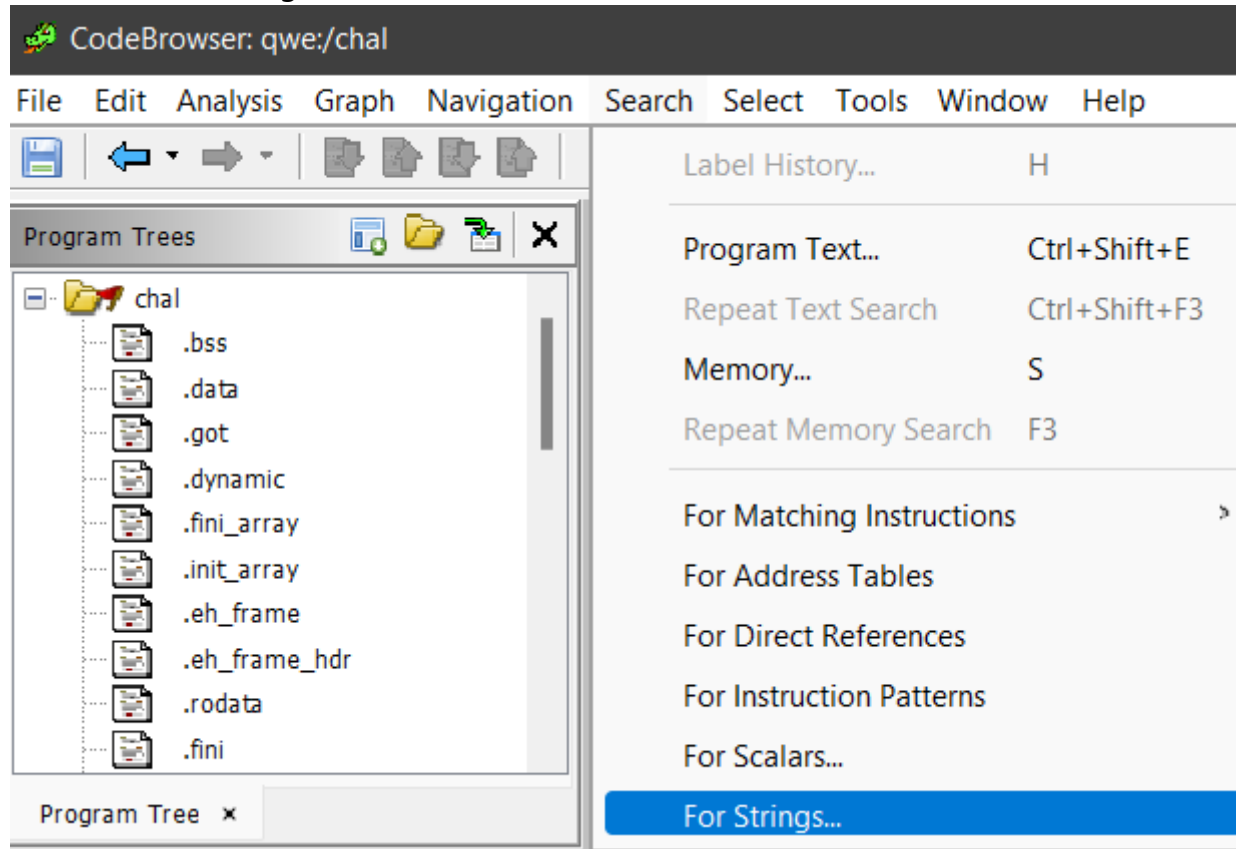



- Debug this shit

## The end

---

- Locate correct string




**Search For Strings**
✕

☒ **Require Null Termination**

**Minimum Length:**

Dec

☐ **Pascal Strings**

**Alignment:**

Dec

**Word Model:**

...

