



NATIONAL UNIVERSITY
OF COMPUTER & EMERGING SCIENCES
PESHAWAR CAMPUS



Problem Set:	Assignment 02	Semester:	Spring 2013
Points:	2		
Date Set:	February 18, 2013	Due Date:	February 25, 2013
Course:	CS206 Operating Systems	Instructor:	Nauman

This assignment has two parts – one related to assembly code and the other to C code.

1. Write an assembly program with the following code and name it `hello.asm`:

```
1  section .data
2  hello:    db 'Hello world!',10    ; 'Hello world!' plus a linefeed character
3  helloLen: equ $-hello            ; Length of the 'Hello world!' string
4
5  section .text
6  global _start
7
8  _start:
9  mov eax,4                ; The system call for write (sys_write)
10 mov ebx,1                ; File descriptor 1 - standard output
11 mov ecx,hello            ; Put the offset of hello in ecx
12 mov edx,helloLen         ; helloLen is a constant
13 int 80h                  ; ??
14
15 mov eax,1                ; ??
16 mov ebx,0                ; ??
17 int 80h
```

- (a) Compile the program using the command:

```
1  nasm -f elf64 hello.asm
```

If you are on a 32-bit machine, issue this command instead:

```
1  nasm -f elf hello.asm
```

Note: If you don't have nasm installed, you can issue the following command to install it.

```
1  sudo apt-get install nasm
```

- (b) Link the object file using the following command:

```
1  ld -s -o hello hello.o
```

- (c) Run the new executable:

```
1  ./hello
```

- (d) Explain the lines marked with ?? in the assembly code above.

- (e) Finally, use the `strace` command to take a look at the system calls made by the application. Try to explain the output of `strace` as much as possible.

```
1  strace ./hello
```

2. Take a look at the man page for `stat` function.

```
1  man 2 stat
```

- (a) Scroll down to look at the example code for getting statistics of a file. Copy the code and paste it in a C source file.

- (b) Compile the file using the command:

```
1  gcc -o stat-example stat-example.c
```

- (c) Execute it using:

```
1  ./stat-example <somefile>
```

- (d) Modify the code to output at least one statistic not included in the example. Recompile and re-execute.