

OOP Lab

Week 5 Assignment Submission

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200905044

Batch B1

10

GDB EXCERCISE:

```
#include<stdio.h>
```

```
int main(){

    int num;

    do{

        printf("Enter a positive integer");

        scanf("%d",&num);

    } while(num<0);


    int factorial, i;

    for (i = 1; i<=num; i++){

        factorial = factorial *i;

    }

    printf("%d! = %d\n", num, factorial);

    return 0;

}
```

(gdb) run

Starting program: /home/Student/Parth/firstexample

Enter a positive integer4

4! = -129024

[Inferior 1 (process 4334) exited normally]

(gdb) break main

Breakpoint 1 at 0x555555554722: file firstexample.c, line 3.

(gdb) run

Starting program: /home/Student/Parth/firstexample

Breakpoint 1, main () at firstexample.c:3

3 int main(){

(gdb) next

6 printf("Enter a positive integer");

(gdb) next

7 scanf("%d",&num);

(gdb) list

2

3 int main(){

4 int num;

5 do{

6 printf("Enter a positive integer");

7 scanf("%d",&num);

8 } while(num<0);

9

10 int factorial, i;

11 for (i = 1; i<=num; i++){

(gdb) print num

\$1 = 21845

(gdb) next

Enter a positive integer4

8 } while(num<0);

(gdb) print num

\$2 = 4

(gdb) next

11 for (i = 1; i<=num; i++){

(gdb) next

12 factorial = factorial *i;

(gdb) next

11 for (i = 1; i<=num; i++){

(gdb) print factorial

\$3 = -5376

(gdb) next

12 factorial = factorial *i;

(gdb) next

11 for (i = 1; i<=num; i++){

(gdb) print factorial

\$4 = -10752

(gdb) break firstexample.c:10

Breakpoint 2 at 0x555555554761: file firstexample.c, line 10.

(gdb) next

12 factorial = factorial *i;

(gdb) print i

\$5 = 3

(gdb) print factorial

\$6 = -10752

(gdb) next

11 for (i = 1; i<=num; i++){

(gdb) print factorial

\$7 = -32256

(gdb) info locals

num = 4

factorial = -32256

i = 3

(gdb) next

```

12      factorial = factorial *i;(gdb) next
11      for (i = 1; i<=num; i++){
(gdb) next
14      printf("%d! = %d\n", num, factorial);
(gdb) next
4! = -129024
15      return 0;
(gdb) info locals
num = 4
factorial = -129024
i = 5
(gdb) next
16  }
(gdb) n
__libc_start_main (main=0x55555555471a <main>, argc=1, argv=0x7fffffffeb08,
init=<optimized out>, fini=<optimized out>, rtdl_fini=<optimized out>,
stack_end=0x7fffffffeaf8) at ../csu/libc-start.c:344
344 ../csu/libc-start.c: No such file or directory.
(gdb) n
[Inferior 1 (process 4431) exited normally]

```

From gdb, we were able to identify the error. The variable factorial was not defined which caused the bug.