**Memory Block Types**

☒ **Loaded Blocks**
☐ **All Blocks**

**Selection Scope**

☒ **Search All**
☐ **Search Selection**

Search

Cancel

Strings [ String Search - 5:50, String Search - 6:35 ] [CodeBrowser: qwe/chal]

Edit Help

String Search - 48 items - [chal, Minimum size = 7, Align = 1]

...	Location	Label	Code Unit	String View	String...	Length	Is Word
A	0010c188	s_/home/a/nl...	ds "/home/a/nim-1.6.6/lib/sy...	/home/a/nim-1.6.6/lib/system/io.nim	string	36	true
A	0010c1ac	s_raiseEIO_0...	ds "raiseEIO"	"raiseEIO"	string	9	true
A	0010c1b5	s_EOFError_...	ds "EOFError"	"EOFError"	string	9	true
A	0010c1be	s_raiseEOF_0...	ds "raiseEOF"	"raiseEOF"	string	9	true
A	0010c2ef		ds "@over- or underflow"	"@over- or underflow"	string	20	true
A	0010c32f		ds "@[[reraised from:\n"	"@[[reraised from:\n"	string	19	true
A	0010c40f		ds "@no exception to reraise"	"@no exception to reraise"	string	25	true
A	0010c428	s_out_of_me...	ds "out of memory\n"	"out of memory\n"	string	15	true
A	0010c438	s_[GC]_cann...	ds "[GC] cannot register thr...	"[GC] cannot register thread local vari...	string	76	true
A	0010c484	s_OverflowDe...	ds "OverflowDefect"	"OverflowDefect"	string	15	true
A	0010c498	s_/home/a/nl...	ds "/home/a/nim-1.6.6/lib/sy...	/home/a/nim-1.6.6/lib/system/fatal.n...	string	39	true
A	0010c4bf	s_sysFatal_0...	ds "sysFatal"	"sysFatal"	string	9	true
A	0010c4c9	s_Error:_unh...	ds "Error: unhandled excepti...	"Error: unhandled exception: "	string	29	true
A	0010c4ec	s_ReraiseDef...	ds "ReraiseDefect"	"ReraiseDefect"	string	14	true
A	0010c500	s_SIGINT:_Int...	ds "SIGINT: Interrupted by C...	"SIGINT: Interrupted by Ctrl-C.\n"	string	32	true
A	0010c520	s_SIGSEGV:_Il...	ds "SIGSEGV: Illegal storage...	"SIGSEGV: Illegal storage access. (Atte...	string	62	true
A	0010c560	s_SIGABRT:_...	ds "SIGABRT: Abnormal termin...	"SIGABRT: Abnormal termination.\n"	string	32	true
A	0010c580	s_SIGFPE:_Ar...	ds "SIGFPE: Arithmetic error...	"SIGFPE: Arithmetic error.\n"	string	27	true
A	0010c59b	s_SIGILL:_Ille...	ds "SIGILL: Illegal operatio...	"SIGILL: Illegal operation.\n"	string	28	true
A	0010c5b7	s_SIGPIPE:_Pi...	ds "SIGPIPE: Pipe closed.\n"	"SIGPIPE: Pipe closed.\n"	string	23	true
A	0010c5ce	s_unknown_s...	ds "unknown signal\n"	"unknown signal\n"	string	16	true
A	0010c5ee	s_procname_...	ds "procname"	"procname"	string	9	true
A	0010c5fc	s_filename_0...	ds "filename"	"filename"	string	9	true
A	0010c62f		ds "@Submit the flag! FAST!"	"@Submit the flag! FAST!"	string	24	true
A	0010c66f		ds "@That's not it..."	"@That's not it..."	string	18	true

Filter:

☐ Auto Label

Offset: 
Dec

Preview: "@Submit the flag! FAST!"

