

Week 5

1)

```
Student@dblab-hp-26:~/190905104_ost/week5_1$ cat > helloworld.c
#include <stdio.h>

int main(){
int n;
scanf("%d", &n);
printf("%d", n);
return 0;
}
Student@dblab-hp-26:~/190905104_ost/week5_1$ git init
Initialized empty Git repository in /home/Student/190905104_ost/week5_1/.git/
Student@dblab-hp-26:~/190905104_ost/week5_1$ git add helloworld.c
Student@dblab-hp-26:~/190905104_ost/week5_1$ git status
On branch master

Initial commit

Changes to be committed:
  (use "git rm --cached <file>..." to unstage)

        new file:   helloworld.c
```

```
        new file:   helloworld.c

Student@dblab-hp-26:~/190905104_ost/week5_1$ git commit -m "First commit"
[master (root-commit) 53bb738] First commit
 1 file changed, 8 insertions(+)
 create mode 100644 helloworld.c
Student@dblab-hp-26:~/190905104_ost/week5_1$
```

```
Student@dblab-hp-26:~/190905104_ost/week5_1$ cat > helloworld.c
#include <stdio.h>

int main(){
int n;
scanf("%d", &n);
printf("%d", n+1);
return 0;
}
Student@dblab-hp-26:~/190905104_ost/week5_1$ git diff
diff --git a/helloworld.c b/helloworld.c
index 0294818..ada4e06 100644
--- a/helloworld.c
+++ b/helloworld.c
@@ -1,8 +1,8 @@
#include <stdio.h>

int main(){
-int n;
+int n;
scanf("%d", &n);
-printf("%d", n);
+printf("%d", n+1);
return 0;
}
```

```
Student@dblab-hp-26:~/190905104_ost/week5_1$ git add .
Student@dblab-hp-26:~/190905104_ost/week5_1$ git commit -m "Changes made"
[master d1b7a95] Changes made
 1 file changed, 2 insertions(+), 2 deletions(-)
Student@dblab-hp-26:~/190905104_ost/week5_1$ git log
commit d1b7a9525d17326b16d45eeb0dd6bdf520c98152
Author: ParthS28 <parthshukla285@gmail.com>
Date:   Wed Feb 17 13:49:46 2021 +0530
```

Changes made

```
commit 53bb738754111f701656b353db8c2090358fe4d6
Author: ParthS28 <parthshukla285@gmail.com>
Date:   Wed Feb 17 13:45:44 2021 +0530
```

First commit

```
Student@dblab-hp-26:~/190905104_ost/week5_1$ cat > helloworld.c
#include <stdio.h>

int main(){
int n;
scanf("%d", &n);
printf("%d", n+2);
return 0;
}
Student@dblab-hp-26:~/190905104_ost/week5_1$ 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

no changes added to commit (use "git add" and/or "git commit -a")
Student@dblab-hp-26:~/190905104_ost/week5_1$
```

```
Student@dblab-hp-26:~/190905104_ost/week5_1$ git checkout -- helloworld.c
Student@dblab-hp-26:~/190905104_ost/week5_1$ git status
On branch master
nothing to commit, working directory clean
Student@dblab-hp-26:~/190905104_ost/week5_1$
```

```
Student@dblab-hp-26:~/190905104_ost/week5_1$ git show
commit d1b7a9525d17326b16d45eeb0dd6bdf520c98152
Author: ParthS28 <parthshukla285@gmail.com>
Date:   Wed Feb 17 13:49:46 2021 +0530
```

Changes made

```
diff --git a/helloworld.c b/helloworld.c
index 0294818..ada4e06 100644
--- a/helloworld.c
+++ b/helloworld.c
@@ -1,8 +1,8 @@
#include <stdio.h>

int main(){
- int n;
+ int n;
  scanf("%d", &n);
- printf("%d", n);
+ printf("%d", n+1);
  return 0;
}
```

2)

```
Student@dblab-hp-26:~/190905104_ost/git folder$ ls
a.out helloworld.c
Student@dblab-hp-26:~/190905104_ost/git folder$ git init
Initialized empty Git repository in /home/Student/190905104_ost/git folder/.git/
Student@dblab-hp-26:~/190905104_ost/git folder$ git add .
Student@dblab-hp-26:~/190905104_ost/git folder$ git remote add origin https://github.com/ParthS28/OST-lab-repo.git
Student@dblab-hp-26:~/190905104_ost/git folder$ git commit -m "First commit"
[master (root-commit) 181b30b] First commit
 2 files changed, 8 insertions(+)
 create mode 100755 a.out
 create mode 100644 helloworld.c
Student@dblab-hp-26:~/190905104_ost/git folder$ git push -u origin master
Username for 'https://github.com': ParthS28
Password for 'https://ParthS28@github.com':
Counting objects: 4, done.
Delta compression using up to 4 threads.
Compressing objects: 100% (4/4), done.
Writing objects: 100% (4/4), 2.80 KiB | 0 bytes/s, done.
Total 4 (delta 0), reused 0 (delta 0)
To https://github.com/ParthS28/OST-lab-repo.git
 * [new branch]      master -> master
Branch master set up to track remote branch master from origin.
Student@dblab-hp-26:~/190905104_ost/git folder$ git pull
Already up-to-date.
Student@dblab-hp-26:~/190905104_ost/git folder$
```

Buggy program:

```
#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>, rtd_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;
}

```