMMON block.
info copying -- Conditions for redistributing copies of GDB.
info dcache -- Print information on the dcache performance.
info display -- Expressions to display when program stops, with code numbers.
info exceptions -- List all Ada exception names.
info extensions -- All filename extensions associated with a source language.
info files -- Names of targets and files being debugged.
info float -- Print the status of the floating point unit.
info frame -- All about the selected stack frame.
info frame-filter -- List all registered Python frame-filters.
info functions -- All function names or those matching REGEXPs.
info guile -- Prefix command for Guile info displays.
info handle -- What debugger does when program gets various signals.
info inferiors -- Print a list of inferiors being managed.
info line -- Core addresses of the code for a source line.
info locals -- All local variables of current stack frame or those matching REGEXPs.
info macro -- Show the definition of MACRO, and it's source location.
info macros -- Show the definitions of all macros at LINESPEC, or the current source location.
info mem -- Memory region attributes.
info module -- Print information about modules.
info modules -- All module names, or those matching REGEXP.
info os -- Show OS data ARG.
info pretty-printer -- GDB command to list all registered pretty-printers.
info probes -- Show available static probes.
info proc -- Show additional information about a process.
info program -- Execution status of the program.
info record -- Info record options.
info registers -- List of integer registers and their contents, for selected stack frame.
info scope -- List the variables local to a scope.
info selectors -- All Objective-C selectors, or those matching REGEXP.
info set -- Show all GDB settings.
info sharedlibrary -- Status of loaded shared object libraries.
--Type <RET> for more, q to quit, c to continue without paging--
info signals -- What debugger does when program gets various signals.
info skip -- Display the status of skips.
```

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info module -- Print information about modules.
info modules -- All module names, or those matching REGEXP.
info os -- Show OS data ARG.
info pretty-printer -- GDB command to list all registered pretty-printers.
info probes -- Show available static probes.
info proc -- Show additional information about a process.
info program -- Execution status of the program.
info record -- Info record options.
info registers -- List of integer registers and their contents, for selected stack frame.
info scope -- List the variables local to a scope.
info selectors -- All Objective-C selectors, or those matching REGEXP.
info set -- Show all GDB settings.
info sharedlibrary -- Status of loaded shared object libraries.
--Type <RET> for more, q to quit, c to continue without paging--
info signals -- What debugger does when program gets various signals.
info skip -- Display the status of skips.
info source -- Information about the current source file.
info sources -- All source files in the program or those matching REGEXP.
info stack -- Backtrace of the stack, or innermost COUNT frames.
info static-tracepoint-markers -- List target static tracepoints markers.
info symbol -- Describe what symbol is at location ADDR.
info target -- Names of targets and files being debugged.
info tasks -- Provide information about all known Ada tasks.
info terminal -- Print inferior's saved terminal status.
info threads -- Display currently known threads.
info tracepoints -- Status of specified tracepoints (all tracepoints if no argument).
info tvariables -- Status of trace state variables and their values.
info type-printers -- GDB command to list all registered type-printers.
info types -- All type names, or those matching REGEXP.
info unwinder -- GDB command to list unwinders.
info variables -- All global and static variable names or those matching REGEXPs.
info vector -- Print the status of the vector unit.
info vtbl -- Show the virtual function table for a C++ object.
info warranty -- Various kinds of warranty you do not have.
info watchpoints -- Status of specified watchpoints (all watchpoints if no argument).
info win -- List of all displayed windows.
info xmethod -- GDB command to list registered xmethod matchers.

Type "help info" followed by info subcommand name for full documentation.
Type "apropos word" to search for commands related to "word".
Type "apropos -v word" for full documentation of commands related to "word".
Command name abbreviations are allowed if unambiguous.
(gdb) clear
No breakpoint at this line.
(gdb)
```

```
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Quit anyway? (y or n) y
student@ai-HP-ProDesk-600-G4-MT:~/422136unix$ gdb test it core
Excess command line arguments ignored. (core)
GNU gdb (Ubuntu 9.2-0ubuntu1~20.04.1) 9.2
Copyright (C) 2020 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
Type "show copying" and "show warranty" for details.
This GDB was configured as "x86_64-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<http://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
<http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from test...
/home/student/422136unix/it: No such file or directory.
(gdb) l
1      #include <stdio.h>
2      int main () {
3          int x;
4          int a = x;
5          int b = x;
6          int c = a+b;
7          printf("%d\n",c);
8          return 0;
9      }
(gdb) r
Starting program: /home/student/422136unix/test
-16480
[Inferior 1 (process 5926) exited normally]
(gdb) b 4
Breakpoint 1 at 0x55555555155: file test.c, line 4.