☐ Include Alignment Nulls

☐ Truncate If Needed

Make String

Make Char Array

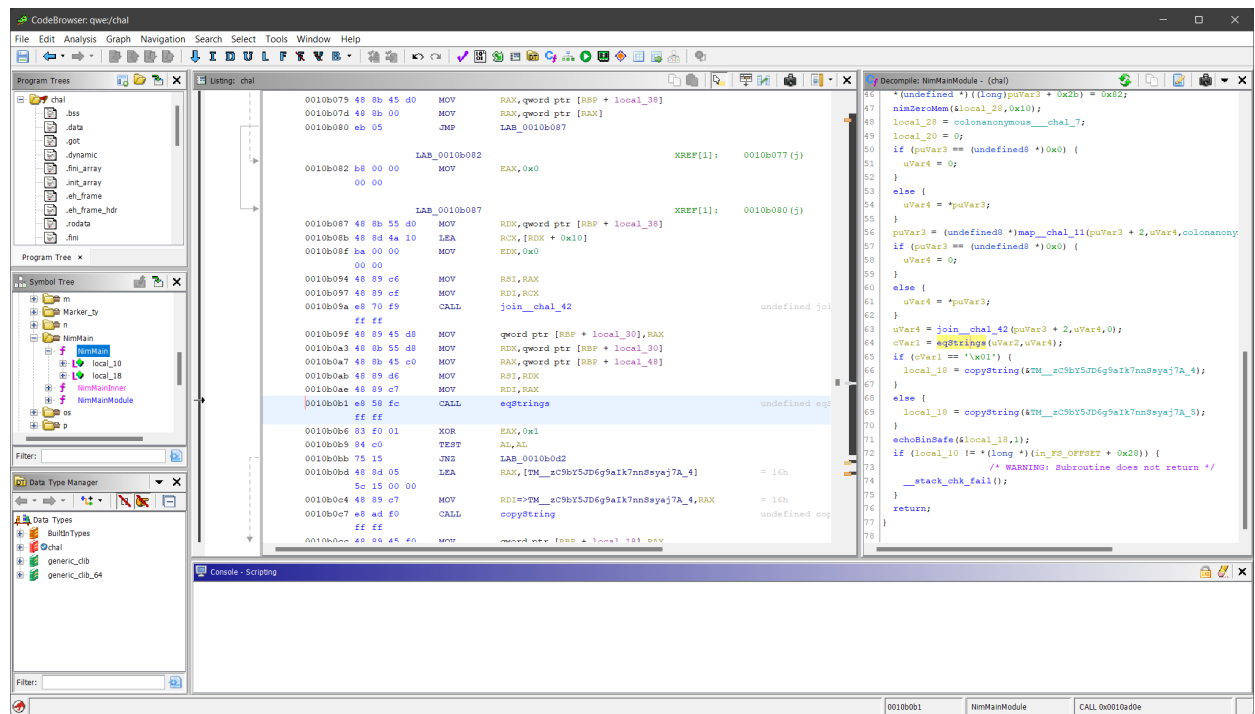
String Search - 5:50
String Search - 6:35

- Locate string references

LI UU      ??      UUU

		TM_zC9bY5JD6g9aIk7nn8syaj7A_4	XREF[2]:	NimMainModule:0010b0bd(*), NimMainModule:0010b0c4(*)
20	16	??	16h	
21	00	??	00h	
22	00	??	00h	
23	00	??	00h	
24	00	??	00h	
25	00	??	00h	
26	00	??	00h	
27	00	??	00h	
28	16	??	16h	
29	00	??	00h	
2a	00	??	00h	
2b	00	??	00h	
2c	00	??	00h	
2d	00	??	00h	
2e	00	??	00h	
2f	40 53 75	ds	"@Submit the flag! FAST!"	
	62 6d 69			
	74 20 74 ...			

