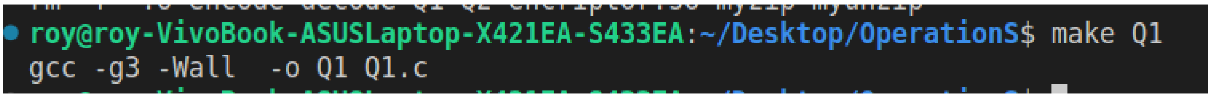
מערכות הפעלה- מטלה 1

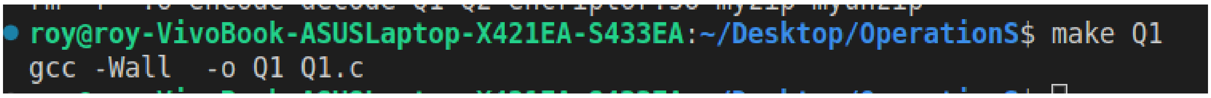
Question 1

1.Using debug:



```
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS$ make Q1
gcc -g3 -Wall  -o Q1 Q1.c
```

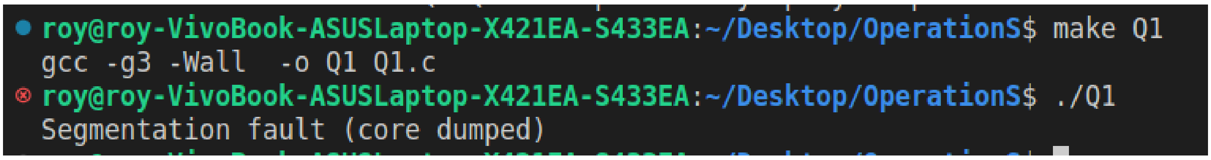
Without debug (Deleted -g3 flags):



```
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS$ make Q1
gcc -Wall  -o Q1 Q1.c
```

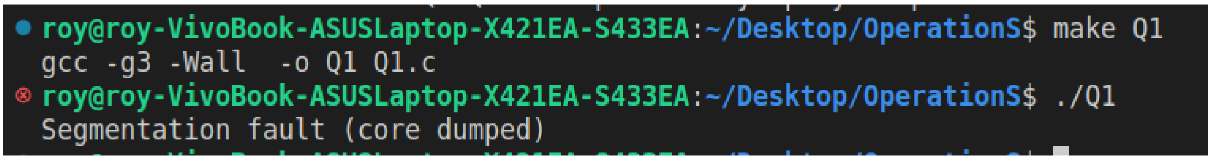
2.Now we will run the program:

Bug B:



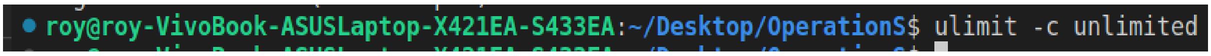
```
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS$ make Q1
gcc -g3 -Wall  -o Q1 Q1.c
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS$ ./Q1
Segmentation fault (core dumped)
```

Bug C:



```
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS$ make Q1
gcc -g3 -Wall  -o Q1 Q1.c
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS$ ./Q1
Segmentation fault (core dumped)
```

3.Now we will present the steps to get the core:

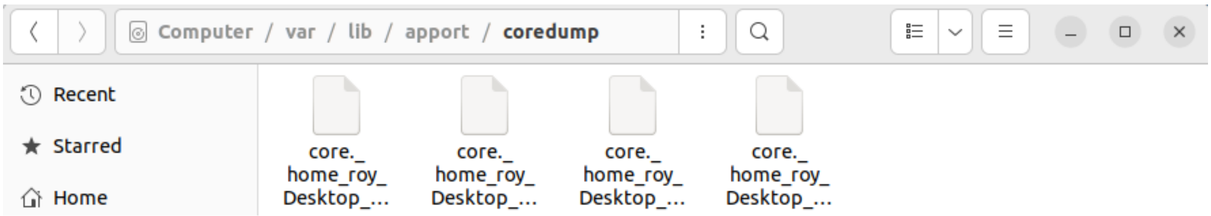


```
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS$ ulimit -c unlimited
```

The command ulimit -c unlimited sets the core file size limit to unlimited for the current shell session.