(gdb)
Note: breakpoint 1 also set at pc 0x55555555155.
Breakpoint 2 at 0x55555555155: file test.c, line 4.
(gdb) p a
No symbol "a" in current context.
(gdb) n
The program is not being run.
(gdb) run
Starting program: /home/student/422136unix/test
```

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<http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from test...
/home/student/422136unix/it: No such file or directory.
(gdb) l
1      #include <stdio.h>
2      int main () {
3          int x;
4          int a = x;
5          int b = x;
6          int c = a+b;
7          printf("%d\n",c);
8          return 0;
9      }
(gdb) r
Starting program: /home/student/422136unix/test
-16480
[Inferior 1 (process 5926) exited normally]
(gdb) b 4
Breakpoint 1 at 0x55555555155: file test.c, line 4.
(gdb)
Note: breakpoint 1 also set at pc 0x55555555155.
Breakpoint 2 at 0x55555555155: file test.c, line 4.
(gdb) p a
No symbol "a" in current context.
(gdb) n
The program is not being run.
(gdb) run
Starting program: /home/student/422136unix/test

Breakpoint 1, main () at test.c:4
4      int a = x;
(gdb) l
1      #include <stdio.h>
2      int main () {
3          int x;
4          int a = x;
5          int b = x;
6          int c = a+b;
7          printf("%d\n",c);
8          return 0;
9      }
(gdb) 
```

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Activities Terminal Mar 14 10:23 student@ai-HP-ProDesk-600-G4-MT: ~/422136unix

7      printf("%d\n",c);
8      return 0;
9      }
(gdb) r
Starting program: /home/student/422136unix/test
-16480
[Inferior 1 (process 5926) exited normally]
(gdb) b 4
Breakpoint 1 at 0x55555555155: file test.c, line 4.
(gdb)
Note: breakpoint 1 also set at pc 0x55555555155.
Breakpoint 2 at 0x55555555155: file test.c, line 4.
(gdb) p a
No symbol "a" in current context.
(gdb) n
The program is not being run.
(gdb) run
Starting program: /home/student/422136unix/test

Breakpoint 1, main () at test.c:4
4      int a = x;
(gdb) l
1      #include <stdio.h>
2      int main () {
3          int x;
4          int a = x;
5          int b = x;
6          int c = a+b;
7          printf("%d\n",c);
8          return 0;
9      }
(gdb) quit
A debugging session is active.

Inferior 1 [process 5933] will be killed.

Quit anyway? (y or n) y
student@ai-HP-ProDesk-600-G4-MT:~/422136unix$ gcc -std=c99 -g -o test test.c
student@ai-HP-ProDesk-600-G4-MT:~/422136unix$ ls -lart
total 40
-rw-rw-r-- 1 student student 104 Mar 14 10:19 test.c
drwxr-xr-x 57 student student 12288 Mar 14 10:19 ..
drwxrwxr-x 2 student student 4096 Mar 14 10:23 .
-rwxrwxr-x 1 student student 19136 Mar 14 10:23 test
student@ai-HP-ProDesk-600-G4-MT:~/422136unix$ 
```

```
Activities Terminal Mar 14 10:25 student@ai-HP-ProDesk-600-G4-MT: ~/422136unix

drwxrwxr-x 2 student student 4096 Mar 14 10:23 .
-rwxrwxr-x 1 student student 19136 Mar 14 10:23 test
student@ai-HP-ProDesk-600-G4-MT:~/422136unix$ gdb ./test
GNU gdb (Ubuntu 9.2-0ubuntu1~20.04.1) 9.2
Copyright (C) 2020 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
Type "show copying" and "show warranty" for details.
This GDB was configured as "x86_64-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<http://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
<http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from ./test...
(gdb) l
1      #include <stdio.h>
2      int main(){
3          int x;
4          int a = x;
5          int b = x;
6          int c = a+b;
7          printf("%d\n",c);
8          return 0;
9      }
(gdb) b 4
Breakpoint 1 at 0x1155: file test.c, line 4.
(gdb) b 2
Breakpoint 2 at 0x1149: file test.c, line 2.
(gdb) info b
Num      Type             Disp Enb Address            What
1        breakpoint       keep y  0x0000000000001155 in main at test.c:4
2        breakpoint       keep y  0x0000000000001149 in main at test.c:2
(gdb) disable b 2
(gdb) info b
Num      Type             Disp Enb Address            What
1        breakpoint       keep y  0x0000000000001155 in main at test.c:4
2        breakpoint       keep n  0x0000000000001149 in main at test.c:2
(gdb) r
Starting program: /home/student/422136unix/test
Breakpoint 1, main () at test.c:4
```

```
Activities Terminal Mar 14 10:25 student@ai-HP-ProDesk-600-G4-MT: ~/422136unix

Breakpoint 1 at 0x1155: file test.c, line 4.
