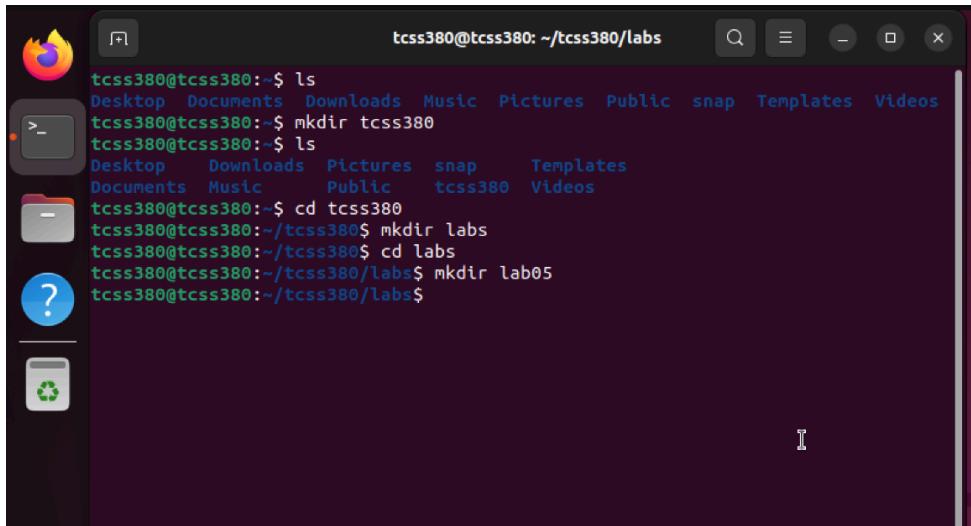
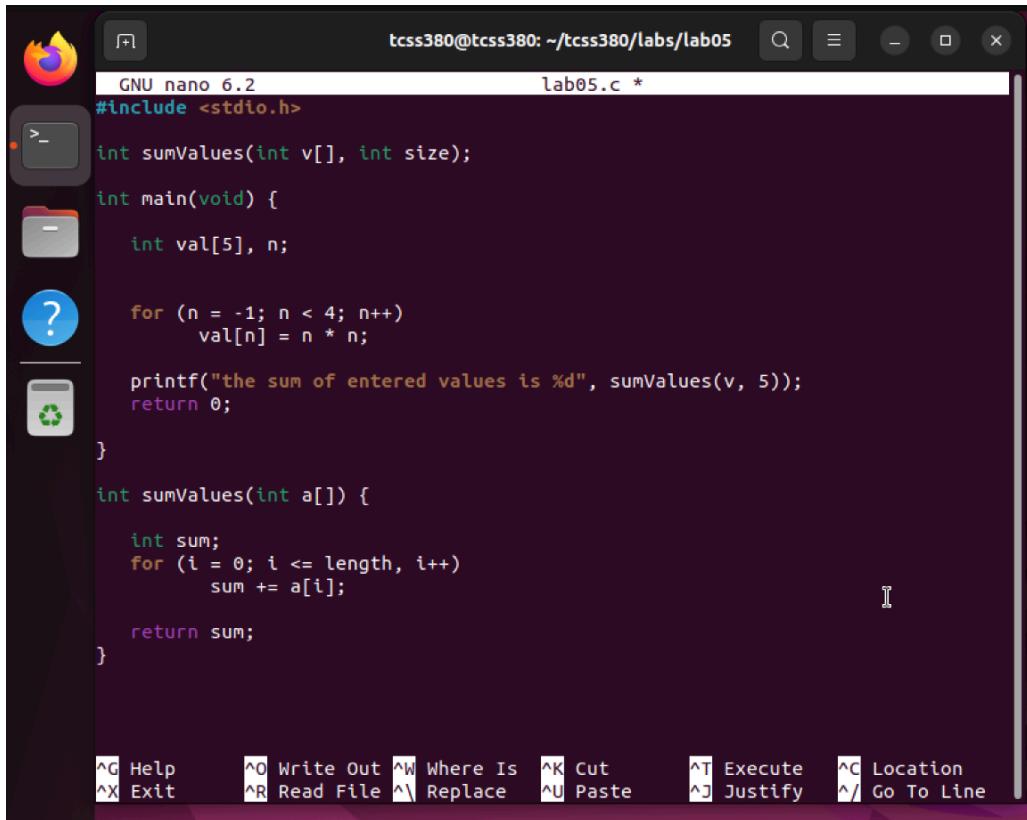


