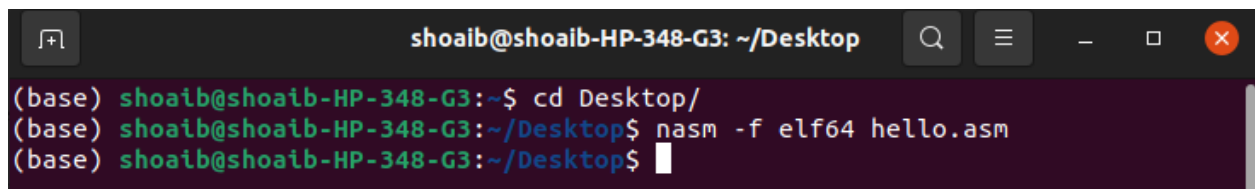


Roll-No: 20P-0147

NAME: SHOAIB AKHTAR

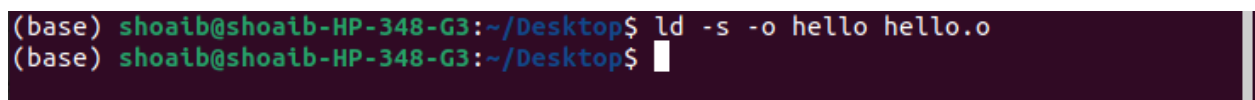
SECTION: BS-CS(4B)

1: compiling hello.asm

A terminal window with a dark purple background. The title bar shows the user 'shoaib@shoaib-HP-348-G3' and the current directory '~/Desktop'. The terminal contains three lines of text: the first line shows the user changing to the Desktop directory, the second line shows the user running the nasm assembler on hello.asm to produce hello.o, and the third line shows the prompt after the command has finished.

```
(base) shoaib@shoaib-HP-348-G3:~$ cd Desktop/  
(base) shoaib@shoaib-HP-348-G3:~/Desktop$ nasm -f elf64 hello.asm  
(base) shoaib@shoaib-HP-348-G3:~/Desktop$
```

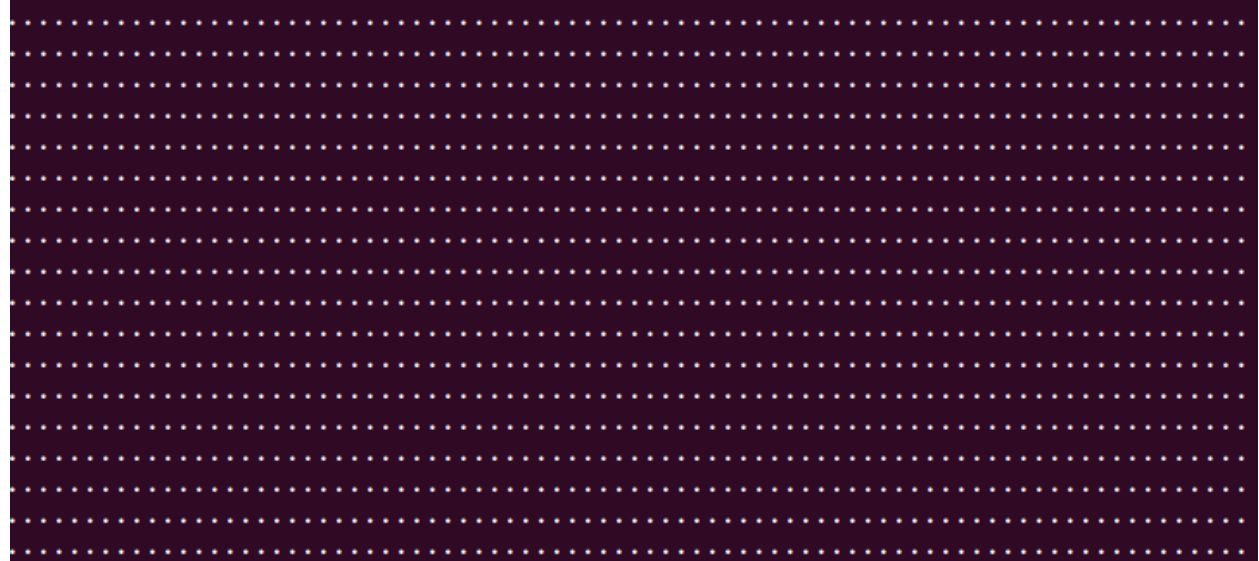
2: Linking hello.asm

A terminal window with a dark purple background. The terminal contains two lines of text: the first line shows the user running the ld linker to create the final executable hello, and the second line shows the prompt after the command has finished.

```
(base) shoaib@shoaib-HP-348-G3:~/Desktop$ ld -s -o hello hello.o  
(base) shoaib@shoaib-HP-348-G3:~/Desktop$
```

3: Running hello file.

```
(base) shoaib@shoaib-HP-348-G3:~/Desktop$ ./hello
```



4: Time of the file hello.asm

```
(base) shoaib@shoaib-HP-348-G3:~/Desktop$ time ./hello >/ dev/null
bash: /: Is a directory

real    0m0.003s
user    0m0.003s
sys     0m0.000s
(base) shoaib@shoaib-HP-348-G3:~/Desktop$
```

5: Compiling the hello.asm and hello2.asm and linking the object files

```
(base) shoaib@shoaib-HP-348-G3:~/Desktop$ nasm -f elf64 -o hello.o hello.asm
(base) shoaib@shoaib-HP-348-G3:~/Desktop$ nasm -f elf64 -o hello2.o hello2.asm
(base) shoaib@shoaib-HP-348-G3:~/Desktop$ ld -s -o hello hello.o
(base) shoaib@shoaib-HP-348-G3:~/Desktop$ ld -s -o hello2 hello2.o
(base) shoaib@shoaib-HP-348-G3:~/Desktop$
```

6: creating the executable of .sh

```
base) shoaib@shoaib-HP-348-G3:~/Desktop$ chmod +x runner.sh
base) shoaib@shoaib-HP-348-G3:~/Desktop$ ./runner.sh
base) shoaib@shoaib-HP-348-G3:~/Desktop$
```

Number of experiments run:

$N = 50$

Average 'user time' for hello (int-based calls):

$I = 241.74$

Average 'user time' for hello2 (syscall-based calls): $S = 191.64$

Percentage speedup: $(I-S)*100/I$

$P = (241.74 - 191.64) * 100 / 241.74 = 20.724$