We located the files in Computer->var->lib->apport->coredump

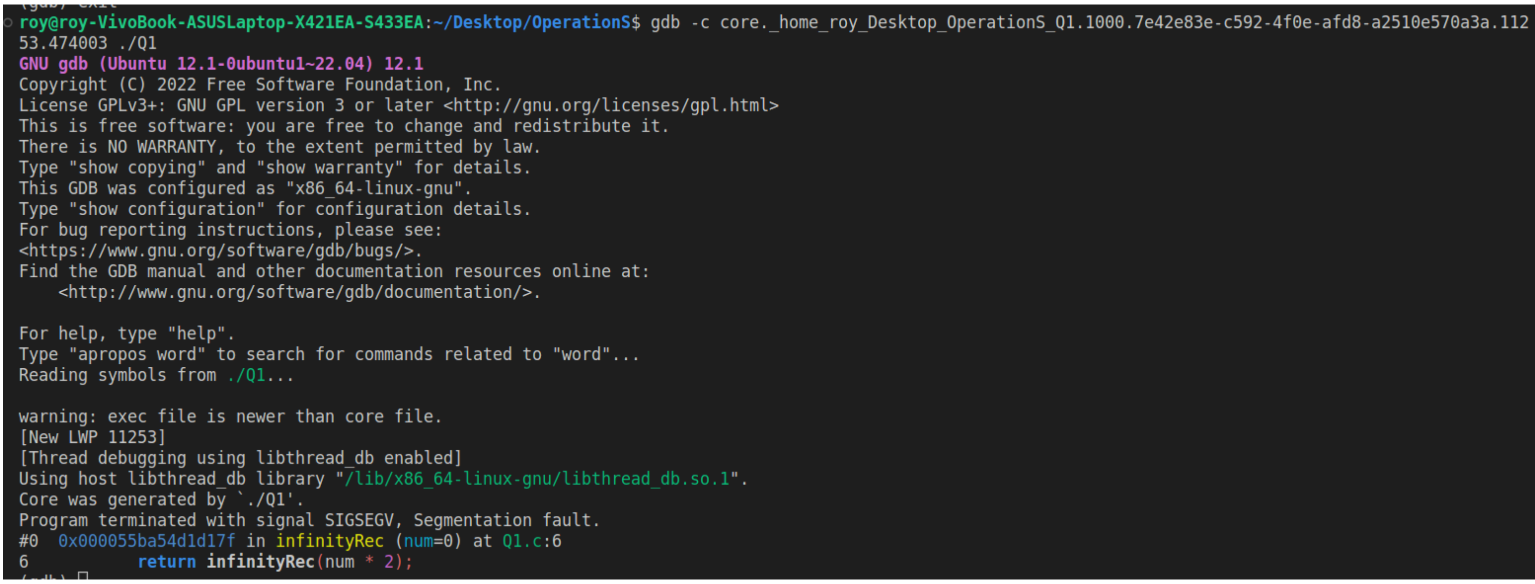
(The names of the file will be change to Debugger/noDebugger)



Computer / var / lib / apport / coredump
Recent
Starred
Home
core._home_roy_Desktop_...
core._home_roy_Desktop_...
core._home_roy_Desktop_...
core._home_roy_Desktop_...

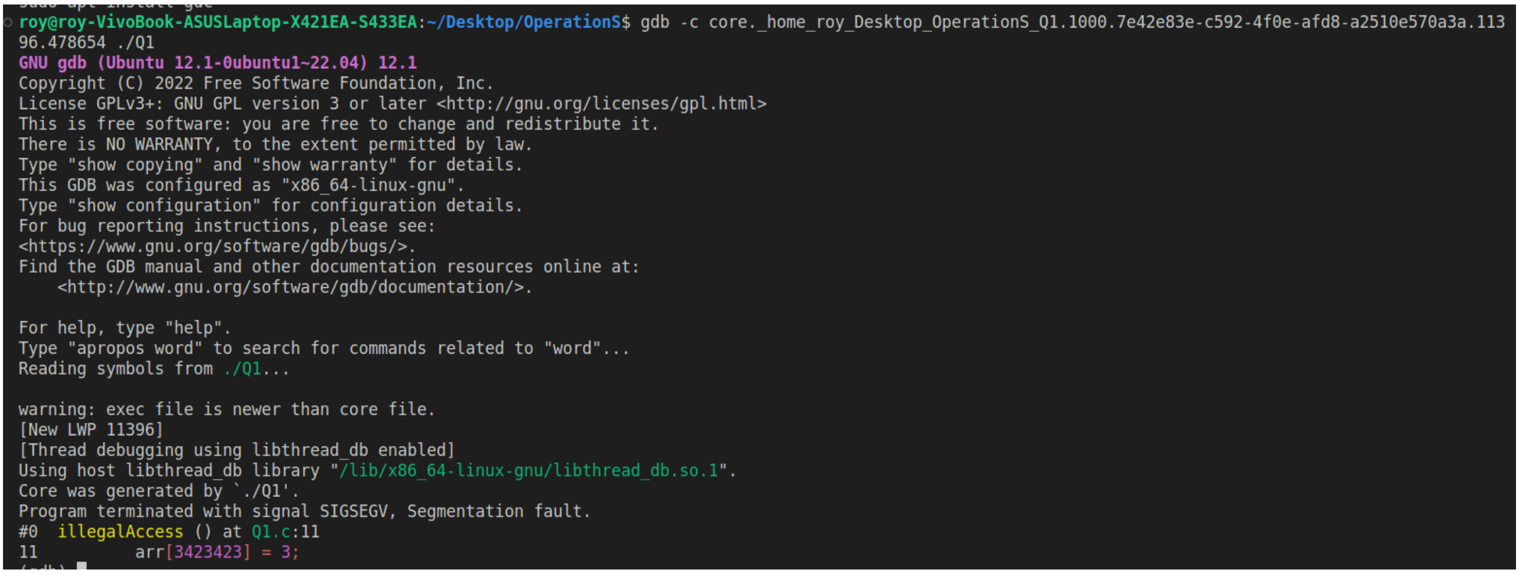
4.Loading gdb with debug (-g3):

Bug B:



```
(gdb) exit
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS$ gdb -c core._home_roy_Desktop_OperationS_Q1.1000.7e42e83e-c592-4f0e-afd8-a2510e570a3a.112
53.474003 ./Q1
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 "x86_64-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 ./Q1...

warning: exec file is newer than core file.
[New LWP 11253]
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".
Core was generated by `./Q1'.
Program terminated with signal SIGSEGV, Segmentation fault.
#0  0x000055ba54d1d17f in infinityRec (num=0) at Q1.c:6
6           return infinityRec(num * 2);
(gdb) 
```