TCSS 380  
lab05 - SCs  
Corey Young & Caleb Krauter



```
tcss380@tcss380:~$ ls
Desktop Documents Downloads Music Pictures Public snap Templates Videos
tcss380@tcss380:~$ mkdir tcss380
tcss380@tcss380:~$ ls
Desktop Downloads Pictures snap Templates
Documents Music Public tcss380 Videos
tcss380@tcss380:~$ cd tcss380
tcss380@tcss380:~/tcss380$ mkdir labs
tcss380@tcss380:~/tcss380$ cd labs
tcss380@tcss380:~/tcss380/labs$ mkdir lab05
tcss380@tcss380:~/tcss380/labs$
```

- Using terminal commands to make folders -



```
GNU nano 6.2          lab05.c *
#include <stdio.h>

int sumValues(int v[], int size);

int main(void) {
    int val[5], n;

    for (n = -1; n < 4; n++)
        val[n] = n * n;

    printf("the sum of entered values is %d", sumValues(v, 5));
    return 0;
}

int sumValues(int a[]) {

    int sum;
    for (i = 0; i <= length, i++)
        sum += a[i];

    return sum;
}
```

- Initial program entered in -

```
tcss380@tcss380:~/tcss380$ mkdir labs
tcss380@tcss380:~/tcss380$ cd labs
tcss380@tcss380:~/tcss380/labs$ mkdir lab05
tcss380@tcss380:~/tcss380/labs$ cd lab05
tcss380@tcss380:~/tcss380/labs/lab05$ nano lab05.c
tcss380@tcss380:~/tcss380/labs/lab05$ gcc lab05.c
lab05.c: In function 'main':
lab05.c:13:56: error: 'v' undeclared (first use in this function)
  13 |     printf("the sum of entered values is %d", sumValues(v, 5));
                 ^
lab05.c:13:56: note: each undeclared identifier is reported only once for each function it appears in
lab05.c: At top level:
lab05.c:18:5: error: conflicting types for 'sumValues'; have 'int(int *)'
  18 | int sumValues(int a[]) {
                 ^
lab05.c:3:5: note: previous declaration of 'sumValues' with type 'int(int *, int)'
  3 | int sumValues(int v[], int size);
                 ^
lab05.c: In function 'sumValues':
lab05.c:21:9: error: 'i' undeclared (first use in this function)
  21 |     for (i = 0; i <= length, i++)
                 ^
lab05.c:21:21: error: 'length' undeclared (first use in this function)
  21 |         for (i = 0; i <= length, i++)
                 ^
lab05.c:21:32: error: expected ';' before ')' token
  21 |             for (i = 0; i <= length, i++)
                 ^
                 ;
tcss380@tcss380:~/tcss380/labs/lab05$
```

```
          ^
lab05.c:21:9: note: each undeclared identifier is reported only once for each function it appears in
lab05.c:21:21: error: 'length' undeclared (first use in this function)
  21 |     for (i = 0; i <= length, i++)
                 ^
lab05.c:21:32: error: expected ';' before ')' token
  21 |         for (i = 0; i <= length, i++)
                 ^
                 ;
tcss380@tcss380:~/tcss380/labs/lab05$ nano lab05.c
tcss380@tcss380:~/tcss380/labs/lab05$ gcc lab05.c
lab05.c: In function 'sumValues':
lab05.c:21:9: error: 'i' undeclared (first use in this function)
  21 |     for (i = 0; i <= length, i++)
                 ^
lab05.c:21:9: note: each undeclared identifier is reported only once for each function it appears in
lab05.c:21:32: error: expected ';' before ')' token
  21 |         for (i = 0; i <= length, i++)
                 ^
                 ;
tcss380@tcss380:~/tcss380/labs/lab05$ nano lab05.c
tcss380@tcss380:~/tcss380/labs/lab05$ gcc lab05.c
lab05.c: In function 'sumValues':
lab05.c:21:32: error: expected ';' before ')' token
  21 |         for (i = 0; i <= length, i++)
                 ^
                 ;
tcss380@tcss380:~/tcss380/labs/lab05$ nano lab05.c
tcss380@tcss380:~/tcss380/labs/lab05$ gcc lab05.c
tcss380@tcss380:~/tcss380/labs/lab05$
```