Correct program:

```
#include<stdio.h>
```

```
int main(){
```

```

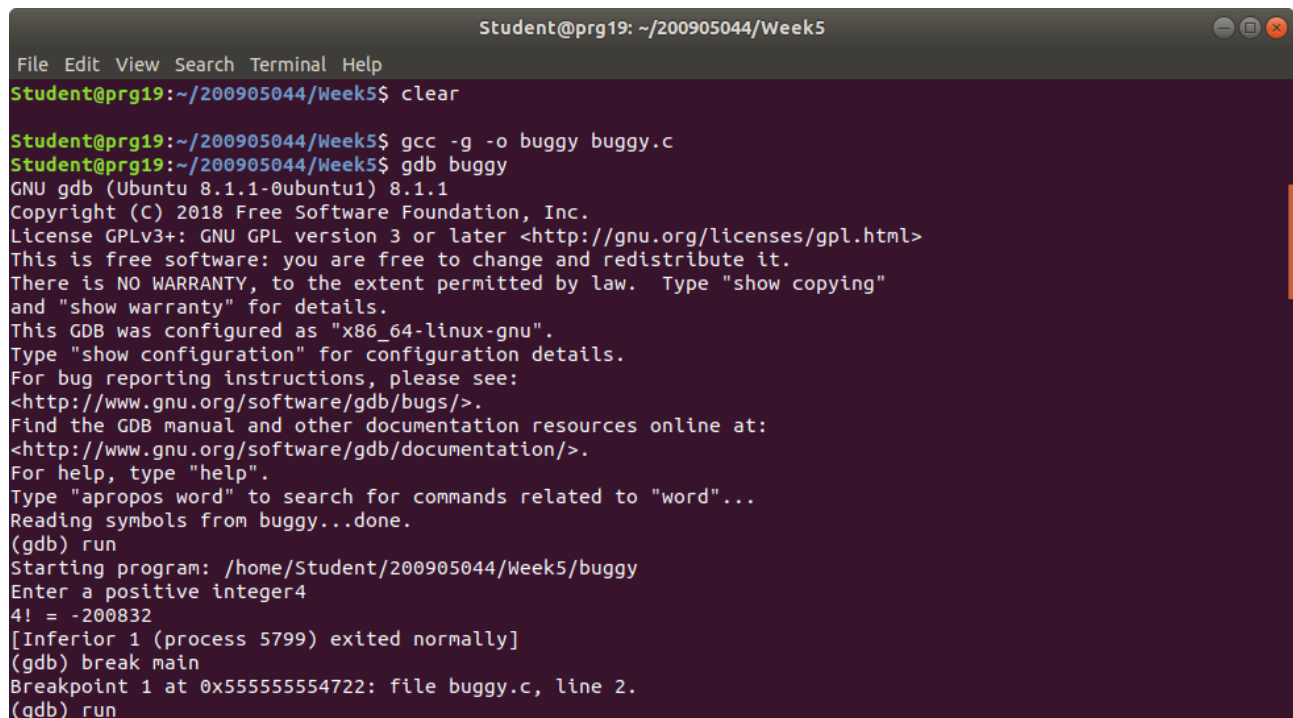
int num;

do{
    printf("Enter a positive integer");
    scanf("%d",&num);
} while(num<0);

int factorial = 1, i;
for (i = 1; i<=num; i++){
    factorial = factorial *i;
}
printf("%d! = %d\n", num, factorial);
return 0;
}

```

OUTPUT:



```

Student@prg19: ~/200905044/Week5
File Edit View Search Terminal Help
Student@prg19:~/200905044/Week5$ clear

Student@prg19:~/200905044/Week5$ gcc -g -o buggy buggy.c
Student@prg19:~/200905044/Week5$ gdb buggy
GNU gdb (Ubuntu 8.1.1-0ubuntu1) 8.1.1
Copyright (C) 2018 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:
<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 buggy...done.
(gdb) run
Starting program: /home/Student/200905044/Week5/buggy
Enter a positive integer4
4! = -200832
[Inferior 1 (process 5799) exited normally]
(gdb) break main
Breakpoint 1 at 0x555555554722: file buggy.c, line 2.
(gdb) run

