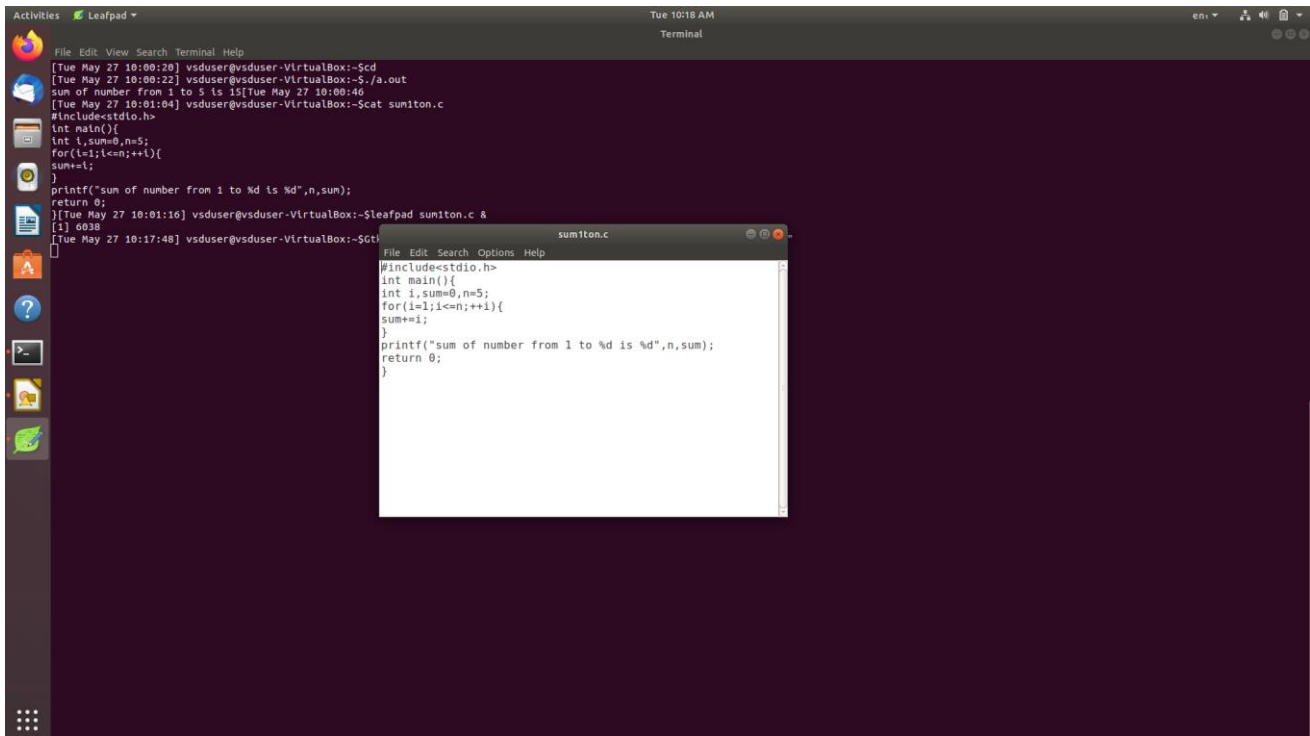


Task 2

1.C Code compiled on gcc Compiler



The screenshot displays a Linux desktop environment with a terminal window and a code editor window. The terminal window shows the following commands and output:

```
[Tue May 27 10:00:20] vsduser@vsduser-VirtualBox:~$ cd
[Tue May 27 10:00:22] vsduser@vsduser-VirtualBox:~$ ./a.out
sum of number from 1 to 5 is 15[Tue May 27 10:00:46]
[Tue May 27 10:01:04] vsduser@vsduser-VirtualBox:~$ gcc sumiton.c
#include<stdio.h>
int main(){
int i,sum=0,n=5;
for(i=1;i<=n;++i){
sum+=i;
}
printf("sum of number from 1 to %d is %d",n,sum);
return 0;
}[Tue May 27 10:01:16] vsduser@vsduser-VirtualBox:~$ leafpad sumiton.c &
[1] 6038
[Tue May 27 10:17:48] vsduser@vsduser-VirtualBox:~$ gcc
```

The code editor window, titled "sumiton.c", shows the following C code:

```
#include<stdio.h>
int main(){
int i,sum=0,n=5;
for(i=1;i<=n;++i){
sum+=i;
}
printf("sum of number from 1 to %d is %d",n,sum);
return 0;
}
```

2.C Code compiled on riscv gcc Compiler

```
Activities Terminal Tue 9:59 AM en:
File Edit View Search Terminal Tabs Help

0000000000100b0: <main>:
100b0: 00021537      lui      a0,0x21
100b4: f7f01013      addi     sp,sp,-16
100b8: 00f06013      ll       a2,15
100bc: 00500593      ll       a1,5
100c0: 10050513      addi     a0,a0,384 # 21180 <__clzld2+0x48>
100c4: 00113423      sd       ra,8(sp)
100c8: 340000ef      jal      ra,10400 <printf>
100cc: 00813083      ld       ra,8(sp)
100d0: 00000513      li       a0,0
100d4: 01010113      addi     sp,sp,16
100d8: 00000067      ret

0000000000100dc: <register_fini>:
100dc: ffff0797      autpc    a5,0xffff0
100e0: f2470793      addi     a5,a5,-220 # 0 <main-0x100b0>
100e4: 00078063      beqz     a5,100f4 <register_fini+0x18>
100e8: 00000517      autpc    a0,0x0