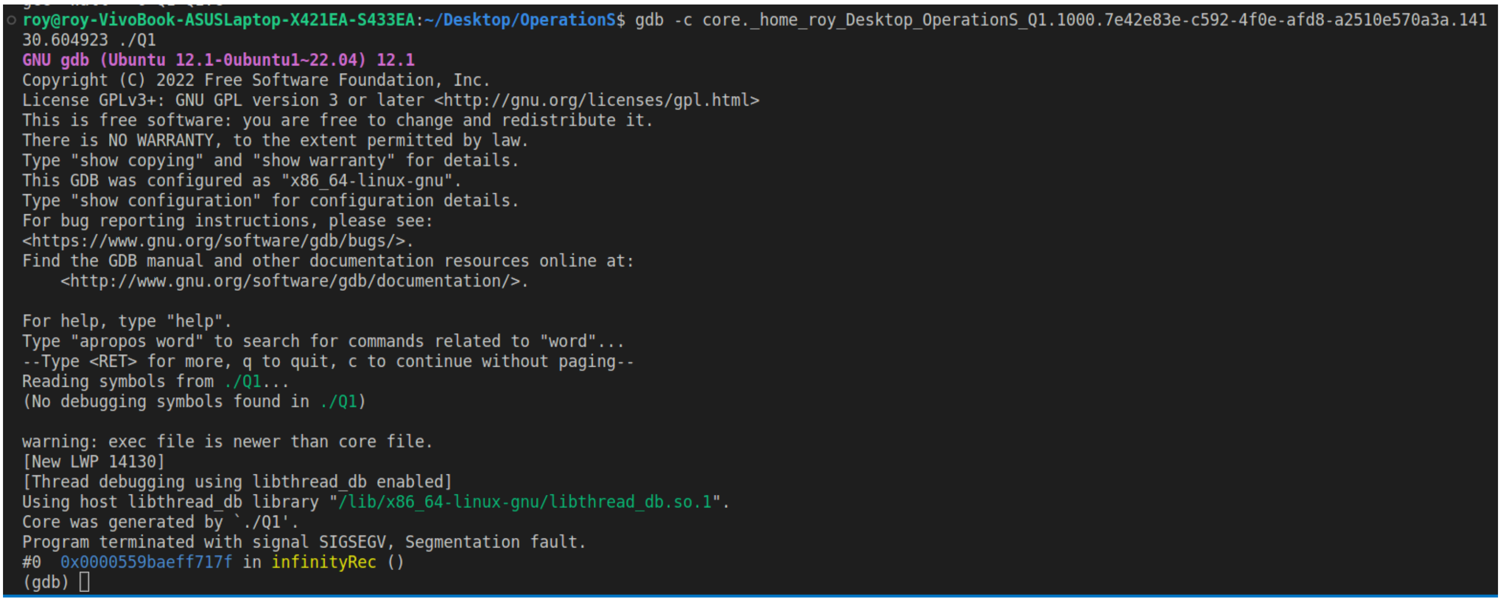
Bug C:



```
sudo apt install gdb
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS$ gdb -c core._home_roy_Desktop_OperationS_Q1.1000.7e42e83e-c592-4f0e-afd8-a2510e570a3a.113
96.478654 ./Q1
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 "x86_64-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 ./Q1...

warning: exec file is newer than core file.
[New LWP 11396]
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".
Core was generated by `./Q1'.
Program terminated with signal SIGSEGV, Segmentation fault.
#0  illegalAccess () at Q1.c:11
11          arr[3423423] = 3;
(gdb) 
```

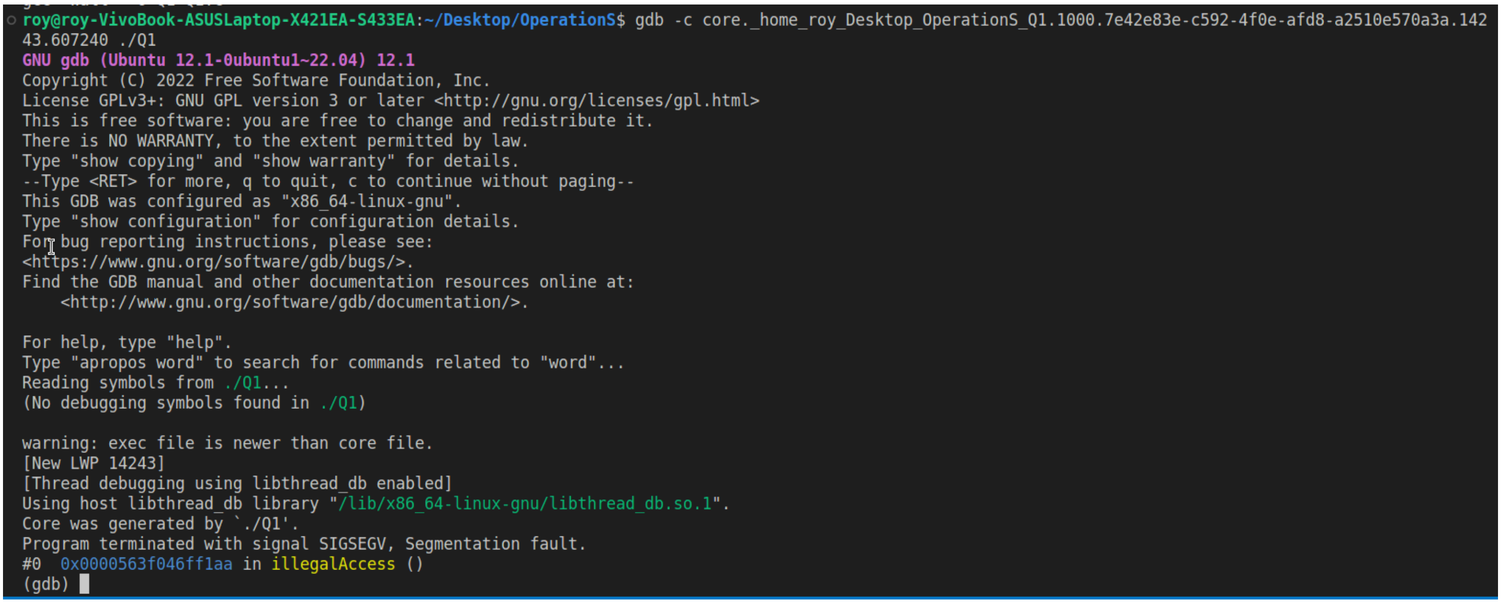
Loading gdb without debug (delete -g3):