(gdb) b 2
Breakpoint 2 at 0x1149: file test.c, line 2.
(gdb) info b
Num      Type             Disp Enb Address            What
1        breakpoint       keep y  0x0000000000001155 in main at test.c:4
2        breakpoint       keep y  0x0000000000001149 in main at test.c:2
(gdb) disable b 2
(gdb) info b
Num      Type             Disp Enb Address            What
1        breakpoint       keep y  0x0000000000001155 in main at test.c:4
2        breakpoint       keep n  0x0000000000001149 in main at test.c:2
(gdb) r
Starting program: /home/student/422136unix/test
Breakpoint 1, main () at test.c:4
4      int a = x;
(gdb) n
5      int b = x;
(gdb) p x
$1 = -8240
(gdb) p a
$2 = -8240
(gdb) n
6      int c = a+b;
(gdb) p b
$3 = -8240
(gdb) n
7      printf("%d\n",c);
(gdb) p c
$4 = -16480
(gdb) n
8      return 0;
(gdb) p c
$5 = -16480
(gdb) n
9      }
(gdb) n
__libc_start_main (main=0x5555555555149 <main>, argc=1, argv=0x7fffffffd8, init=<optimized out>, fini=<optimized out>, rtdl_fini=<optimized out>,
stack_end=0x7fffffffd8) at ../csu/libc-start.c:342
342  ../csu/libc-start.c: No such file or directory.
(gdb)
[Inferior 1 (process 6022) exited normally]
(gdb)
```

```
Activities Terminal
student@ai-HP-ProDesk-600-G4-MT: ~/422136unix
student@ai-HP-ProDesk-600-G4-MT:~/422136unix$ gcc -g -o test test.c
student@ai-HP-ProDesk-600-G4-MT:~/422136unix$ gdb ./test
GNU gdb (Ubuntu 9.2-0ubuntu1~20.04.1) 9.2
Copyright (C) 2020 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <http://gnu.org/licenses/gpl.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.
Type "show copying" and "show warranty" for details.
This GDB was configured as "x86_64-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<http://www.gnu.org/software/gdb/bugs/>.
Find the GDB manual and other documentation resources online at:
<http://www.gnu.org/software/gdb/documentation/>.

For help, type "help".
Type "apropos word" to search for commands related to "word"...
Reading symbols from ./test...
(gdb) l
1      #include <stdio.h>
2      int main () {
3          int x;
4          int a = x;
5          int b = x;
6          int c = a+b;
7          printf("%d\n",c);
8          return 0;
9      }
(gdb) b 6
Breakpoint 1 at 0x1161: file test.c, line 6.
(gdb) b 8
Breakpoint 2 at 0x1182: file test.c, line 8.
(gdb) run
Starting program: /home/student/422136unix/test

Breakpoint 1, main () at test.c:6
6          int c = a+b;
(gdb) p x
$1 = -8240
(gdb) p y
No symbol "y" in current context.
(gdb) p result
$2 = '\000' <repeats 113 times>
(gdb) n
7          printf("%d\n",c);
(gdb) p result
```

```
Activities Terminal
student@ai-HP-ProDesk-600-G4-MT: ~/422136unix
2      int main () {
3          int x;
4          int a = x;
5          int b = x;
6          int c = a+b;
7          printf("%d\n",c);
8          return 0;
9      }
(gdb) b 6
Breakpoint 1 at 0x1161: file test.c, line 6.
(gdb) b 8
Breakpoint 2 at 0x1182: file test.c, line 8.
(gdb) run
Starting program: /home/student/422136unix/test

Breakpoint 1, main () at test.c:6
6          int c = a+b;
(gdb) p x
$1 = -8240
(gdb) p y
No symbol "y" in current context.
(gdb) p result
$2 = '\000' <repeats 113 times>
(gdb) n
7          printf("%d\n",c);
(gdb) p result
$3 = '\000' <repeats 113 times>
(gdb) disable b 8
No breakpoint number 8.
(gdb) enable b 8
No breakpoint number 8.
(gdb) info b
Num      Type           Disp Enb Address            What
1        breakpoint     keep y   0x000055555555161 in main at test.c:6
         breakpoint already hit 1 time
2        breakpoint     keep y   0x000055555555182 in main at test.c:8
(gdb) clear
No breakpoint at this line.
(gdb) q
A debugging session is active.

        Inferior 1 [process 6104] will be killed.

Quit anyway? (y or n) y
student@ai-HP-ProDesk-600-G4-MT:~/422136unix$
```