100ec: 11000513      addi     a0,a0,272 # 101f8 <__libc_fini_array>
100f0: 0c00006f      j        101b0 <atexit>
100f4: 00000067      ret

0000000000100f8: <start>:
100f8: 00013197      autpc    gp,0x13
100fc: 91018193      addi     gp,gp,-1776 # 22a08 <__global_pointer$>
10100: 77018513      addi     a0,gp,-1904 # 23178 <_edata>
10104: 00013617      autpc    a2,0x13
10108: 10400613      addi     a2,a2,260 # 23208 <__BSS_END__>
1010c: 40a00633      sub      a2,a2,a0
10110: 00000593      ll       a1,0
10114: 104000ef      jal      ra,102e8 <mset>
10118: 00000517      autpc    a0,0x0
1011c: 00050513      addi     a0,a0,224 # 101f8 <__libc_fini_array>
10120: 000000ef      jal      ra,10200 <atexit>
10124: 130000ef      jal      ra,10254 <__libc_lnt_array>
10128: 00012503      lw       a0,0(sp)
1012c: 00010593      addi     a1,sp,8
10130: 00000613      li       a2,0
10134: f7dfffef      jal      ra,100b0 <main>
10138: 08c0006f      j        101c4 <exit>

00000000001013c: <do_global_dtors_aux>:
1013c: 7981c783      lbu      a5,1944(gp) # 231a0 <completed.5468>
10140: 04079463      bnez     a5,10180 <__do_global_dtors_aux+0x4c>
10144: f7f07797      autpc    a5,0xffff0
10148: ebc70793      addi     a5,a5,-324 # 0 <main-0x100b0>
1014c: 02078063      beqz     a5,1017c <do_global_dtors_aux+0x40>
10150: f7f01013      addi     sp,sp,-16
10154: 00012517      autpc    a0,a0,12
10158: eac50513      addi     a0,a0,-340 # 22000 <__FRAME_END__>
1015c: 00113423      sd       ra,8(sp)
10160: 00000097      autpc    ra,0x0

210bc: 00165613      srll     a2,a2,0x1
210c0: fe0690e3      bnez     a3,210ac <__udlvd13+0x2c>
210c4: 00008067      ret

0000000000210c8: <_unoddl3>:
210c8: 00008293      mv       t0,ra
210cc: fb5ff0ef      jal      ra,21080 <__udlvd13>
210d0: 00055513      mv       a0,a1
210d4: 00028067      jr       t0