Bug B:



```
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS$ gdb -c core._home_roy_Desktop_OperationS_Q1.1000.7e42e83e-c592-4f0e-afd8-a2510e570a3a.141
30.604923 ./Q1
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 "x86_64-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"...
--Type <RET> for more, q to quit, c to continue without paging--
Reading symbols from ./Q1...
(No debugging symbols found in ./Q1)

warning: exec file is newer than core file.
[New LWP 14130]
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".
Core was generated by `./Q1'.
Program terminated with signal SIGSEGV, Segmentation fault.
#0  0x0000559baeff717f in infinityRec ()
(gdb) 
```

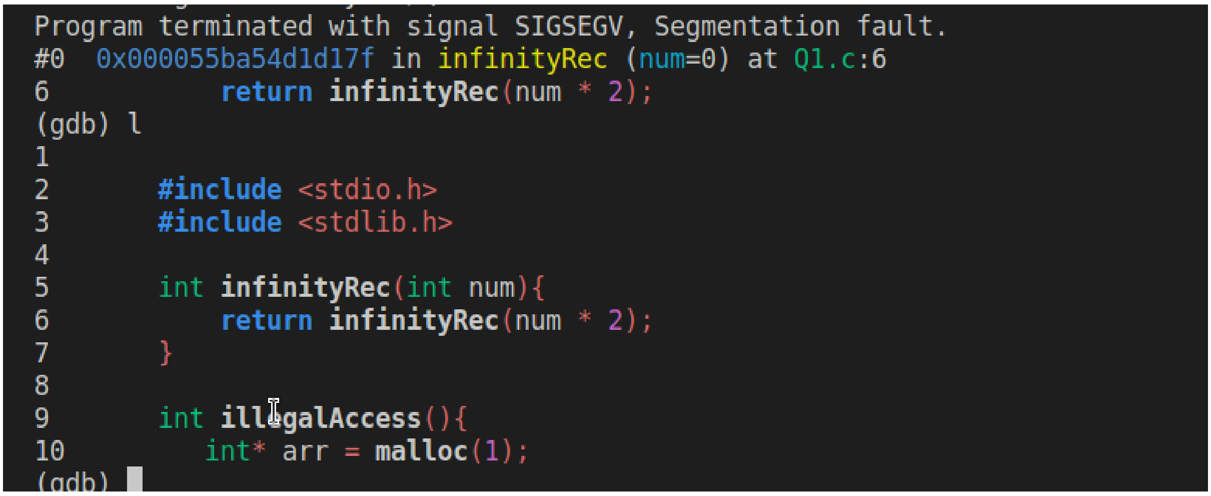
Bug C:



```
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS$ gdb -c core._home_roy_Desktop_OperationS_Q1.1000.7e42e83e-c592-4f0e-afd8-a2510e570a3a.142
43.607240 ./Q1
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.
--Type <RET> for more, q to quit, c to continue without paging--
This GDB was configured as "x86_64-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 ./Q1...
(No debugging symbols found in ./Q1)

warning: exec file is newer than core file.
[New LWP 14243]
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".
Core was generated by `./Q1'.
Program terminated with signal SIGSEGV, Segmentation fault.
#0  0x0000563f046ff1aa in illegalAccess ()
(gdb) 
```

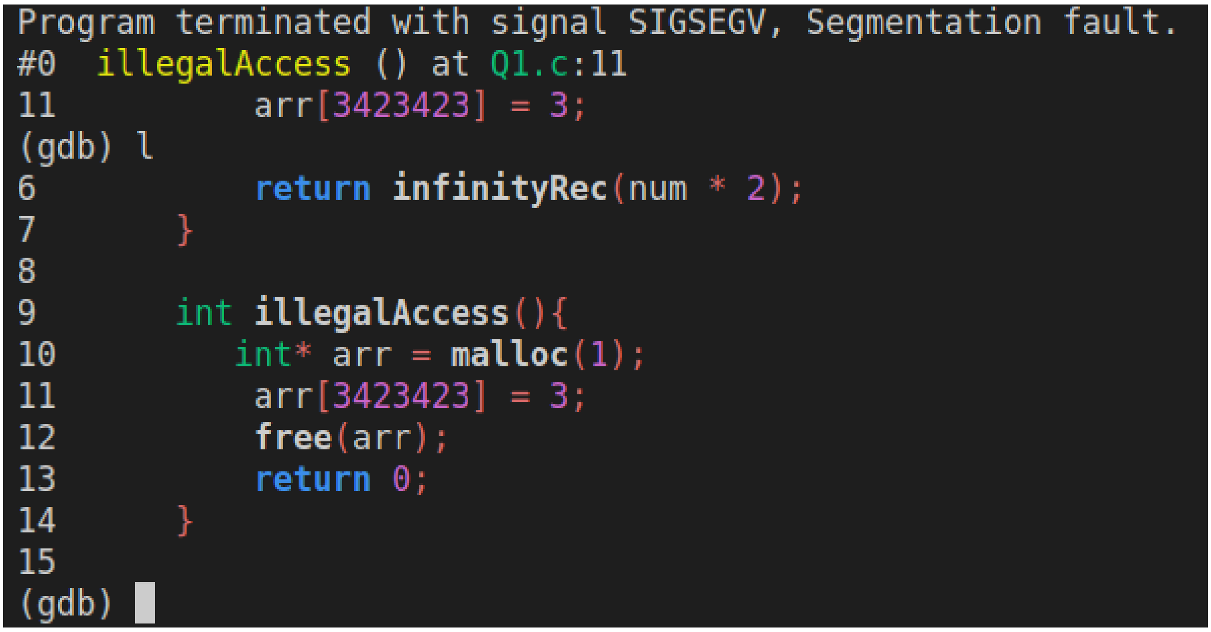
5.We will show the location of core dump row:

