```
Contents of section .group:
0000 01000000 0c000000
Contents of section .group:
0000 01000000 0d000000
Contents of section .group:
0000 01000000 0e000000
Contents of section .text:
0010 84820000 000089cl 83el0703 948a0000 .......
0020 0000ffe2 8b442404 f7d0c383 e0038b54
                                        .....D$......T
0030 240489c1 d3fa89d0 c3f7d023 442404c3 $......#D$..
0040 cle0080b 442404c3 33442404 c38b4424
                                        ....D$...3D$....D$
0050 04f7d8f3 c35653e8 fcffffff 81c60200
                                        .....VS......
0060 00008b44 240c8886 00000000 bb000000
                                         ...D$.......
0070 00ebla53 0fbe8600 00000050 e8fcffff
                                        ...S.....P....
0080 ff83c408 88860000 000083c3 0183fb0d
                                        . . . . . . . . . . . . . . . . . . .
0090 76e15b5e c3555756 53e8fcff ffff81c3 v.[^.UWVS......
00a0 02000000 8b742414 b9ffffff ffb80000 .....t$.......
00b0 000089f7 f2ae89c8 f7d083e8 0189c5b9
                                        . . . . . . . . . . . . . . . . .
00c0 00000000 eb0383c1 0139e97d 268d3c0e
                                        .........9.}&.<.
00d0 0fbe170f b6941300 00000032 93000000
                                        . . . . . . . . . . . 2 . . . .
00e0 0083e27f 881783ea 2080fa5e 76d8c607
                                        ....... ..^v...
00f0 20ebd35b 5e5f5dc3 565383ec 04e8fcff
                                        ..[^_].VS.....
0100 ffff81c3 02000000 68c00000 00e8fcff
                                        .....h...h...
0110 ffff8db3 00000000 56e8fcff ffff83ec .........V......
0120 0456e8fc ffffff83 c4145b5e c3
                                        .V.....[^.
Contents of section .data:
0000 c0000000 31313730 33303038 323500
                                        ....1170300825.
Contents of section .rodata:
. . . . . . . . . . . . . . . .
0020 00010203 04050607 08090a0b 0c0d0e0f
                                        . . . . . . . . . . . . . . . . . . .
0030 10111213 14151617 18191a1b 1cldlelf
                                        . . . . . . . . . . . . . . . .
0040 4243262c 393a5d3c 6d6f2825 4a366862 BC&,9:]<mo(%J6hb
0050 53453b63 7b794e48 75465427 4147553f SE;c{yNHuFT'AGU?
0060 333e6974 22722d32 302e6c4f 672a2970 3>it"r-20.log*)p
0070 7a56646e 44777e2b 6b6a662f 73495257 zVdnDw~+kjf/sIRW
0080 385a4c4b 60715065 5f517640 314d345b 8ZLK`qPe Qv@1M4[
0090 357c3761 24785920 585e7d23 5c213d7f 5|7a$xY X^{+}|_{=}
00a0 4b9bffff 30000000 99340000 c6560000 K...0...4...V..
00b0 blceffff 4bccffff 4lcaffff a7c4ffff
                                        ....K...A.....
00c0 8d050000 daa8ffff 810a0000 d0b3ffff ......
00d0 b47e0000 837a0000
                                      .~..z..
Contents of section .data.rel.local:
0000 00000000
Contents of section .text.__x86.get_pc_thunk.dx:
0000 8b1424c3
Contents of section .text.__x86.get_pc_thunk.bx:
0000 8b1c24c3
                                    ..$.
Contents of section .text.__x86.get_pc_thunk.si:
0000 8b3424c3
Contents of section .comment:
0000 00474343 3a202855 62756e74 7520372e .GCC: (Ubuntu 7.
0010 332e302d 31367562 756e7475 33292037 3.0-16ubuntu3) 7
```

phase5.o: file format elf32-i386

```
0020 2e332e30 00
                                   .3.0.
Contents of section .eh_frame:
0000 14000000 00000000 017a5200 017c0801 .....zR......
0010 1b0c0404 88010000 10000000 1c000000 ......
0020 00000000 55000000 00000000 28000000 ....U......(...
0030 30000000 55000000 40000000 00410e08 0...U...@....A..
0040 8602410e 0c83035d 0e10480e 14480e0c ..A....]..H..H..
0050 4fc30e08 41c60e04 34000000 5c000000 O...A...4...\...
0060 95000000 63000000 00410e08 8502410e ....c....A....A.
0070 0c870341 0e108604 410e1483 05025bc3 ...A....A....[.