```

```
Student@prg19: ~/200905044/Week5
File Edit View Search Terminal Help
Starting program: /home/Student/200905044/Week5/buggy

Breakpoint 1, main () at buggy.c:2
2   int main(){
(gdb) next
5   printf("Enter a positive integer");
(gdb) next
6   scanf("%d",&num);
(gdb) list
1   #include<stdio.h>
2   int main(){
3   int num;
4   do{
5   printf("Enter a positive integer");
6   scanf("%d",&num);
7   }while(num<0);
8   int factorial,i;
9   for(i=1;i<=num;i++){
10  factorial=factorial*i;
(gdb) list
11  }
12  printf("%d! = %d\n",num,factorial);
13  return 0;
14  }
(gdb) next
Enter a positive integer11
7   }while(num<0);
```

```
Student@prg19: ~/200905044/Week5
File Edit View Search Terminal Help
(gdb) next
Enter a positive integer11
7   }while(num<0);
(gdb) print num
$1 = 11
(gdb) next
9   for(i=1;i<=num;i++){
(gdb) next
10  factorial=factorial*i;
(gdb) next
9   for(i=1;i<=num;i++){
(gdb) next
10  factorial=factorial*i;
(gdb) next
9   for(i=1;i<=num;i++){
(gdb) next
10  factorial=factorial*i;
(gdb) next
9   for(i=1;i<=num;i++){
(gdb) next
10  factorial=factorial*i;
(gdb) print factorial
$2 = -200832
```

```
Student@prg19: ~/200905044/Week5
File Edit View Search Terminal Help
10     factorial=factorial*i;
(gdb) print factorial
$2 = -200832
(gdb) break buggy.c:5
Breakpoint 2 at 0x555555554731: file buggy.c, line 5.
(gdb) next
9     for(i=1;i<=num;i++){
(gdb) print i
$3 = 5
(gdb) next
10     factorial=factorial*i;
(gdb) print i
$4 = 6
(gdb) next
9     for(i=1;i<=num;i++){
(gdb) info locals
num = 11
factorial = -6024960
i = 6
(gdb) n
10     factorial=factorial*i;
(gdb) n
9     for(i=1;i<=num;i++){
(gdb) n
10     factorial=factorial*i;
(gdb) n
9     for(i=1;i<=num;i++){
```

```
Student@prg19: ~/200905044/Week5
File Edit View Search Terminal Help
10     factorial=factorial*i;
(gdb) n
9     for(i=1;i<=num;i++){
(gdb) n
10     factorial=factorial*i;
(gdb) n
9     for(i=1;i<=num;i++){
(gdb) next
10     factorial=factorial*i;
(gdb) next
9     for(i=1;i<=num;i++){
(gdb) next
10     factorial=factorial*i;
(gdb) next
9     for(i=1;i<=num;i++){
(gdb) next
12     printf("%d! = %d\n",num,factorial);
(gdb) next
11! = 983666688
13     return 0;
(gdb) next
14     }
(gdb) next
__libc_start_main (main=0x55555555471a <main>, argc=1, argv=0x7fffffffd5f8, init=<optimized out>,
    fini=<optimized out>, rtd_fini=<optimized out>, stack_end=0x7fffffffd548) at ../csu/libc-start.c:344
344     ../csu/libc-start.c: No such file or directory.
(gdb)
```

GIT EXERCISES:

1) Write a simple C program that takes a number as an input and gives the same number as the output. Now create a new git repository (check the contents of .git directory).

```
Student@prg19: ~/200905044/Week5
File Edit View Search Terminal Help
Student@prg19:~/200905044/Week5$ gedit helloWorld.c
Student@prg19:~/200905044/Week5$ gcc helloWorld.c -o hw
Student@prg19:~/200905044/Week5$ ./hw
Enter a number: 25
Entered number is 25
Student@prg19:~/200905044/Week5$ git init
Initialized empty Git repository in /home/Student/200905044/Week5/.git/
Student@prg19:~/200905044/Week5$ ls
200905044_Week_5.odt helloWorld.c hw
Student@prg19:~/200905044/Week5$ ls .git
branches config description HEAD hooks info objects refs
Student@prg19:~/200905044/Week5$ git status
On branch master

No commits yet

Untracked files:
  (use "git add <file>..." to include in what will be committed)

    .~lock.200905044_Week_5.odt#
    200905044_Week_5.odt
    helloWorld.c
    hw

nothing added to commit but untracked files present (use "git add" to track)
Student@prg19:~/200905044/Week5$ git add .
Student@prg19:~/200905044/Week5$ git commit -m "helloworld file made"
```