Bug B:



```
Program terminated with signal SIGSEGV, Segmentation fault.
#0  0x000055ba54d1d17f in infinityRec (num=0) at Q1.c:6
6           return infinityRec(num * 2);
(gdb) l
1
2       #include <stdio.h>
3       #include <stdlib.h>
4
5       int infinityRec(int num){
6           return infinityRec(num * 2);
7       }
8
9       int illegalAccess(){
10         int* arr = malloc(1);
(gdb)
```

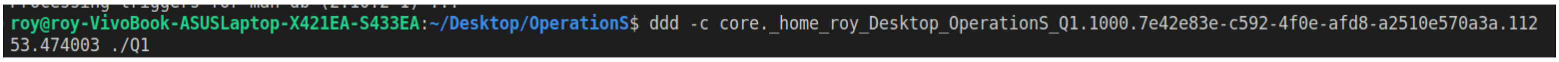
Bug C:



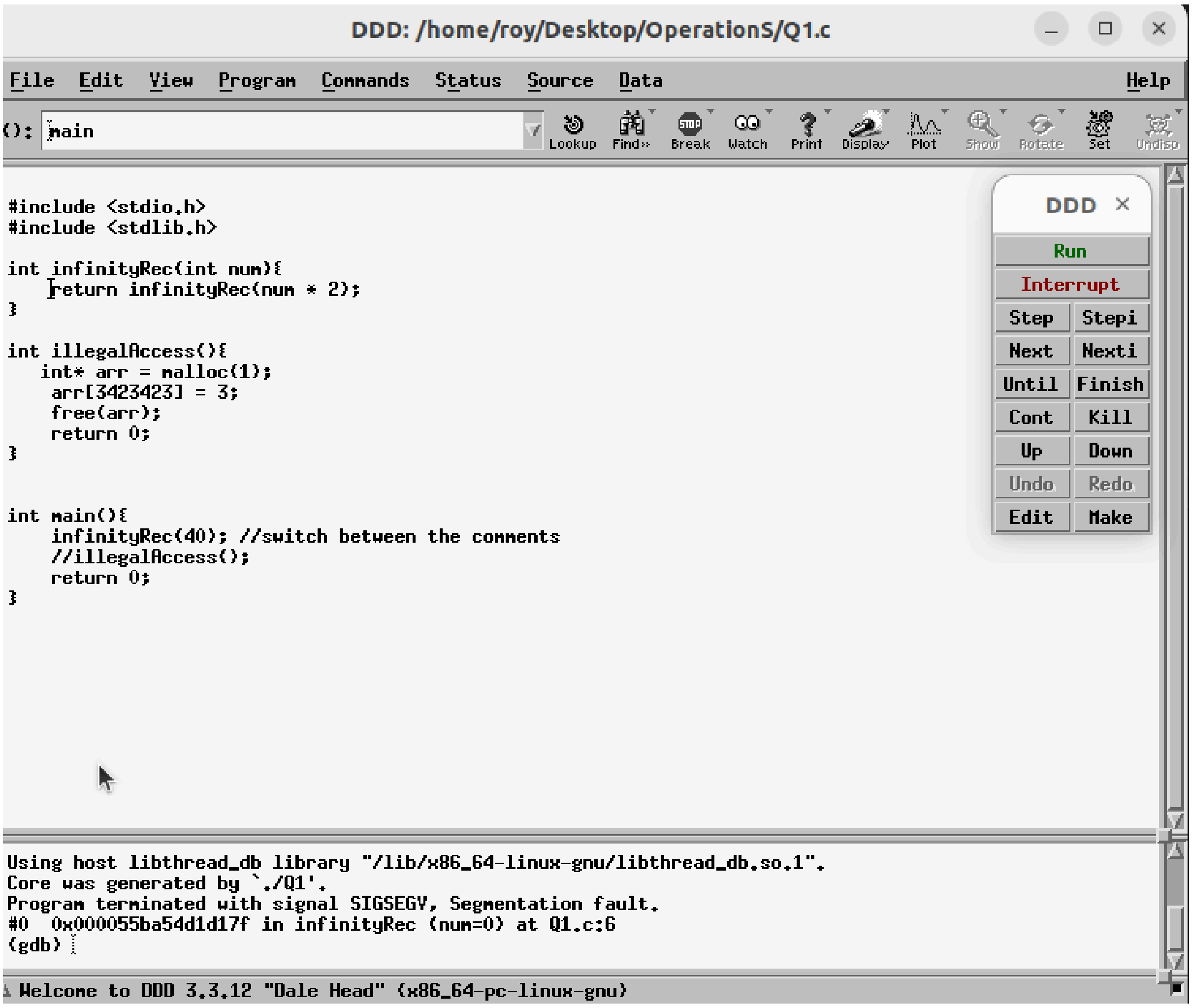
```
Program terminated with signal SIGSEGV, Segmentation fault.
#0  illegalAccess () at Q1.c:11
11          arr[3423423] = 3;
(gdb) l
6           return infinityRec(num * 2);
7       }
8
9       int illegalAccess(){
10         int* arr = malloc(1);
11          arr[3423423] = 3;
12          free(arr);
13          return 0;
14      }
15
(gdb)
```