- NimMainModule located



- Start GDB

→ nimrod gdb chal

- Locate NimMainModule function

```
gdb-peda$ info functions
All defined functions:
```

```

Non-debugging symbols:
0x0000000000001000  _init
...
0x000000000000ac6b  colonanonymous___chal_7
0x000000000000ac8b  nimCmpMem
0x000000000000acc5  equalMem__system_1735
0x000000000000ad0e  eqStrings
0x000000000000ad97  initStackBottomWith
0x000000000000adb2  PreMainInner
0x000000000000adbd  PreMain
0x000000000000ae1b  NimMainInner
0x000000000000ae2b  NimMain
0x000000000000ae7f  main
0x000000000000aec3  NimMainModule <-----This
0x000000000000b10e  chalDatInit000
0x000000000000b154  _fini

```

- Set a breakpoint and tinker around

```

gdb-peda$ b *NimMainModule
Breakpoint 1 at 0xae3
gdb-peda$ r
...
Breakpoint 1, 0x000055555555e3 in NimMainModule ()

```

- Disassemble this function

```

gdb-peda$ disassemble
Dump of assembler code for function NimMainModule:
=> 0x000055555555e3 <+0>:      endbr64
    0x000055555555e7 <+4>:      push    rbp
    0x000055555555e8 <+5>:      mov     rbp, rsp
    0x000055555555ecb <+8>:      sub     rsp, 0x40
    0x000055555555eef <+12>:     mov     rax, QWORD PTR fs:0x28
    0x000055555555eed8 <+21>:    mov     QWORD PTR [rbp-0x8], rax
    0x000055555555eedc <+25>:    xor     eax, eax
    0x000055555555eede <+27>:    lea     rax, [rbp-0x10]
    0x000055555555eee2 <+31>:    mov     esi, 0x8
    0x000055555555eee7 <+36>:    mov     rdi, rax
    0x000055555555eeea <+39>:    call    0x55555555eb51 <nimZeroMem>
    0x000055555555eef <+44>:    mov     QWORD PTR [rbp-0x40], 0x0
    0x000055555555eef7 <+52>:    mov     rax, QWORD PTR [rip+0x5172]      #
0x5555555564070 <stdin@GLIBC_2.2.5>
    0x000055555555eefe <+59>:    mov     rdi, rax
    0x000055555555ef01 <+62>:    call    0x5555555561f3 <readLine__systemZio_271>
    0x000055555555ef06 <+67>:    mov     QWORD PTR [rbp-0x40], rax
    0x000055555555ef0a <+71>:    mov     QWORD PTR [rbp-0x38], 0x0
    0x000055555555ef12 <+79>:    mov     esi, 0x1c

```

```

0x000055555555ef17 <+84>:    lea     rax,[rip+0x16182]          # 0x55555555750a0
<NTIseqLcharT__lBgZ7a89beZGYP18PiANMTA_>
0x000055555555ef1e <+91>:    mov     rdi,rax
0x000055555555ef21 <+94>:    call   0x55555555c774 <newSeq>
0x000055555555ef26 <+99>:    mov     QWORD PTR [rbp-0x38],rax
0x000055555555ef2a <+103>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555ef2e <+107>:   mov     BYTE PTR [rax+0x10],0xaa
0x000055555555ef32 <+111>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555ef36 <+115>:   mov     BYTE PTR [rax+0x11],0xab
0x000055555555ef3a <+119>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555ef3e <+123>:   mov     BYTE PTR [rax+0x12],0xb2
0x000055555555ef42 <+127>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555ef46 <+131>:   mov     BYTE PTR [rax+0x13],0xbc
0x000055555555ef4a <+135>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555ef4e <+139>:   mov     BYTE PTR [rax+0x14],0xab
0x000055555555ef52 <+143>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555ef56 <+147>:   mov     BYTE PTR [rax+0x15],0xb9
0x000055555555ef5a <+151>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555ef5e <+155>:   mov     BYTE PTR [rax+0x16],0x84
0x000055555555ef62 <+159>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555ef66 <+163>:   mov     BYTE PTR [rax+0x17],0x91
0x000055555555ef6a <+167>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555ef6e <+171>:   mov     BYTE PTR [rax+0x18],0xce
0x000055555555ef72 <+175>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555ef76 <+179>:   mov     BYTE PTR [rax+0x19],0x92
0x000055555555ef7a <+183>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555ef7e <+187>:   mov     BYTE PTR [rax+0x1a],0x9d
0x000055555555ef82 <+191>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555ef86 <+195>:   mov     BYTE PTR [rax+0x1b],0x93
0x000055555555ef8a <+199>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555ef8e <+203>:   mov     BYTE PTR [rax+0x1c],0xcc
0x000055555555ef92 <+207>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555ef96 <+211>:   mov     BYTE PTR [rax+0x1d],0xa0
0x000055555555ef9a <+215>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555ef9e <+219>:   mov     BYTE PTR [rax+0x1e],0xce
0x000055555555efa2 <+223>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555efa6 <+227>:   mov     BYTE PTR [rax+0x1f],0x8c
0x000055555555efaa <+231>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555efae <+235>:   mov     BYTE PTR [rax+0x20],0xa0
0x000055555555efb2 <+239>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555efb6 <+243>:   mov     BYTE PTR [rax+0x21],0x94
0x000055555555efba <+247>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555efbe <+251>:   mov     BYTE PTR [rax+0x22],0xce
0x000055555555efc2 <+255>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555efc6 <+259>:   mov     BYTE PTR [rax+0x23],0x91
0x000055555555efca <+263>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555efce <+267>:   mov     BYTE PTR [rax+0x24],0x9b
0x000055555555efd2 <+271>:   mov     rax,QWORD PTR [rbp-0x38]
0x000055555555efd6 <+275>:   mov     BYTE PTR [rax+0x25],0xcb