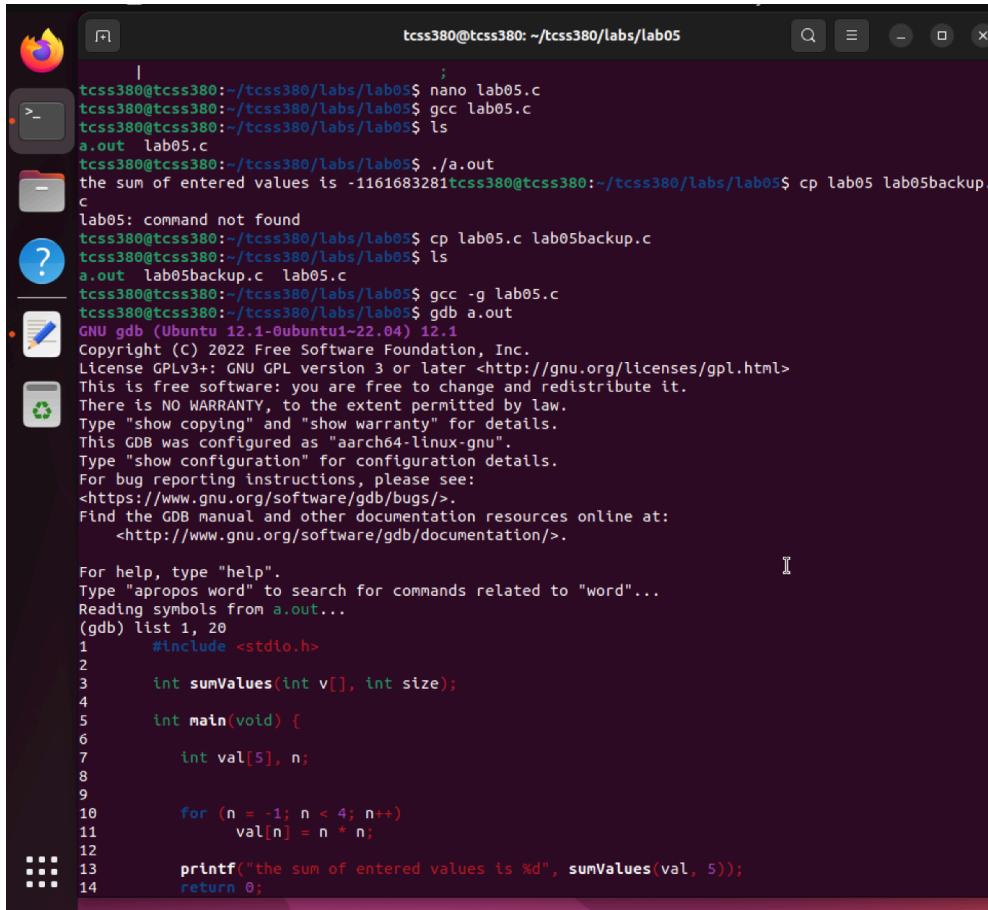
```
tcss380@tcss380: ~/tcss380/labs/lab05
21 |     for (i = 0; i <= length, i++)
          ^~~~~~
lab05.c:21:32: error: expected ';' before ')' token
21 |     for (i = 0; i <= length, i++)
          ^
          ;
lab05.c:22:18: error: 'a' undeclared (first use in this function)
22 |             sum += a[i];
          ^
          ;
tcss380@tcss380:~/tcss380/labs/lab05$ nano lab05.c
tcss380@tcss380:~/tcss380/labs/lab05$ nano lab05.c
tcss380@tcss380:~/tcss380/labs/lab05$ gcc lab05.c
lab05.c:18:5: error: conflicting types for 'sumValues'; have 'int(int *)'
18 | int sumValues(int a[]) {
          ^
          ;
lab05.c:3:5: note: previous declaration of 'sumValues' with type 'int(int *, int)'
3 | int sumValues(int v[], int size);
          ^
          ;
lab05.c: In function 'sumValues':
lab05.c:21:9: error: 'i' undeclared (first use in this function)
21 |     for (i = 0; i <= length, i++)
          ^
          ;
lab05.c:21:9: note: each undeclared identifier is reported only once for each function it appears in
lab05.c:21:21: error: 'length' undeclared (first use in this function)
21 |     for (i = 0; i <= length, i++)
          ^
          ;
lab05.c:21:32: error: expected ';' before ')' token
21 |     for (i = 0; i <= length, i++)
          ^
          ;

