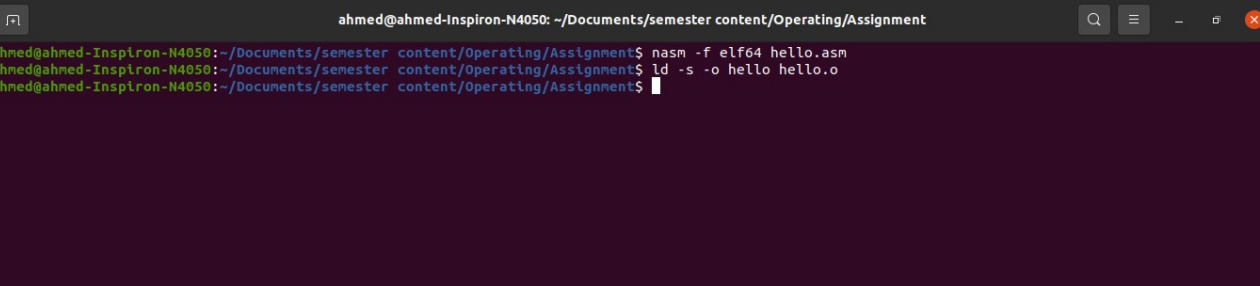
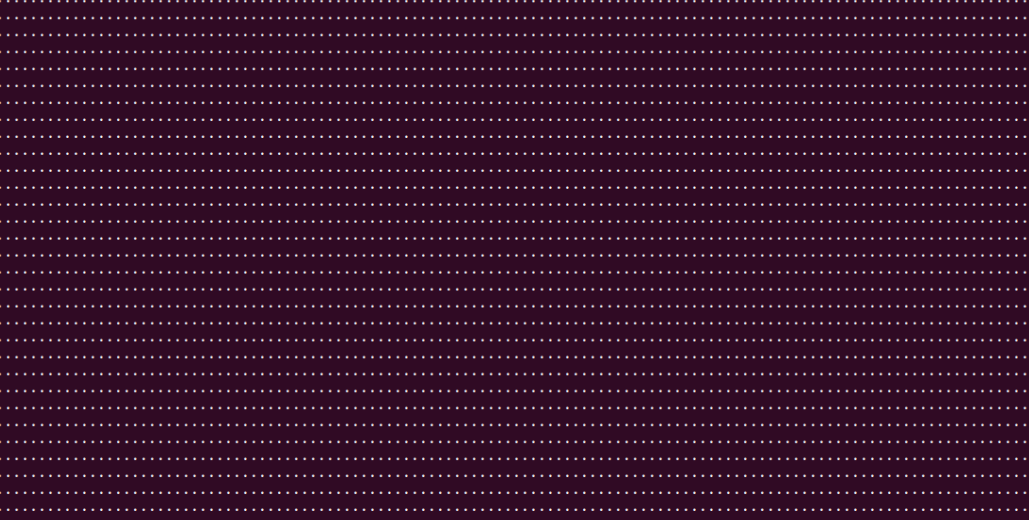


Name: Ahmed Ali
Section: CS-4B
Roll No: P19-0042



```
ahmed@ahmed-Inspiron-N4050: ~/Documents/semester content/Operating/Assignment
ahmed@ahmed-Inspiron-N4050:~/Documents/semester content/Operating/Assignment$ nasm -f elf64 hello.asm
ahmed@ahmed-Inspiron-N4050:~/Documents/semester content/Operating/Assignment$ ld -s -o hello hello.o
ahmed@ahmed-Inspiron-N4050:~/Documents/semester content/Operating/Assignment$
```

A screenshot of a terminal window. The title bar at the top reads "ahmed@ahmed-inspiron-N4050: ~/Documents/semester content/Operating/Assignment". The terminal area is filled with a repeating pattern of the word "ahmed" in a light blue font on a dark background. At the bottom, a shell prompt is visible: "ahmed@ahmed-inspiron-N4050:~/Documents/semester content/Operating/Assignment\$". The window includes standard Linux window controls (minimize, maximize, close) and a search icon in the top right corner.

```
ahmed@ahmed-Inspiron-N4050:~/Documents/semester content/Operating/Assignment$ time ./hello > /dev/null

real    0m0.351s
user    0m0.195s
ahmed@ahmed-Inspiron-N4050:~/Documents/semester content/Operating/Assignment$
```

```
ahmed@ahmed-Inspiron-N4050: ~/Documents/semester content/Operating/Assignment
command 'lnv' from deb renameutils (0.12.0-7)
command 'time' from deb time (1.7-25.1build1)
See 'snap info <snapname>' for additional versions.
ahmed@ahmed-Inspiron-N4050:~/Documents/semester content/Operating/Assignment$ time ./hello > /dev/null
real    0m0.351s
user    0m0.195s
ahmed@ahmed-Inspiron-N4050:~/Documents/semester content/Operating/Assignment$
ahmed@ahmed-Inspiron-N4050:~/Documents/semester content/Operating/Assignment$ nasm -f elf64 -o hello.o hello.asm
ahmed@ahmed-Inspiron-N4050:~/Documents/semester content/Operating/Assignment$ nasm -f elf64 -o hello2.o hello2.asm
ahmed@ahmed-Inspiron-N4050:~/Documents/semester content/Operating/Assignment$ ld -s -o hello hello.o
ahmed@ahmed-Inspiron-N4050:~/Documents/semester content/Operating/Assignment$ ld -s -o hello2 hello2.o
ahmed@ahmed-Inspiron-N4050:~/Documents/semester content/Operating/Assignment$ chmod +x runner.sh
chmod: cannot access 'runner.sh': No such file or directory
ahmed@ahmed-Inspiron-N4050:~/Documents/semester content/Operating/Assignment$ chmod +x runner.sh
ahmed@ahmed-Inspiron-N4050:~/Documents/semester content/Operating/Assignment$
```

Number of experiments run: $N = 50$

Average 'user time' for hello (int-based calls): $I = 0.19264s$

Average 'user time' for hello2 (syscall-based calls): $S = 0.13914s$

Percentage speedup: $(I-S)*100/I = 27.7720$