```

```

0x000055555555efda <+279>: mov    rax,QWORD PTR [rbp-0x38]
0x000055555555efde <+283>: mov    BYTE PTR [rax+0x26],0xa0
0x000055555555efe2 <+287>: mov    rax,QWORD PTR [rbp-0x38]
0x000055555555efe6 <+291>: mov    BYTE PTR [rax+0x27],0x9c
0x000055555555efea <+295>: mov    rax,QWORD PTR [rbp-0x38]
0x000055555555efee <+299>: mov    BYTE PTR [rax+0x28],0xcf
0x000055555555eff2 <+303>: mov    rax,QWORD PTR [rbp-0x38]
0x000055555555eff6 <+307>: mov    BYTE PTR [rax+0x29],0xcf
0x000055555555effa <+311>: mov    rax,QWORD PTR [rbp-0x38]
0x000055555555effe <+315>: mov    BYTE PTR [rax+0x2a],0x93
0x000055555555f002 <+319>: mov    rax,QWORD PTR [rbp-0x38]
0x000055555555f006 <+323>: mov    BYTE PTR [rax+0x2b],0x82
0x000055555555f00a <+327>: lea    rax,[rbp-0x20]
0x000055555555f00e <+331>: mov    esi,0x10
0x000055555555f013 <+336>: mov    rdi,rax
0x000055555555f016 <+339>: call   0x55555555eb51 <nimZeroMem>
0x000055555555f01b <+344>: lea    rax,[rip+0xffffffffffffc49]      #
0x55555555ec6b <colonanonymous____chal_7>
0x000055555555f022 <+351>: mov    QWORD PTR [rbp-0x20],rax
0x000055555555f026 <+355>: mov    QWORD PTR [rbp-0x18],0x0
0x000055555555f02e <+363>: mov    QWORD PTR [rbp-0x30],0x0
0x000055555555f036 <+371>: cmp    QWORD PTR [rbp-0x38],0x0
0x000055555555f03b <+376>: je     0x55555555f046 <NimMainModule+387>
0x000055555555f03d <+378>: mov    rax,QWORD PTR [rbp-0x38]
0x000055555555f041 <+382>: mov    rsi,QWORD PTR [rax]
0x000055555555f044 <+385>: jmp    0x55555555f04b <NimMainModule+392>
0x000055555555f046 <+387>: mov    esi,0x0
0x000055555555f04b <+392>: mov    rax,QWORD PTR [rbp-0x38]
0x000055555555f04f <+396>: lea    rdi,[rax+0x10]
0x000055555555f053 <+400>: mov    rax,QWORD PTR [rbp-0x20]
0x000055555555f057 <+404>: mov    rdx,QWORD PTR [rbp-0x18]
0x000055555555f05b <+408>: mov    rcx,rdx
0x000055555555f05e <+411>: mov    rdx,rax
0x000055555555f061 <+414>: call   0x55555555eb9c <map__chal_11>
0x000055555555f066 <+419>: mov    QWORD PTR [rbp-0x30],rax
0x000055555555f06a <+423>: mov    QWORD PTR [rbp-0x28],0x0
0x000055555555f072 <+431>: cmp    QWORD PTR [rbp-0x30],0x0
0x000055555555f077 <+436>: je     0x55555555f082 <NimMainModule+447>
0x000055555555f079 <+438>: mov    rax,QWORD PTR [rbp-0x30]
0x000055555555f07d <+442>: mov    rax,QWORD PTR [rax]
0x000055555555f080 <+445>: jmp    0x55555555f087 <NimMainModule+452>
0x000055555555f082 <+447>: mov    eax,0x0
0x000055555555f087 <+452>: mov    rdx,QWORD PTR [rbp-0x30]
0x000055555555f08b <+456>: lea    rcx,[rdx+0x10]
0x000055555555f08f <+460>: mov    edx,0x0
0x000055555555f094 <+465>: mov    rsi,rax
0x000055555555f097 <+468>: mov    rdi,rcx
0x000055555555f09a <+471>: call   0x55555555ea0f <join__chal_42>
0x000055555555f09f <+476>: mov    QWORD PTR [rbp-0x28],rax