0080 0e1041c6 0e0c41c7 0e0841c5 0e040000
                                       ..A...A...A....
0090 34000000 94000000 f8000000 35000000 4...........
00a0 00410e08 8602410e 0c830343 0e10500e .A....A....C..P.
00b0 144c0e18 480e1c41 0e20480e 0c41c30e .L..H..A. H..A..
00c0 0841c60e 04000000 10000000 cc000000
                                       .A..........
00d0 00000000 04000000 00000000 10000000 ......
00f0 10000000 f4000000 00000000 04000000 ......
0100 00000000
Disassembly of section .text:
000000000 <transform code>:
  0: e8 fc ff ff
                          call
                               1 <transform code+0x1>
                                                       //0218 0000
      81 c2 02 00 00 00
  5 •
                          add
                                $0x2,%edx
                                                        //0A19 0000
  b: 8b 44 24 08
                          mov
                                0x8(%esp),%eax
  f: 8b 84 82 00 00 00 00 mov
                                0x0(\%edx,\%eax,4),\%eax
                                                        //091A 0000
                                %eax,%ecx
 16: 89 c1
                          mov
 18: 83 e1 07
                          and
                                $0x7, %
                                0 \times 0 (\% \text{edx}, \% \text{ecx}, 4), \% \text{edx}
 1b: 03 94 8a 00 00 00 00 add
                                                       //0905 0000
 22: ff e2
                          jmp
                                *%edx
00000024 <.L3>:
 24: 8b 44 24 04
                          mov
                                0x4(%esp),%eax
 28: f7 d0
                          not
                                %eax
 2a: c3
                          ret
0000002b <.L5>:
 2b: 83 e0 03
                         and
                                $0x3,%
 2e: 8b 54 24 04
                         mov
                                0x4(%esp),%edx
 32: 89 c1
                         mov
                                %eax,%ecx
 34: d3 fa
                                %cl,%
                         sar
 36: 89 d0
                                %edx,%
                         mov
 38: c3
                          ret
00000039 <.L6>:
 39: f7 d0
                         not
                                %eax
 3b: 23 44 24 04
                         and
                                0x4(%esp), %eax
 3f: c3
                          ret
00000040 <.L7>:
 40: c1 e0 08
                         shl
                                $0x8,%
 43: 0b 44 24 04
                          or
                                0x4(%esp),%eax
 47: c3
                          ret
00000048 <.L8>:
 48: 33 44 24 04
                        xor 0x4(%esp),%eax
```

```
4c: c3
                            ret
0000004d <.L2>:
 4d: 8b 44 24 04
                            mov
                                   0x4(%esp),%eax
 51: f7 d8
                            neg
                                   %eax
00000053 <.L1>:
 53: f3 c3
                            repz ret
00000055 <generate code>:
 55: 56
                            push
                                   %esi
 56: 53
                            push
                                   %ebx
 57: e8 fc ff ff
                            call
                                   58 <generate_code+0x3> [58000000 021c0000
  //缺少__X86.get_pc_thunk.si
                                   $0x2,%esi
                                                         //0A19 0000
 5c: 81 c6 02 00 00 00
                            add
   //映射_GLOBAL_OFFSET_TABLE_
 62: 8b 44 24 0c
                            mov
                                   0xc(%esp),%eax
 66: 88 86 00 00 00 00
                            mov
                                   %al,0x0(%esi)
                                                        //091D 0000
   //映射CODE
                                   $0x0,%=bx
 6c: bb 00 00 00 00
                            mov
                                   8d <generate_code+0x38>
 71: eb 1a
                            jmp
 73:
      53
                            push
                                   %ebx
 74: Of be 86 00 00 00 00 movsbl 0x0(\%esi),\%eax
 7b: 50
                            push
                                   %eax
 7c: e8 fc ff ff
                            call
                                   7d <generate_code+0x28>|7d000000 02170000
   //缺少tranform_code
 81: 83 c4 08
                            add
                                   $0x8,%
 84: 88 86 00 00 00 00
                            mov
                                   %al_{0}x_{0}(%_{esi})
                                                    //091D 0000
   //映射CODE
 8a: 83 c3 01
                            add
                                   $0x1,% ebx
 8d: 83 fb 0d
                            cmp
                                   $0xd, % ebx
 90:
      76 e1
                            ibe
                                   73 <generate_code+0x1e>
 92: 5b
                            pop
                                   %ebx
 93: 5e
                            pop
                                   %esi
 94: c3
