# 实验四 GDB 调试工具使用实验

#### 一、 实验简介

1. 概述 Linux 包含了一个叫 gdb 的 GNU 调试程序。gdb 是一个用来调试 C 和 C++程序的强有力调试器。它使你能在程序运行时观察程序的内部结构和内存的使用情 况。它具有以下一些功能: 监视程序中变量的值; 设置断点以使程序在指定的代码行上停止执行; 一行行的执行代码。

## 二、实验目的

1. 熟悉 GDB 工具原理; 2. 使用 GDB 调试程

## 四、实验内容

```
# gcc ./greeting.c -o ./greeting.out
# gcc ./greeting.c -o ./greeting.out -g
# gdb ./greeting.out
GNU gdb (Ubuntu 9.2-Oubuntu1~20.04) 9.2
Copyright (C) 2020 Free Software Foundation, Inc.
License GPLv3+: GNU GPL version 3 or later <a href="http://gnu.org/licenses/gpl.html">http://gnu.org/licenses/gpl.html</a>
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:
<http://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 ./greeting.out...
(gdb) l
         #include <stdio.h>
         #include <stdlib.h>
         #include <string.h>
         int main()
5
6
             void my_print(char *string);
7
             void my_print2(char *string);
             char my_string[] = "hello there";
8
9
             my_print(my_string);
10
             my_print2(my_string);
(gdb)
```

```
(gdb) b 9
Breakpoint 1 at 0x904: file ./greeting.c, line 9.
(qdb) r
Starting program: /mnt/c/Users/I_Rin/Documents/2021-thundersoft-training/EX4/greeting.out
my_print (string=0xfffffffffee78 "hello there") at ./greeting.c:14
printf("The string is %c\n"
(gdb) s
            printf("The string is %s\n", string);
(gdb) p
The history is empty.
(gdb) l
            my_print(my_string);
            my_print2(my_string);
10
11
        void my_print(char *string)
            printf("The string is %s\n", string);
14
15
16
        void my_print2(char *string)
            char *string2;
(gdb) n
The string is hello there
15
(gdb) n
main () at ./greeting.c:10
            my_print2(my_string);
(gdb) n
The string printed backwand is
The string printed backwand is ereht olleh
11
(gdb) l
```

## 六、拓展练习

使用 set args 为排序输入参数

经过 debug 发现, num\_y 经常出现值变为 0 的情况, 因此推测这是造成死循环的原因。

```
(gdb) p num_y
$6 = 0
```

发现是第20行的等于号问题,将其改正后如下:

```
if (num_y == 0)
{
    y[0] = new_y;
    return;
}
```

除此之外发现程序不能正确排序, 总是输出 0, 因此推断没有正确在 insert 的时插入当前值。 Insert 处添加:

```
}
y[num_y] = new_y;
```

#### 再修改位移函数:

```
oid scoot_over(int jj)
  for (int k = num_y ; k > jj; k--)
    y[k] = y[k - 1];
```

最后程序可以正常工作。