210d8: 40a00533      neg      a0,a0
210dc: 00050863      bgez     a1,210ec <_unoddl3+0x24>
210e0: 40a00533      neg      a1,a1
210e4: f9dfffef      j        21080 <__udlvd13>
210e8: 40b005b3      neg      a1,a1
210ec: 00008293      mv       t0,ra
210f0: f91ff0ef      jal      ra,21080 <__udlvd13>
210f4: 40a00533      neg      a0,a0
210f8: 00028067      jr       t0

0000000000210fc: <_moddl3>:
210fc: 00008293      mv       t0,ra
21100: 0005ca03      bltz     a1,21114 <_moddl3+0x18>
21104: 00054a63      bltz     a0,2111c <_moddl3+0x20>
21108: f79ff0ef      jal      ra,21080 <__udlvd13>
2110c: 00058513      mv       a0,a1
21110: 00028067      jr       t0
21114: 40b005b3      neg      a1,a1
21118: fe0558e3      bgez     a0,21108 <_moddl3+0xc>
2111c: 40a00533      neg      a0,a0
21120: f61ff0ef      jal      ra,21080 <__udlvd13>
21124: 40b00533      neg      a0,a1
21128: 00028067      jr       t0
2112c: 01f29293      slll     t0,t0,0x1f
21130: f45514e3      bne      a0,t0,21078 <__dlvd13>
21134: 00008067      ret

000000000021138: <_clzld2>:
21138: 03800793      li       a5,56
2113c: 00f55733      srl      a4,a0,a5
21140: 0ff77713      andl     a4,a4,255
21144: 00071663      bnez     a4,21150 <_clzld2+0x18>
21148: f7870793      addi     a5,a5,-8
2114c: fc0700e3      bnez     a5,2113c <_clzld2+0x4>
21150: 04000713      li       a4,64
21154: 40f70733      sub      a4,a4,a5
21158: 00f557b3      srl      a5,a0,a5
2115c: 00001517      autpc    a0,0x1
21160: cc450513      addi     a0,a0,-828 # 21e20 <__clz_tab>
21164: 00f507b3      add      a5,a0,a5
21168: 0007c553      lbu      a0,0(a5)
2116c: 40a7053b      subw     a0,a4,a0
21170: 00008067      ret

[Tue May 27 09:58:29] vdsuser@vdsuser-VirtualBox:~$
```

```
Activities Terminal Tue 9:58 AM en:
File Edit View Search Terminal Tabs Help