2) Check the status of the repository. Add the file and commit the changes.

```
Student@prg19: ~/200905044/Week5
File Edit View Search Terminal Help
nothing added to commit but untracked files present (use "git add" to track)
Student@prg19:~/200905044/Week5$ git add .
Student@prg19:~/200905044/Week5$ git commit -m "helloworld file made"
[master (root-commit) 0fce28c] helloworld file made
 4 files changed, 10 insertions(+)
 create mode 100644 .~lock.200905044_Week_5.odt#
 create mode 100644 200905044_Week_5.odt
 create mode 100644 helloWorld.c
 create mode 100755 hw
Student@prg19:~/200905044/Week5$ gedit helloWorld.c
Student@prg19:~/200905044/Week5$ gcc helloWorld.c -o hw
Student@prg19:~/200905044/Week5$ ./hw
Enter a number: 25
Entered number is 26
Student@prg19:~/200905044/Week5$ git diff
diff --git a/helloWorld.c b/helloWorld.c
index bcd553f..bb9ecf9 100644
--- a/helloWorld.c
+++ b/helloWorld.c
@@ -4,6 +4,7 @@ int main(){
     int a;
     printf("Enter a number: ");
     scanf("%d", &a);
+    a++;
     printf("Entered number is %d\n",a);
     return 0;
 }
```

3) Modify your C program such that it takes a number as input and prints a new number after adding 1 to the input. Check the changes that you have made using \$git diff

4) Add this file to your git repository and commit. Check the logs of git commit using \$git log

5) Undo modifying a modified File:

a. Again modify your program such that now it adds 2 to your input before printing it.
Check the
git status.