6.We will open the core with graphic debugger, we chose ddd:

Bug B:



```
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS$ ddd -c core._home_roy_Desktop_OperationS_Q1.1000.7e42e83e-c592-4f0e-afd8-a2510e570a3a.112
53.474003 ./Q1
```



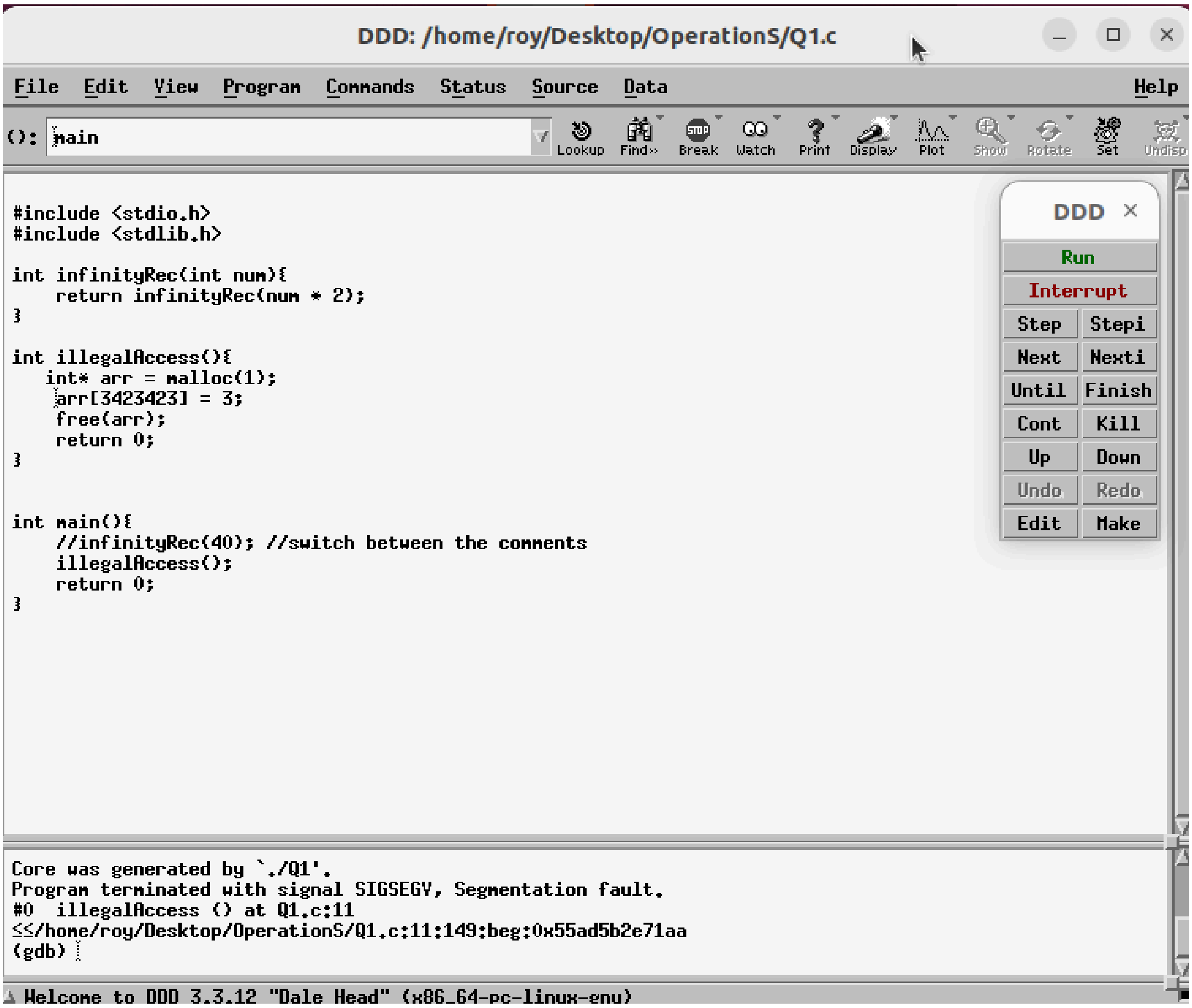
```
main
```

```c
#include <stdio.h>
#include <stdlib.h>

int infinityRec(int num){
    return infinityRec(num * 2);
}

int illegalAccess(){
   int* arr = malloc(1);
    arr[3423423] = 3;
    free(arr);
    return 0;
}


int main(){
    infinityRec(40); //switch between the comments
    //illegalAccess();
    return 0;
}
```

```
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".
Core was generated by `./Q1'.
Program terminated with signal SIGSEGV, Segmentation fault.
#0  0x000055ba54d1d17f in infinityRec (num=0) at Q1.c:6
(gdb)
```

```
Welcome to DDD 3.3.12 "Dale Head" (x86_64-pc-linux-gnu)
```

Bug C:


DDD: /home/roy/Desktop/OperationS/Q1.c
File Edit View Program Commands Status Source Data Help
(): main
Lookup Find» Break Watch Print Display Plot Show Rotate Set Undisp
DDD
Run
Interrupt
Step Stepi
Next Nexti
Until Finish
Cont Kill
Up Down
Undo Redo
Edit Make

```
#include <stdio.h>
#include <stdlib.h>

int infinityRec(int num){
    return infinityRec(num * 2);
}

int illegalAccess(){
   int* arr = malloc(1);
    arr[3423423] = 3;
    free(arr);
    return 0;
}


int main(){
    //infinityRec(40); //switch between the comments
    illegalAccess();
    return 0;
}
```