210bc: 00165613      srll     a2,a2,0x1
210c0: fe0690e3      bnez     a3,210ac <__udlvd13+0x2c>
210c4: 00008067      ret

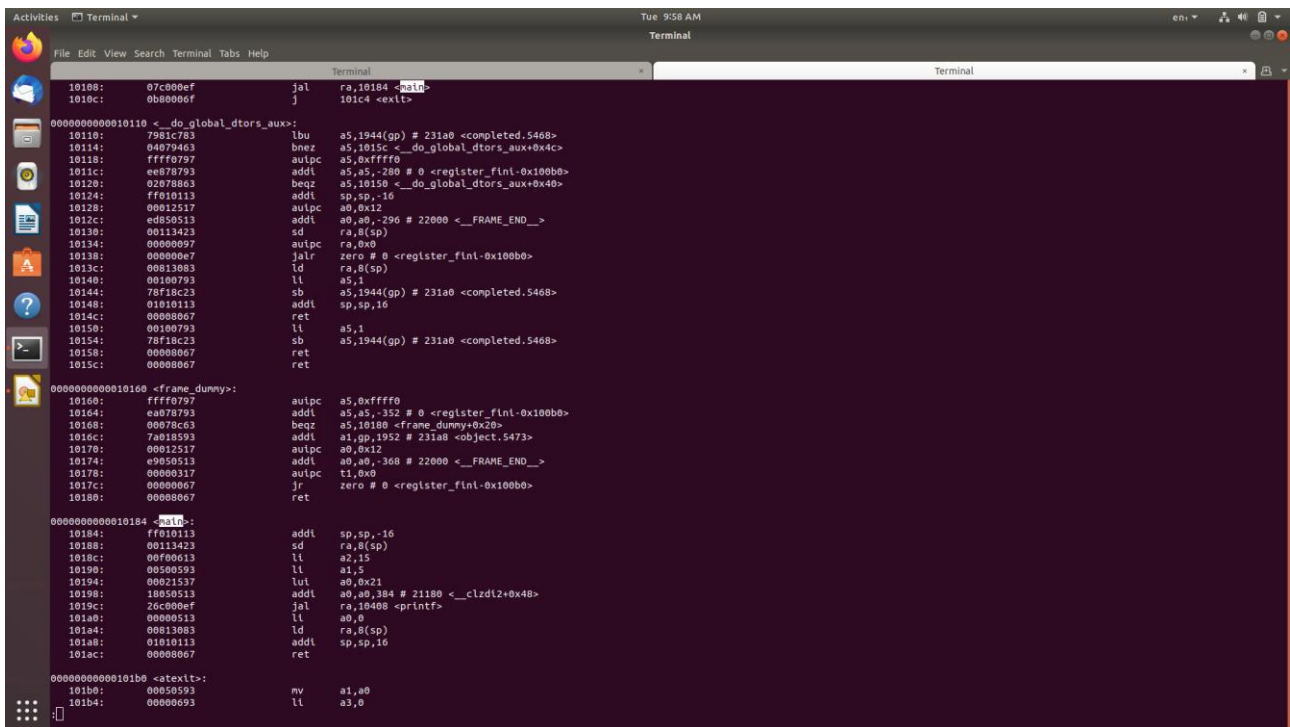
0000000000210c8: <_unoddl3>:
210c8: 00008293      mv       t0,ra
210cc: fb5ff0ef      jal      ra,21080 <__udlvd13>
210d0: 00055513      mv       a0,a1
210d4: 00028067      jr       t0
210d8: 40a00533      neg      a0,a0
210dc: 00050863      bgez     a1,210ec <_unoddl3+0x24>
210e0: 40a00533      neg      a1,a1
210e4: f9dfffef      j        21080 <__udlvd13>
210e8: 40b005b3      neg      a1,a1
210ec: 00008293      mv       t0,ra
210f0: f91ff0ef      jal      ra,21080 <__udlvd13>
210f4: 40a00533      neg      a0,a0
210f8: 00028067      jr       t0

0000000000210fc: <_moddl3>:
210fc: 00008293      mv       t0,ra
21100: 0005ca03      bltz     a1,21114 <_moddl3+0x18>
21104: 00054a63      bltz     a0,2111c <_moddl3+0x20>
21108: f79ff0ef      jal      ra,21080 <__udlvd13>
2110c: 00058513      mv       a0,a1
21110: 00028067      jr       t0
21114: 40b005b3      neg      a1,a1
21118: fe0558e3      bgez     a0,21108 <_moddl3+0xc>
2111c: 40a00533      neg      a0,a0
21120: f61ff0ef      jal      ra,21080 <__udlvd13>
21124: 40b00533      neg      a0,a1
21128: 00028067      jr       t0
2112c: 01f29293      slll     t0,t0,0x1f
21130: f45514e3      bne      a0,t0,21078 <__dlvd13>
21134: 00008067      ret

000000000021138: <_clzld2>:
21138: 03800793      li       a5,56
2113c: 00f55733      srl      a4,a0,a5
21140: 0ff77713      andl     a4,a4,255
21144: 00071663      bnez     a4,21150 <_clzld2+0x18>
21148: f7870793      addi     a5,a5,-8
2114c: fc0700e3      bnez     a5,2113c <_clzld2+0x4>
21150: 04000713      li       a4,64
21154: 40f70733      sub      a4,a4,a5
21158: 00f557b3      srl      a5,a0,a5
2115c: 00001517      autpc    a0,0x1