                            ret
00000095 <encode>:
 95: 55
                            push
                                   %ebp
 96: 57
                            push
                                   %edi
 97: 56
                                   %esi
                            push
 98: 53
                                   %ebx
                            push
 99: e8 fc ff ff
                            call
                                   9a < encode + 0x5 > | 9a000000 021f0000
   //缺少__X86.get_pc_thunk.bx
 9e: 81 c3 02 00 00 00
                            add
                                   $0x2,%ebx
                                                         //0A19 0000
  //映射_GLOBAL_OFFSET_TABLE_
 a4: 8b 74 24 14
                                   0x14(%asp),%asi
                            mov
 a8: b9 ff ff ff
                                   $0xfffffffff,%ecx
                            mov
 ad:
      b8 00 00 00 00
                            mov
                                   $0x0, %
 b2:
      89 f7
                                   %esi,%edi
                            mov
 b4: f2 ae
                            repnz scas %es:(%edi),%al
 b6: 89 c8
                            mov
                                   %ecx,%eax
 b8: f7 d0
                            not
                                   %eax
 ba:
      83 e8 01
                            sub
                                   $0x1,%
 bd:
      89 c5
                            mov
                                   %eax,%ebp
 bf:
      b9 00 00 00 00
                            mov
                                   $0x0, %
 c4:
      eb 03
                            gmį
                                   c9 <encode+0x34>
                            add
 c6:
      83 cl 01
                                   $0x1,%ecx
```

```
c9: 39 e9
                         cmp %ebp,%ecx
 cb: 7d 26
                           jge
                               f3 <encode+0x5e>
 cd: 8d 3c 0e
                          lea
                                 (%esi,%ecx,1),%edi
                          movsbl (%edi),%edx
 d0: Of be 17
 d3: Of b6 94 13 00 00 00 movzbl 0x0(% bx, % dx, 1), % dx
 da: 00
 db: 32 93 00 00 00 00
                                0 \times 0 (\% = b \times ), \% = 1
                         xor
                                                    //091D 0000
  //映射CODE
 e1: 83 e2 7f
                          and
                                $0x7f,%edx
 e4: 88 17
                                %dl,(%<mark>edi</mark>)
                          mov
 e6: 83 ea 20
                                $0x20,%
                          sub
 e9: 80 fa 5e
                          cmp
                                $0x5e,%
 ec: 76 d8
                           jbe
                                c6 <encode+0x31>
 ee: c6 07 20
                          movb $0x20,(\%edi)
 f1: eb d3
                           jmp
                                c6 <encode+0x31>
 f3: 5b
                          pop
                                %ebx
 f4: 5e
                                %esi
                          pop
 f5: 5f
                                 %edi
                          pop
 f6: 5d
                                %ebp
                          pop
 f7: c3
                          ret
000000f8 <do_phase>:
 f8: 56
                          push %esi
 f9: 53
                          push %ebx
 fa: 83 ec 04
                          sub
                                 $0x4,%esp
 fd: e8 fc ff ff ff
                         call fe <do_phase+0x6> | fe000000 021f0000
   //缺少__X86.get_pc_thunk.bx
102: 81 c3 02 00 00 00
                        add
                                 $0x2,%
108: 68 c0 00 00 00
                         push $0xc0
10d: e8 fc ff ff
                          call 10e <do phase+0x16> | 0e010000 021b0000
   //缺少generate_code
                                0x0(\% = 0x), \% = 81 //0922 0000
112: 8d b3 00 00 00 00 lea
118: 56
                          push %esi
119: e8 fc ff ff
                                11a <do phase+0x22> //021E 0000
                         call
encode
11e: 83 ec 04
                                 $0x4,%
                          sub
121: 56
                          push
                                %esi
122: e8 fc ff ff ff
                          call
                                123 <do_phase+0x2b> //0423 0000
printf
127: 83 c4 14
                          add
                                 $0x14,%
12a: 5b
                                 %ebx
                          pop
12b: 5e
                          pop
                                 %esi
12c: c3
                          ret
Disassembly of section .text.__x86.get_pc_thunk.dx:
00000000 <__x86.get_pc_thunk.dx>:
  0: 8b 14 24
                          mov
                                 (%esp),%edx
  3:
     с3
                           ret
Disassembly of section .text.__x86.get_pc_thunk.bx:
00000000 <__x86.get_pc_thunk.bx>:
  0: 8b 1c 24
                          mov
                                 (%esp),%ebx
  3: c3
                          ret
Disassembly of section .text.__x86.get_pc_thunk.si:
```