

642303003

Assignment No:03

Aim: Use gdb to read assembly code for C program to find factorial of a number with recursion and demonstrate how parameters are passed using pass by value.

```
rohan@rohanlaptop: ~/yashppl
rohan@rohanlaptop:~$ cd yashppl
rohan@rohanlaptop:~/yashppl$ gedit ppl3.c
^C^C
rohan@rohanlaptop:~/yashppl$ gcc -g ppl3.c
rohan@rohanlaptop:~/yashppl$ gdb ./a.out
GNU gdb (Ubuntu 12.0.90-0ubuntu1) 12.0.90
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 ./a.out...
(gdb) b main
Breakpoint 1 at 0x11cf: file ppl3.c, line 12.
(gdb) b factorial
Breakpoint 2 at 0x1199: file ppl3.c, line 5.
(gdb) tui enable
rohan@rohanlaptop:~/yashppl$
```

```
ppl3.c
4      {
5          if (n == 0)
6              return 1;
7          else
8              return(n * factorial(n-1));
9      }
10
11  int main()
12  {
13      int number;
14      long fact;
15      printf("Enter a number: ");
16      scanf("%d", &number);
17
18      fact = factorial(number);
19      printf("Factorial of %d is %ld\n", number, fact);
20      return 0;
21  }
22
23
24
25
exec No process in:
(gdb) L?? PC: ??
```

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```
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ppl3.c
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9      }
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11  int main()
12  {
13      int number;
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15      printf("Enter a number: ");
16      scanf("%d", &number);
17
18      fact = factorial(number);
19      printf("Factorial of %d is %ld\n", number, fact);
20      return 0;
21  }
22
23
24
25

multi-thre Thread 0x7ffff7fa87 In: main                                L12    PC: 0x5555555551cf
(gdb) r
Starting program: /home/rohan/yashppl/a.out
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".

Breakpoint 1, main () at ppl3.c:12
(gdb)
```

```
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ppl3.c
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8              return(n * factorial(n-1));
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11  int main()
12  {
13      int number;
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15      printf("Enter a number: ");
16      scanf("%d", &number);
17
18      fact = factorial(number);
19      printf("Factorial of %d is %ld\n", number, fact);
20      return 0;
21  }
22
23
24
25

multi-thre Thread 0x7ffff7fa87 In: factorial                        L8      PC: 0x5555555551a6
Continuing.
Enter a number: 5
Breakpoint 2, factorial (n=5) at ppl3.c:5
(gdb) n
(gdb) n

Breakpoint 2, factorial (n=4) at ppl3.c:5
(gdb) n
(gdb) n

Breakpoint 2, factorial (n=3) at ppl3.c:5
(gdb) n
(gdb) n
```

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```
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4      {
5      if (n == 0)
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9      }
10
11  int main()
12  {
13      int number;
14      long fact;
15      printf("Enter a number: ");
16      scanf("%d", &number);
17
18      fact = factorial(number);
19      printf("Factorial of %d is %ld\n", number, fact);
20      printf("Factorial of %d is %ld\n", number, fact);
21      return 0;
22
23
24
25
```

multi-thre Thread 0x7ffff7fa87 In: main L19 PC: 0x55555555521b

(gdb) n 20 38

(gdb) n

(gdb) n

factorial (n=5) at ppl3.c:8

(gdb) n

(gdb) n

main () at ppl3.c:19

(gdb) p

The history is empty.

(gdb) n

Factorial of 5 is 120

(gdb) p

The history is empty.

(gdb)