b. Later you can un modify the program by \$git checkout –HelloWorld.c

c. Check git status again

```
Student@prg19: ~/200905044/Week5
File Edit View Search Terminal Help
diff --git a/hw b/hw
index ec8b0cf..dd7b4bb 100755
Binary files a/hw and b/hw differ
Student@prg19:~/200905044/Week5$ git add .
Student@prg19:~/200905044/Week5$ git commit -m "add 1 to input"
[master 9f87341] add 1 to input
2 files changed, 1 insertion(+)
Student@prg19:~/200905044/Week5$ git log
commit 9f8734130f6d3ac63deeb1372af7de53aa0cdd14 (HEAD -> master)
Author: nathan <nathan.castelino@learner.manipal.edu>
Date: Mon Dec 6 15:52:47 2021 +0600

    add 1 to input

commit 0fce28c260b18b0c390d0ec8162cafd81364be5b
Author: nathan <nathan.castelino@learner.manipal.edu>
Date: Mon Dec 6 15:51:23 2021 +0600

    helloworld file made
Student@prg19:~/200905044/Week5$ gedit helloWorld.c
Student@prg19:~/200905044/Week5$ gcc helloWorld.c -o hw
Student@prg19:~/200905044/Week5$ ./hw
Enter a number: 25
Entered number is 27
Student@prg19:~/200905044/Week5$ git status
On branch master
Changes not staged for commit:
```

```
Student@prg19: ~/200905044/Week5
File Edit View Search Terminal Help
Student@prg19:~/200905044/Week5$ git status
On branch master
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git checkout -- <file>..." to discard changes in working directory)

        modified:   helloWorld.c
        modified:   hw

no changes added to commit (use "git add" and/or "git commit -a")
Student@prg19:~/200905044/Week5$ git checkout helloWorld.c
Student@prg19:~/200905044/Week5$ git status
On branch master
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git checkout -- <file>..." to discard changes in working directory)

        modified:   hw

no changes added to commit (use "git add" and/or "git commit -a")
Student@prg19:~/200905044/Week5$ git log
commit 9f8734130f6d3ac63deeb1372af7de53aa0cdd14 (HEAD -> master)
Author: nathan <nathan.castelino@learner.manipal.edu>
Date:   Mon Dec 6 15:52:47 2021 +0600

    add 1 to input
```

```
Student@prg19: ~/200905044/Week5
File Edit View Search Terminal Help

no changes added to commit (use "git add" and/or "git commit -a")
Student@prg19:~/200905044/Week5$ git log
commit 9f8734130f6d3ac63deeb1372af7de53aa0cdd14 (HEAD -> master)
Author: nathan <nathan.castelino@learner.manipal.edu>
Date:   Mon Dec 6 15:52:47 2021 +0600

    add 1 to input

commit 0fce28c260b18b0c390d0ec8162cafd81364be5b
Author: nathan <nathan.castelino@learner.manipal.edu>
Date:   Mon Dec 6 15:51:23 2021 +0600

    helloworld file made
Student@prg19:~/200905044/Week5$ git show
commit 9f8734130f6d3ac63deeb1372af7de53aa0cdd14 (HEAD -> master)
Author: nathan <nathan.castelino@learner.manipal.edu>
Date:   Mon Dec 6 15:52:47 2021 +0600

    add 1 to input

diff --git a/helloWorld.c b/helloWorld.c
index bcd553f..bb9ecf9 100644
--- a/helloWorld.c
+++ b/helloWorld.c
@@ -4,6 +4,7 @@ int main(){
    int a;
```

```
Student@prg19: ~/200905044/Week5
File Edit View Search Terminal Help

helloworld file made
Student@prg19:~/200905044/Week5$ git show
commit 9f8734130f6d3ac63deeb1372af7de53aa0cdd14 (HEAD -> master)
Author: nathan <nathan.castelino@learner.manipal.edu>
Date: Mon Dec 6 15:52:47 2021 +0600

    add 1 to input

diff --git a/helloWorld.c b/helloWorld.c
index bcd553f..bb9ecf9 100644
--- a/helloWorld.c
+++ b/helloWorld.c
@@ -4,6 +4,7 @@ int main(){
    int a;
    printf("Enter a number: ");
    scanf("%d", &a);
+   a++;
    printf("Entered number is %d\n",a);
    return 0;
}
diff --git a/hw b/hw
index ec8b0cf..dd7b4bb 100755
Binary files a/hw and b/hw differ
Student@prg19:~/200905044/Week5$ git show 9f8734130f6d3ac63deeb1372af7de53aa0cdd14
commit 9f8734130f6d3ac63deeb1372af7de53aa0cdd14 (HEAD -> master)
Author: nathan <nathan.castelino@learner.manipal.edu>
```

6)Checking old commit

- a. Each commit operation generates a commit ID(you can use git log)
- b. Run \$git show

```
Student@prg19: ~/200905044/Week5
File Edit View Search Terminal Help
}
diff --git a/hw b/hw
index ec8b0cf..dd7b4bb 100755
Binary files a/hw and b/hw differ
Student@prg19:~/200905044/Week5$ git show 9f8734130f6d3ac63deeb1372af7de53aa0cdd14
commit 9f8734130f6d3ac63deeb1372af7de53aa0cdd14 (HEAD -> master)
Author: nathan <nathan.castelino@learner.manipal.edu>
Date: Mon Dec 6 15:52:47 2021 +0600

    add 1 to input

diff --git a/helloWorld.c b/helloWorld.c
index bcd553f..bb9ecf9 100644
--- a/helloWorld.c
+++ b/helloWorld.c
@@ -4,6 +4,7 @@ int main(){
    int a;
    printf("Enter a number: ");
    scanf("%d", &a);
+   a++;
    printf("Entered number is %d\n",a);
    return 0;
}
diff --git a/hw b/hw
index ec8b0cf..dd7b4bb 100755
Binary files a/hw and b/hw differ
Student@prg19:~/200905044/Week5$
```

THANK YOU!