```

```
tcss380@tcss380: ~/tcss380/labs/lab05
lab05.c:21:21: error: 'length' undeclared (first use in this function)
21 |     for (i = 0; i <= length, i++)
          ^
          ;
lab05.c:21:32: error: expected ';' before ')' token
21 |     for (i = 0; i <= length, i++)
          ^
          ;
tcss380@tcss380:~/tcss380/labs/lab05$ nano lab05.c
tcss380@tcss380:~/tcss380/labs/lab05$ gcc lab05.c
lab05.c: In function 'sumValues':
lab05.c:21:9: error: 'i' undeclared (first use in this function)
21 |     for (i = 0; i <= length, i++)
          ^
          ;
lab05.c:21:9: note: each undeclared identifier is reported only once for each function it appears in
lab05.c:21:32: error: expected ';' before ')' token
21 |     for (i = 0; i <= length, i++)
          ^
          ;
tcss380@tcss380:~/tcss380/labs/lab05$ nano lab05.c
tcss380@tcss380:~/tcss380/labs/lab05$ gcc lab05.c
lab05.c: In function 'sumValues':
lab05.c:21:32: error: expected ';' before ')' token
21 |     for (i = 0; i <= length, i++)
          ^
          ;
tcss380@tcss380:~/tcss380/labs/lab05$ nano lab05.c
tcss380@tcss380:~/tcss380/labs/lab05$ gcc lab05.c
tcss380@tcss380:~/tcss380/labs/lab05$ ls
a.out lab05.c
tcss380@tcss380:~/tcss380/labs/lab05$ ./a.out
the sum of entered values is -1161683281
tcss380@tcss380:~/tcss380/labs/lab05$
```

- Compiles without errors here -

- GDB debugging below ↓ -



The screenshot shows a terminal window titled "tcss380@tcss380: ~/tcss380/labs/lab05". The terminal displays a sequence of commands and their outputs:

```
|          ;  
tcss380@tcss380:~/tcss380/labs/lab05$ nano lab05.c  
tcss380@tcss380:~/tcss380/labs/lab05$ gcc lab05.c  
tcss380@tcss380:~/tcss380/labs/lab05$ ls  
a.out  lab05.c  
tcss380@tcss380:~/tcss380/labs/lab05$ ./a.out  
the sum of entered values is -1161683281  
tcss380@tcss380:~/tcss380/labs/lab05$ cp lab05 lab05backup.c  
lab05: command not found  
tcss380@tcss380:~/tcss380/labs/lab05$ cp lab05.c lab05backup.c  
tcss380@tcss380:~/tcss380/labs/lab05$ ls  
a.out  lab05backup.c  lab05.c  
tcss380@tcss380:~/tcss380/labs/lab05$ gcc -g lab05.c  
tcss380@tcss380:~/tcss380/labs/lab05$ gdb a.out  
GNU gdb (Ubuntu 12.1-0ubuntu1~22.04) 12.1  
Copyright (C) 2022 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 "aarch64-linux-gnu".  
Type "show configuration" for configuration details.  
For bug reporting instructions, please see:  
<https://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 a.out...  
(gdb) list 1, 20  
1      #include <stdio.h>  
2  
3      int sumValues(int v[], int size);  
4  
5      int main(void) {  
6  
7          int val[5], n;  
8  
9  
10         for (n = -1; n < 4; n++)  
11             val[n] = n * n;  
12  
13         printf("the sum of entered values is %d", sumValues(val, 5));  
14         return 0;
```

```
tcss380@tcss380: ~/tcss380/labs/lab05
```

```
(gdb) break 11
Breakpoint 1 at 0x87c: file lab05.c, line 11.
(gdb) run
Starting program: /home/tcss380/tcss380/labs/lab05/a.out
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/aarch64-linux-gnu/libthread_db.so.1".
```

Breakpoint 1, main () at lab05.c:11  
11 val[n] = n \* n;  
(gdb) print n  
\$1 = -1  
(gdb) print val[n]  
\$2 = -1  
(gdb) print val  
\$3 = {-4176, 65535, -136154176, 65535, -3800}  
(gdb) cont  
Continuing.

Breakpoint 1, main () at lab05.c:11  
11 val[n] = n \* n;  
(gdb) print n  
\$4 = 2  
(gdb) print val[n]  
\$5 = -136154176  
(gdb) print val  
\$6 = {-4176, 65535, -136154176, 65535, -3800}  
(gdb) cont  
Continuing.