21160: cc450513      addi     a0,a0,-828 # 21e20 <__clz_tab>
21164: 00f507b3      add      a5,a0,a5
21168: 0007c553      lbu      a0,0(a5)
2116c: 40a7053b      subw     a0,a4,a0
21170: 00008067      ret

[Tue May 27 09:58:29] vdsuser@vdsuser-VirtualBox:~$
```

3. Objdump using -O1 format



```
10108: 07c000ef    jal    ra,10104 <main>
1010c: 0b00006f    j      101c4 <exit>

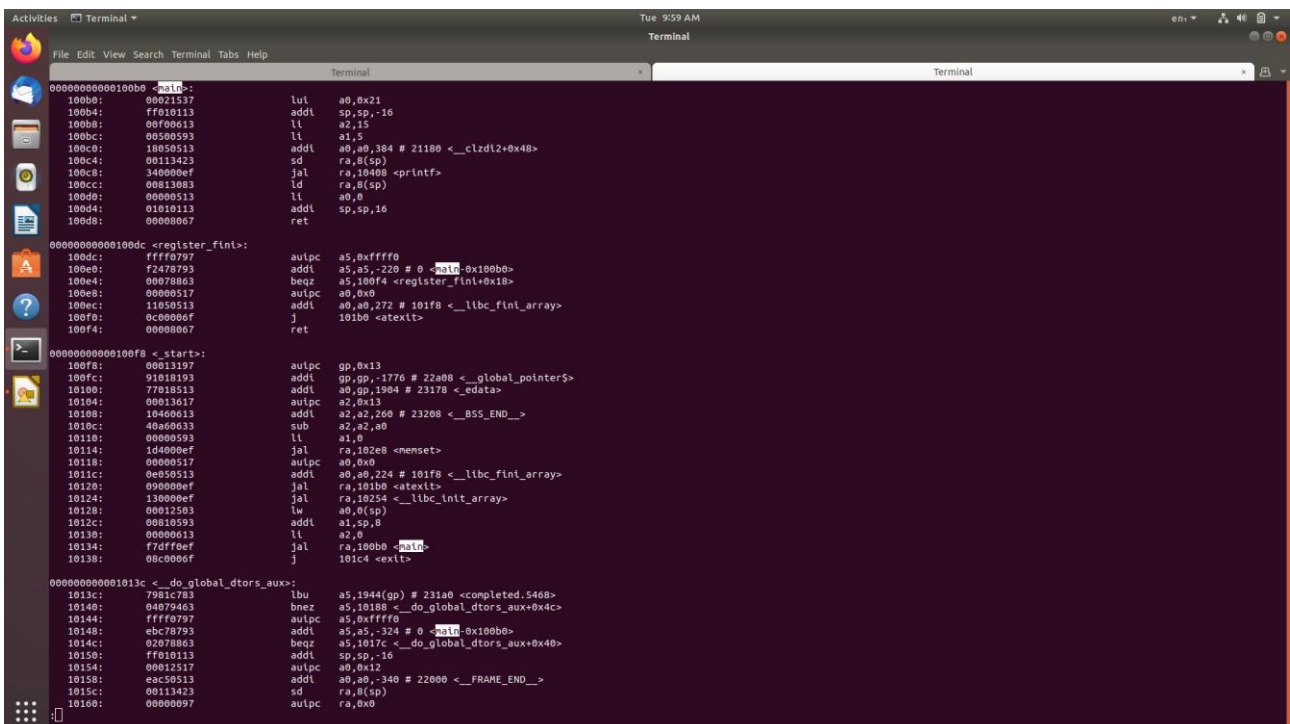
0000000000010110 <_do_global_ctors_aux>:
10110: 7981c783    lbu     a5,1944(gp) # 231a0 <completed.5468>
10114: 04079463    bnez    a5,1015c <_do_global_ctors_aux+0x4c>
10118: ffff0797    auipc   a5,0xfffff0
1011c: ee078793    addi    a5,a5,-200 # 0 <register_fini-0x100b0>
10120: 02078863    beqz    a5,10150 <_do_global_ctors_aux+0x40>
10124: ff010113    addi    sp,sp,-16
10128: 00012517    auipc   a0,0x12
1012c: e0850513    addi    a0,a0,-296 # 22000 <__FRAME_END__>
10130: 00113423    sd      ra,a(sp)
10134: 00000097    auipc   ra,0x0
10138: 000000e7    jalr     zero # 0 <register_fini-0x100b0>
1013c: 00813083    ld      ra,0(sp)
10140: 00100793    ll      a5,1
10144: 78f18c23    sb      a5,1944(gp) # 231a0 <completed.5468>
10148: 01010113    addi    sp,sp,16
1014c: 00008067    ret
10150: 00100793    ll      a5,1
10154: 78f18c23    sb      a5,1944(gp) # 231a0 <completed.5468>
10158: 00008067    ret
1015c: 00008067    ret

0000000000010100 <frame_dummy>:
10100: ffff0797    auipc   a5,0xfffff0
10104: ea078793    addi    a5,a5,-352 # 0 <register_fini-0x100b0>
10108: 00070c63    beqz    a5,10100 <frame_dummy+0x20>
1010c: 7a018593    addi    a1,gp,1952 # 231a8 <object.5473>
10110: 00012517    auipc   a0,0x12
10114: e0850513    addi    a0,a0,-368 # 22000 <__FRAME_END__>
10118: 00000317    auipc   t1,0x0
1011c: 00000067    jr      zero # 0 <register_fini-0x100b0>
10120: 00008067    ret