```

```

0x000055555555f0a3 <+480>: mov     rdx,QWORD PTR [rbp-0x28]
0x000055555555f0a7 <+484>: mov     rax,QWORD PTR [rbp-0x40]
0x000055555555f0ab <+488>: mov     rsi,rdx
0x000055555555f0ae <+491>: mov     rdi,rax
0x000055555555f0b1 <+494>: call    0x55555555ed0e <eqStrings>
0x000055555555f0b6 <+499>: xor     eax,0x1 <-----HELLO THERE
0x000055555555f0b9 <+502>: test    al,al
0x000055555555f0bb <+504>: jne     0x55555555f0d2 <NimMainModule+527>
0x000055555555f0bd <+506>: lea     rax,[rip+0x155c]          # 0x5555555560620
<TM__zC9bY5JD6g9aIk7nnSsyaj7A_4>
0x000055555555f0c4 <+513>: mov     rdi,rax
0x000055555555f0c7 <+516>: call    0x55555555e179 <copyString>
0x000055555555f0cc <+521>: mov     QWORD PTR [rbp-0x10],rax
0x000055555555f0d0 <+525>: jmp     0x55555555f0e6 <NimMainModule+547>
0x000055555555f0d2 <+527>: nop
0x000055555555f0d3 <+528>: lea     rax,[rip+0x1586]          # 0x5555555560660
<TM__zC9bY5JD6g9aIk7nnSsyaj7A_5>
0x000055555555f0da <+535>: mov     rdi,rax
0x000055555555f0dd <+538>: call    0x55555555e179 <copyString>
0x000055555555f0e2 <+543>: mov     QWORD PTR [rbp-0x10],rax
0x000055555555f0e6 <+547>: lea     rax,[rbp-0x10]
0x000055555555f0ea <+551>: mov     esi,0x1
0x000055555555f0ef <+556>: mov     rdi,rax
0x000055555555f0f2 <+559>: call    0x5555555562cb <echoBinSafe>
0x000055555555f0f7 <+564>: nop
0x000055555555f0f8 <+565>: mov     rax,QWORD PTR [rbp-0x8]
0x000055555555f0fc <+569>: sub     rax,QWORD PTR fs:0x28
0x000055555555f105 <+578>: je      0x55555555f10c <NimMainModule+585>
0x000055555555f107 <+580>: call    0x55555555200 <__stack_chk_fail@plt>
0x000055555555f10c <+585>: leave
0x000055555555f10d <+586>: ret
End of assembler dump.