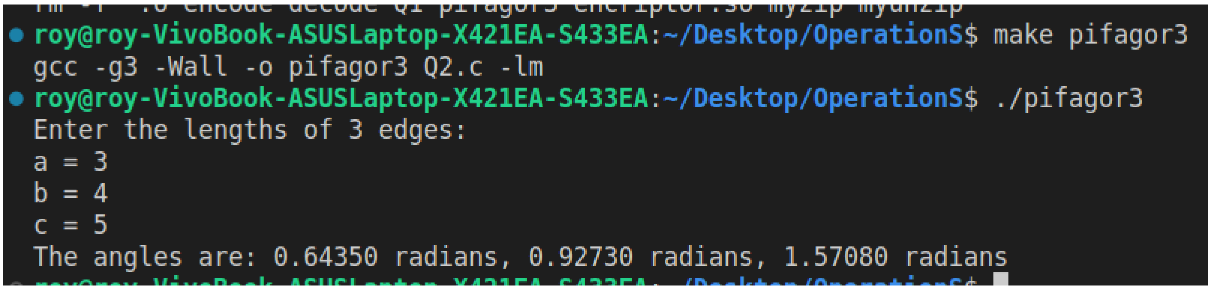
```
Core was generated by `./Q1'.
Program terminated with signal SIGSEGV, Segmentation fault.
#0  illegalAccess () at Q1.c:11
≤≤/home/roy/Desktop/OperationS/Q1.c:11:149:beg:0x55ad5b2e71aa
(gdb)
```

Welcome to DDD 3.3.12 "Dale Head" (x86_64-pc-linux-gnu)

Question 2

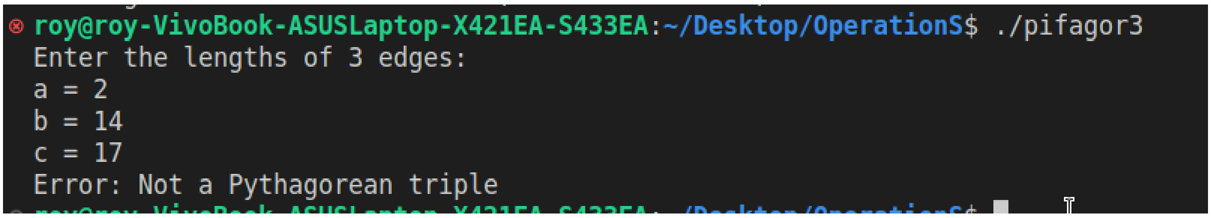
Running Examples:

1. A Pythagorean triple



```
rm -f *.o encode decode Q1 pifagor3 encriptor.so myzip myunzip
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS$ make pifagor3
gcc -g3 -Wall -o pifagor3 Q2.c -lm
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS$ ./pifagor3
Enter the lengths of 3 edges:
a = 3
b = 4
c = 5
The angles are: 0.64350 radians, 0.92730 radians, 1.57080 radians
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS$
```

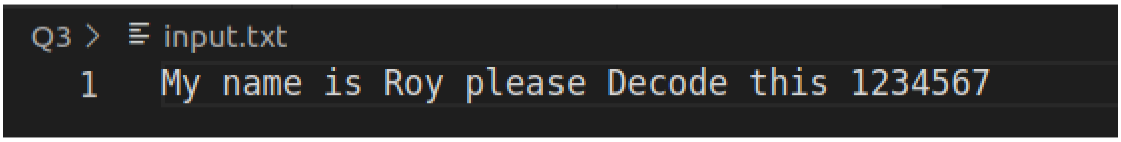
2. Not A Pythagorean triple



```
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS$ ./pifagor3
Enter the lengths of 3 edges:
a = 2
b = 14
c = 17
Error: Not a Pythagorean triple
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS$
```

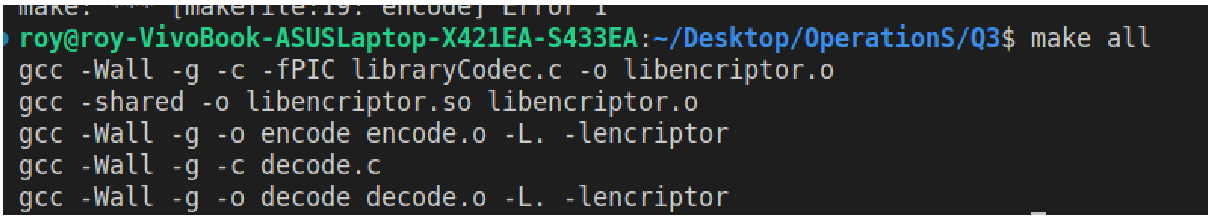
Question 3

encoding example:

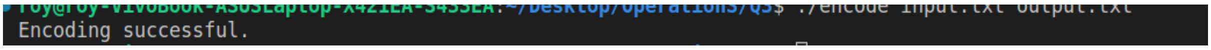


```
My name is Roy please Decode this 1234567
```

Using this text file, we run the code:

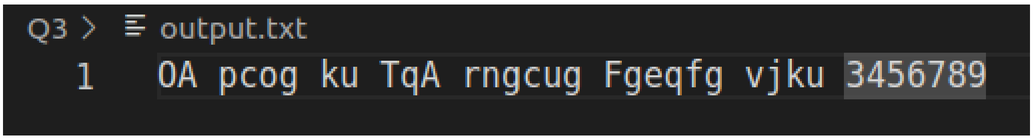


```
make: *** [makefile:19: encode] Error 1
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS/Q3$ make all
gcc -Wall -g -c -fPIC libraryCodec.c -o libencriptor.o
gcc -shared -o libencriptor.so libencriptor.o
gcc -Wall -g -o encode encode.o -L. -lencriptor
gcc -Wall -g -c decode.c
gcc -Wall -g -o decode decode.o -L. -lencriptor
```



```
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS/Q3$ ./encode input.txt output.txt
Encoding successful.
```