0000000000010184 <__fini>:
10184: ff010113    addi    sp,sp,-16
10188: 00113423    sd      ra,0(sp)
1018c: 00f00613    ll      a2,15
10190: 00500593    ll      a1,5
10194: 00021537    lui     a0,0x21
10198: 18050513    addi    a0,a0,384 # 21100 <__clzdi2+0x48>
1019c: 26c000ef    jal     ra,10408 <printf>
101a0: 00000513    ll      a0,0
101a4: 00813083    ld      ra,0(sp)
101a8: 01010113    addi    sp,sp,16
101ac: 00008067    ret

00000000000101b0 <atexit>:
101b0: 00050593    mv      a1,a0
101b4: 00000693    ll      a3,0
```

4. Objdump using -Ofast format



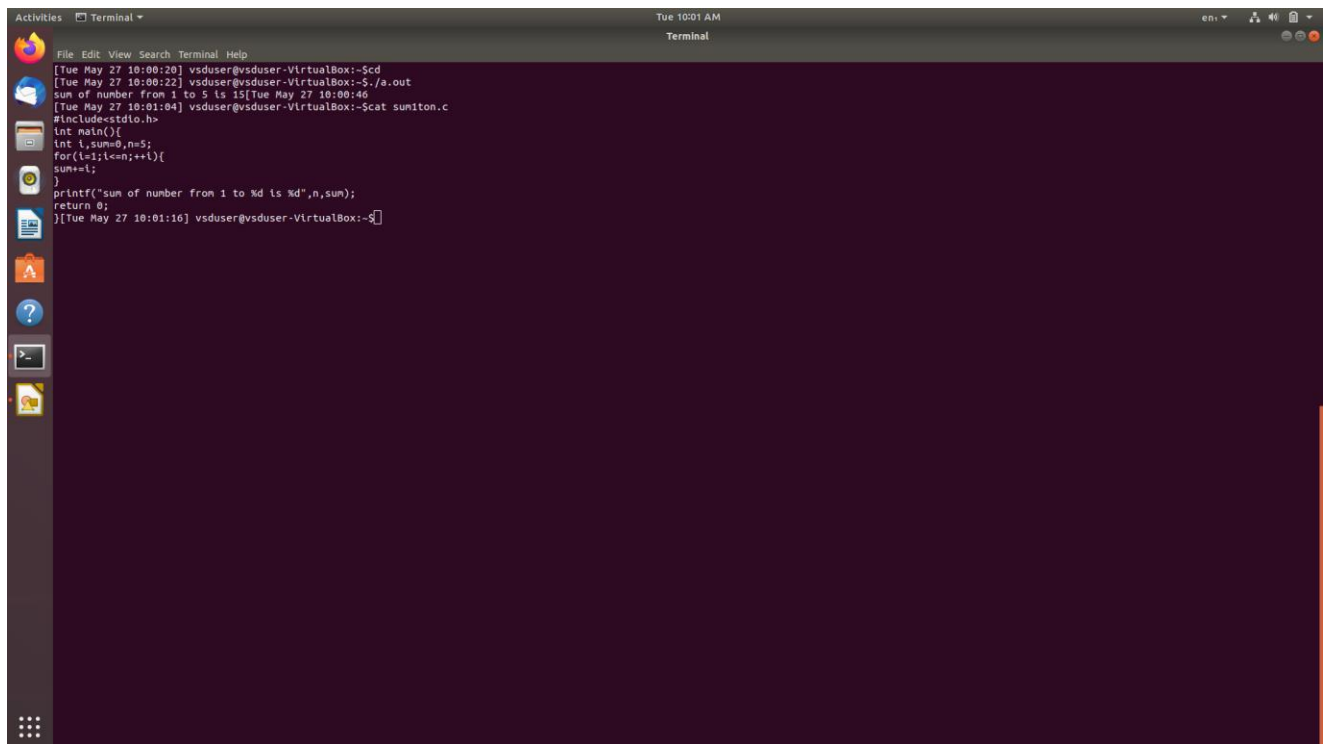
```
00000000000100b0 <__fini>:
100b0: 00012517    lui     a0,0x21
100b4: ff010113    addi    sp,sp,-16
100b8: 00f00613    ll      a2,15
100bc: 00500593    ll      a1,5
100c0: 18050513    addi    a0,a0,384 # 21100 <__clzdi2+0x48>
100c4: 00113423    sd      ra,0(sp)
100c8: 340000ef    jal     ra,10408 <printf>
100cc: 00813083    ld      ra,0(sp)
100d0: 00000513    ll      a0,0
100d4: 01010113    addi    sp,sp,16
100d8: 00008067    ret

00000000000100dc <register_fini>:
100dc: ffff0797    auipc   a5,0xfffff0
100e0: f2478793    addi    a5,a5,-220 # 0 <main-0x100b0>
100e4: 00078863    beqz    a5,100f4 <register_fini+0x18>
100e8: 00000517    auipc   a0,0x0
100ec: 11050513    addi    a0,a0,272 # 101f8 <__libc_fini_array>
100f0: 0c00006f    j      101b0 <atexit>
100f4: 00008067    ret

00000000000100f8 <start>:
100f8: 00013197    auipc   gp,0x13
100fc: 91018193    addi    gp,gp,-1776 # 22a08 <__global_pointer$>
10100: 77018193    addi    a0,gp,-1904 # 23178 <__edata>
10104: 00013017    auipc   a2,0x13
10108: 10400613    addi    a2,a2,260 # 23208 <__BSS_END__>
1010c: 40a00633    sub     a2,a2,a0
10110: 00000593    ll      a1,0
10114: 104000ef    jal     ra,102e8 <mmemset>
10118: 00000517    auipc   a0,0x0