```

- Locate xor function and set a breakpoint

```

gdb-peda$ b *NimMainModule+499
Breakpoint 2 at 0x55555555f0b6

gdb-peda$ c
Continuing.
qwerty
[-----registers-----]
RAX: 0x0
RBX: 0x0
RCX: 0x7ffff7d1857d --> 0x4000000
RDX: 0x7ffff7d170d0 --> 0x1c
RSI: 0x7ffff7d170d0 --> 0x1c
RDI: 0x7ffff7d16050 --> 0x6
RBP: 0x7ffffffffffdc60 --> 0x7ffffffffffdc70 --> 0x7ffffffffffdc90 --> 0x7ffffffffffdcc0 -->

```

```

0x1
RSP: 0x7fffffffdc20 --> 0x7ffff7d16050 --> 0x6
RIP: 0x5555555f0b6 (<NimMainModule+499>:      xor      eax,0x1)
R8 : 0x0
R9 : 0x5555555762a0 --> 0xa797472657771 ('qwerty\n')
R10: 0x77 ('w')
R11: 0x246
R12: 0x7fffffffddd8 --> 0x7fffffffef03f
("/mnt/d/UTMCTF2022_Proto/rev/nimrod/chal")
R13: 0x55555555ee7f (<main>:      endbr64)
R14: 0x555555563d10 --> 0x555555553c0 (<__do_global_dtors_aux>:      endbr64)
R15: 0x7ffff7ffd040 --> 0x7ffff7ffe2e0 --> 0x555555554000 --> 0x10102464c457f
EFLAGS: 0x293 (CARRY parity ADJUST zero SIGN trap INTERRUPT direction overflow)
[-----code-----]
    0x5555555f0ab <NimMainModule+488>: mov     rsi,rdx
    0x5555555f0ae <NimMainModule+491>: mov     rdi,rax
    0x5555555f0b1 <NimMainModule+494>: call    0x5555555ed0e <eqStrings>
=> 0x5555555f0b6 <NimMainModule+499>: xor     eax,0x1
    0x5555555f0b9 <NimMainModule+502>: test    al,al
    0x5555555f0bb <NimMainModule+504>: jne     0x5555555f0d2
<NimMainModule+527>
    0x5555555f0bd <NimMainModule+506>: lea     rax,[rip+0x155c]      #
0x555555560620 <TM__zC9bY5JD6g9aIk7nnSsyaj7A_4>
    0x5555555f0c4 <NimMainModule+513>: mov     rdi,rax
[-----stack-----]
0000| 0x7fffffffdc20 --> 0x7ffff7d16050 --> 0x6
0008| 0x7fffffffdc28 --> 0x7ffff7d17050 --> 0x1c
0016| 0x7fffffffdc30 --> 0x7ffff7d17090 --> 0x1c
0024| 0x7fffffffdc38 --> 0x7ffff7d170d0 --> 0x1c
0032| 0x7fffffffdc40 --> 0x5555555ec6b (<colonanonymous___chal_7>:      endbr64)
0040| 0x7fffffffdc48 --> 0x0
0048| 0x7fffffffdc50 --> 0x0
0056| 0x7fffffffdc58 --> 0x1c25dbf8553edc00
[-----]
Legend: code, data, rodata, value

Breakpoint 2, 0x00005555555f0b6 in NimMainModule ()

```

- Browse memory stack aet the plaintext flag from memory

```

gdb-peda$ x/50s 0x7ffff7d17050
...
0x7ffff7d170a0: "UTMCTF{n1mb13_1s_k1nd4_c00l}"

```

Flag: *subject to change*