Breakpoint 1, main () at lab05.c:11  
11 val[n] = n \* n;  
(gdb) print n  
\$7 = 3  
(gdb) print val[n]  
\$8 = 65535  
(gdb) print val  
\$9 = {-4176, 65535, 4, 65535, -3800}  
(gdb) cont  
Continuing.  
the sum of entered values is -134274385[Inferior 1 (process 2795) exited normally]  
(gdb) print n  
No symbol "n" in current context.  
(gdb) print val[n]  
No symbol "val" in current context.  
(adb) print val

```
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/aarch64-linux-gnu/libthread_db.so.1".
```

```
Breakpoint 1, main () at lab05.c:11
11 val[n] = n * n;
(gdb) print n
$1 = -1
(gdb) print val[n]
$2 = -1
(gdb) print val
$3 = {-4176, 65535, -136154176, 65535, -3800}
(gdb) cont
Continuing.

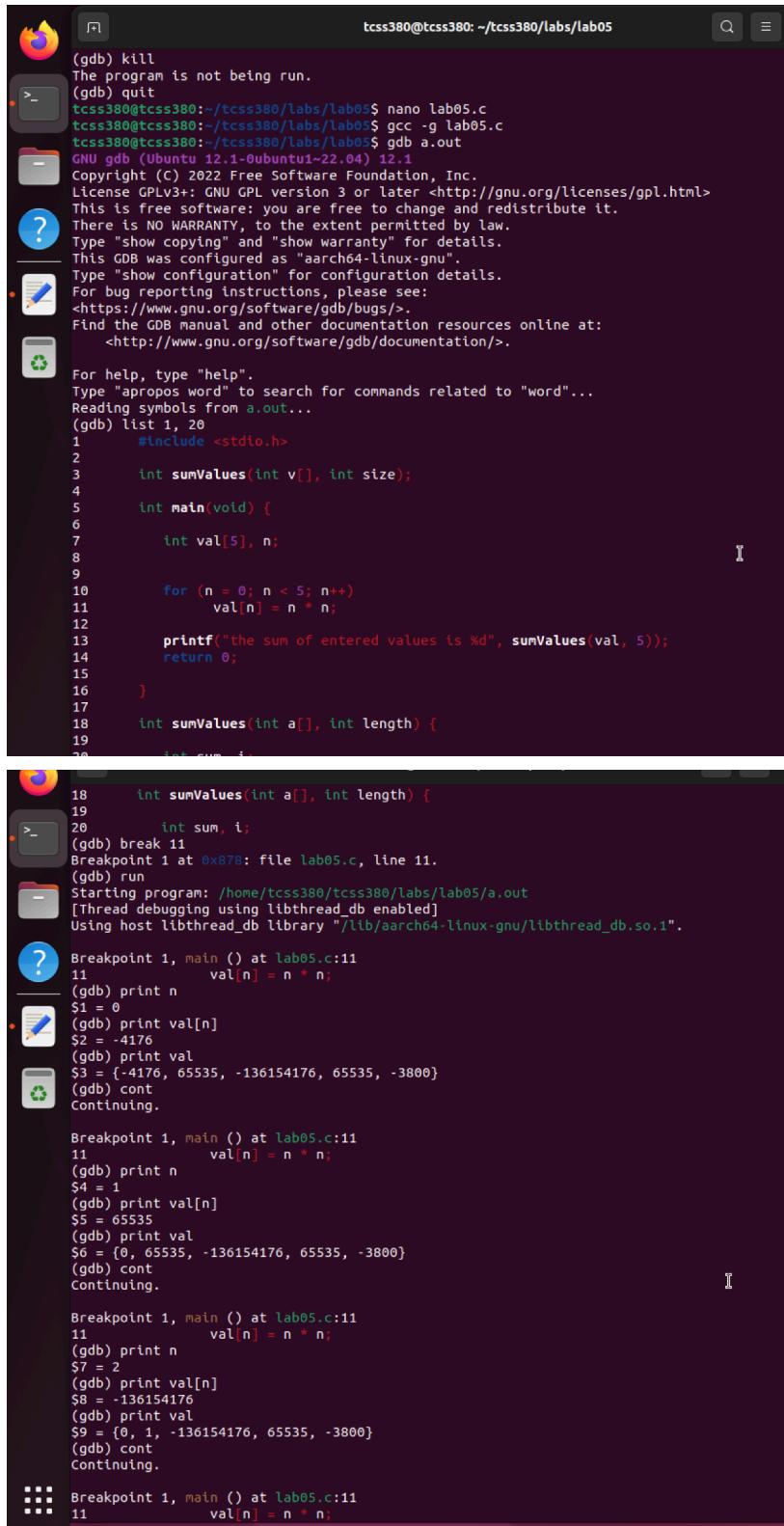
Breakpoint 1, main () at lab05.c:11
11 val[n] = n * n;
(gdb) print n
$4 = 2
(gdb) print val[n]
$5 = -136154176
(gdb) print val
$6 = {-4176, 65535, -136154176, 65535, -3800}
(gdb) cont
Continuing.



Breakpoint 1, main () at lab05.c:11
11 val[n] = n * n;
(gdb) print n
$7 = 3
(gdb) print val[n]
$8 = 65535
(gdb) print val
$9 = {-4176, 65535, 4, 65535, -3800}
(gdb) cont
Continuing.
the sum of entered values is -134274385[Inferior 1 (process 2795) exited normally]
(gdb) print n
No symbol "n" in current context.
(gdb) print val[n]
No symbol "val" in current context.
(gdb) print val
No symbol "val" in current context.
(gdb) cont
The program is not being run.
(gdb)