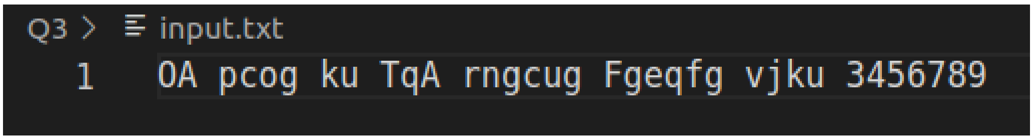
The output is:



```
OA pcog ku TqA rngcug Fgeqfg vjku 3456789
```

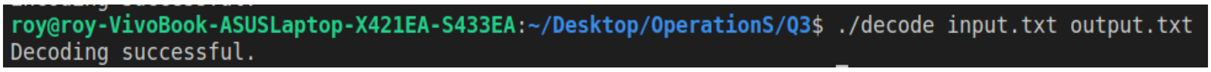
To test the decoding and if the encoding was successful, we will replace the input file to the output file , and decode the output file to see if its returning to the original text. (reverse the files)

The input:



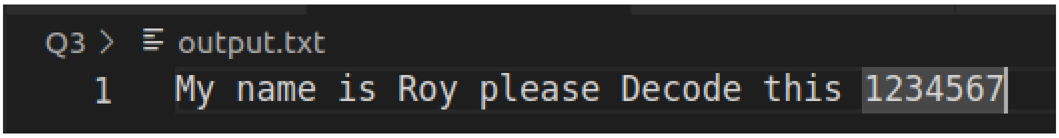
```
OA pcog ku TqA rngcug Fgeqfg vjku 3456789
```

We run the code:



```
Encoding successful.
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS/Q3$ ./decode input.txt output.txt
Decoding successful.
```

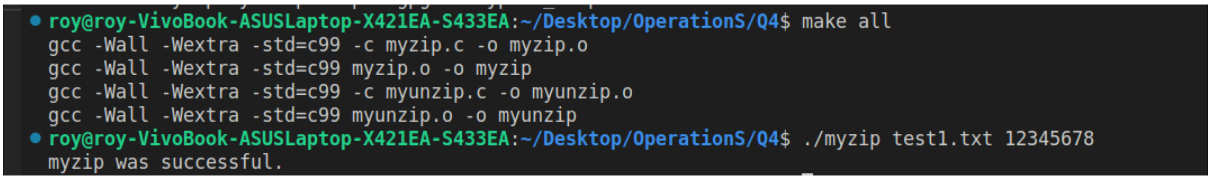
And the output is now the same as the original:



```
My name is Roy please Decode this 1234567
```

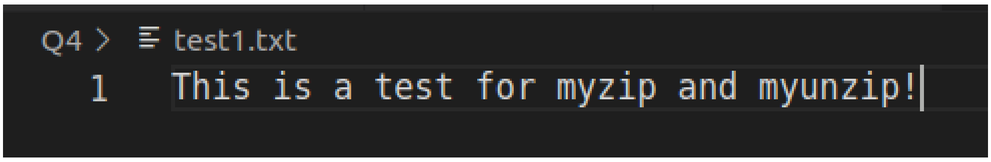
Question 4

Myzip example on test1.txt:



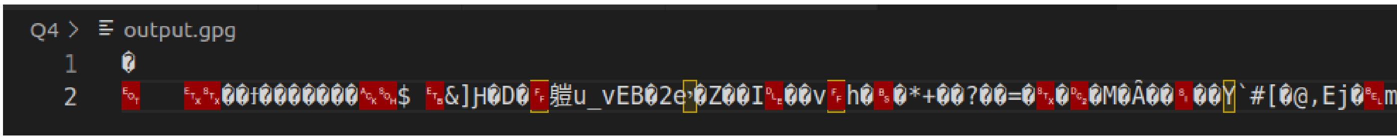
```
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS/Q4$ make all
gcc -Wall -Wextra -std=c99 -c myzip.c -o myzip.o
gcc -Wall -Wextra -std=c99 myzip.o -o myzip
gcc -Wall -Wextra -std=c99 -c myunzip.c -o myunzip.o
gcc -Wall -Wextra -std=c99 myunzip.o -o myunzip
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS/Q4$ ./myzip test1.txt 12345678
myzip was successful.
```

This is the file that we zipped:



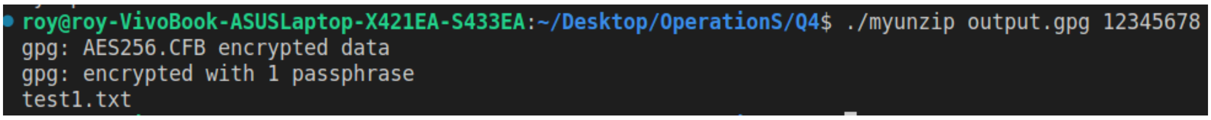
```
This is a test for myzip and myunzip!
```

after running the myzip, a new file was created named:output,gpg.
as we can see, the file is unreadable:



```
�
��ŧ��������$ &]ĦD�D� 豈u_vEB�2e�Z��I��v h� �*+��?��=� � �M�Â�� ��Y`#[�@,Ej�m
```

Now we will delete the test1.txt file, and we will try to unzip the output file.



```
roy@roy-VivoBook-ASUSLaptop-X421EA-S433EA:~/Desktop/OperationS/Q4$ ./myunzip output.gpg 12345678
gpg: AES256.CFB encrypted data
gpg: encrypted with 1 passphrase
test1.txt
```

As we can see, the test1.txt file was created as we wanted.