1011c: 0e050513    addi    a0,a0,224 # 101f8 <__libc_fini_array>
10120: 000000ef    jal     ra,10108 <atexit>
10124: 130000ef    jal     ra,10254 <__libc_init_array>
10128: 00012503    lw      a0,0(sp)
1012c: 00810593    addi    a1,sp,8
10130: 00000613    ll      a2,0
10134: f7dffeef    jal     ra,100b0 <main>
10138: 00c0006f    j      101c4 <exit>

000000000001013c <_do_global_ctors_aux>:
1013c: 7981c783    lbu     a5,1944(gp) # 231a0 <completed.5468>
10140: 04079463    bnez    a5,10188 <_do_global_ctors_aux+0x4c>
10144: ffff0797    auipc   a5,0xfffff0
10148: eb078793    addi    a5,a5,-324 # 0 <main-0x100b0>
1014c: 02078863    beqz    a5,1017c <_do_global_ctors_aux+0x40>
10150: ff010113    addi    sp,sp,-16
10154: 00012517    auipc   a0,0x12
10158: ec050513    addi    a0,a0,-340 # 22000 <__FRAME_END__>
1015c: 00113423    sd      ra,a(sp)
10160: 00000097    auipc   ra,0x0
```

5.Cat Command



The screenshot shows a terminal window with a dark purple background. The terminal displays the following sequence of commands and output:

```
[Tue May 27 10:00:20] vsduser@vsduser-VirtualBox:~$ cd
[Tue May 27 10:00:22] vsduser@vsduser-VirtualBox:~$ ./a.out
sum of number from 1 to 5 is 15[Tue May 27 10:00:46]
[Tue May 27 10:01:04] vsduser@vsduser-VirtualBox:~$ cat sumiton.c
#include<stdio.h>

int main(){
    int i,sum=0,n=5;
    for(i=1;i<=n;++i){
        sum+=i;
    }
    printf("sum of number from 1 to %d is %d",n,sum);
    return 0;
}[Tue May 27 10:01:16] vsduser@vsduser-VirtualBox:~$
```

The terminal window has a menu bar with 'File', 'Edit', 'View', 'Search', 'Terminal', and 'Help'. The title bar indicates the window is titled 'Terminal' and shows the time as 'Tue 10:01 AM'. The left sidebar contains various application icons, including a file manager, a web browser, and a terminal icon.