```

- More debugging with GDB ↓



tcss380@tcss380: ~/tcss380/labs/lab05

```
(gdb) kill
The program is not being run.
(gdb) quit
tcss380@tcss380:~/tcss380/labs/lab05$ nano lab05.c
tcss380@tcss380:~/tcss380/labs/lab05$ gcc -g lab05.c
tcss380@tcss380:~/tcss380/labs/lab05$ gdb a.out
GNU gdb (Ubuntu 12.1-0ubuntu1-22.04) 12.1
Copyright (C) 2022 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 "aarch64-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<https://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 a.out...
(gdb) list 1, 20
1     #include <stdio.h>
2
3     int sumValues(int v[], int size);
4
5     int main(void) {
6
7         int val[5], n;
8
9
10        for (n = 0; n < 5; n++)
11            val[n] = n * n;
12
13        printf("the sum of entered values is %d", sumValues(val, 5));
14        return 0;
15
16    }
17
18    int sumValues(int a[], int length) {
19
20        int sum, i;
```

```
Breakpoint 1, main () at lab05.c:11
(gdb) break 11
Breakpoint 1 at 0x870: file lab05.c, line 11.
(gdb) run
Starting program: /home/tcss380/tcss380/labs/lab05/a.out
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/aarch64-linux-gnu/libthread_db.so.1".

Breakpoint 1, main () at lab05.c:11
11           val[n] = n * n;
(gdb) print n
$1 = 0
(gdb) print val[n]
$2 = -4176
(gdb) print val
$3 = {-4176, 65535, -136154176, 65535, -3800}
(gdb) cont
Continuing.

Breakpoint 1, main () at lab05.c:11
11           val[n] = n * n;
(gdb) print n
$4 = 1
(gdb) print val[n]
$5 = 65535
(gdb) print val
$6 = {0, 65535, -136154176, 65535, -3800}
(gdb) cont
Continuing.

Breakpoint 1, main () at lab05.c:11
11           val[n] = n * n;
(gdb) print n
$7 = 2
(gdb) print val[n]
$8 = -136154176
(gdb) print val
$9 = {0, 1, -136154176, 65535, -3800}
(gdb) cont
Continuing.

Breakpoint 1, main () at lab05.c:11
11           val[n] = n * n;
```

```
(gdb) print val
$9 = {0, 1, -136154176, 65535, -3800}
(gdb) cont
Continuing.

Breakpoint 1, main () at lab05.c:11
11           val[n] = n * n;
(gdb) print n
$10 = 3
(gdb) print val[n]
$11 = 65535
(gdb) print val
$12 = {0, 1, 4, 65535, -3800}
(gdb) cont
Continuing.

Breakpoint 1, main () at lab05.c:11
11           val[n] = n * n;
(gdb) print n
$13 = 4
(gdb) print val[n]
$14 = -3800
(gdb) print val
$15 = {0, 1, 4, 9, -3800}
(gdb) cont
Continuing.
the sum of entered values is -134331927[Inferior 1 (process 2844) exited normally]
(gdb) print val
No symbol "val" in current context.
(gdb) print val[4]

(gdb) print val[4]
No symbol "val" in current context.
(gdb) kill
The program is not being run.
(gdb) quit
tcss380@tcss380:~/tcss380/labs/lab05$ gcc -g lab05.c
tcss380@tcss380:~/tcss380/labs/lab05$ nano lab05.c
tcss380@tcss380:~/tcss380/labs/lab05$ gdb a.out
GNU gdb (Ubuntu 12.1-0ubuntu1~22.04) 12.1
Copyright (C) 2022 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 "aarch64-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<https://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 a.out...
(gdb) break 12
Breakpoint 1 at 0x8a8: file lab05.c, line 13.
(gdb) run
Starting program: /home/tcss380/tcss380/labs/lab05/a.out
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/aarch64-linux-gnu/libthread_db.so.1".

Breakpoint 1, main () at lab05.c:13
13           printf("the sum of entered values is %d", sumValues(val, 5));
(gdb) print val
$1 = {0, 1, 4, 9, 16}
(gdb)
```

tcss380@tcss380: ~/tcss380/labs/lab05

```
GNU nano 6.2          lab05.c
#include <stdio.h>

int sumValues(int v[], int size);

int main(void) {
    int val[5], n;

    for (n = 0; n < 5; n++)
        val[n] = n * n;

    printf("the sum of entered values is %d", sumValues(val, 5));
    return 0;
}

int sumValues(int a[], int length) {
    int sum, i;
    sum = 0;
    for (i = 0; i < length; i++)
        sum += a[i];

    return sum;
}
```

[ Wrote 26 lines ]

File Edit Help ^O Write Out ^W Where Is ^K Cut ^T Execute ^C Location  
^X Exit ^R Read File ^\ Replace ^U Paste ^J Justify ^/ Go To Line

- Final working version of lab05.c
- GDB showing correct output (sum of 0,1,4,9,16 = 30)

tcss380@tcss380: ~/tcss380/labs/lab05

```
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 "aarch64-linux-gnu".
Type "show configuration" for configuration details.
For bug reporting instructions, please see:
<https://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 a.out...
(gdb) break sumValues
Breakpoint 1 at 0x904: file lab05.c, line 21.
(gdb) run
Starting program: /home/tcss380/tcss380/labs/lab05/a.out
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/aarch64-linux-gnu/libthread_db.so.1".

Breakpoint 1, sumValues (a=0xfffffffffef90, length=5) at lab05.c:21
21      sum = 0;
(gdb) cont
Continuing.
the sum of entered values is 30[Inferior 1 (process 2889) exited normally]
(gdb) kill
The program is not being run.
(gdb) run
Starting program: /home/tcss380/tcss380/labs/lab05/a.out
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/aarch64-linux-gnu/libthread_db.so.1".
```

- pointerTests.c being compiled successfully and returning the correct results

The screenshot shows a terminal window titled "lab 5 (C)" running on a Linux system. The terminal output is as follows:

```
tcss380@tcss380: ~/tcss380/labs/lab05$ nano pointerTests.c
tcss380@tcss380: ~/tcss380/labs/lab05$ gcc pointerTests.c
pointerTests.c: In function 'main':
pointerTests.c:17:16: error: incompatible types when assigning to type 'double *' from type 'double'
    17 |         ptr2 = temp;
                  ^~~~
tcss380@tcss380:~/tcss380/labs/lab05$ nano pointerTests.c
tcss380@tcss380:~/tcss380/labs/lab05$ gcc pointerTests.c
tcss380@tcss380:~/tcss380/labs/lab05$ ./a.out
The un-swapped values are:
        num1: 16.0 and num2: 9.0
The swapped values are:
        num1: 16.0 and num2: 16.0
tcss380@tcss380:~/tcss380/labs/lab05$ nano pointerTests.c
tcss380@tcss380:~/tcss380/labs/lab05$ gcc pointerTests.c
tcss380@tcss380:~/tcss380/labs/lab05$ ./a.out
The un-swapped values are:
        num1: 16.0 and num2: 9.0
The swapped values are:
        num1: 9.0 and num2: 16.0
tcss380@tcss380:~/tcss380/labs/lab05$
```

At the bottom of the terminal window, a message reads: "not required to complete the lab in one working session".