```asm
     section:data
     hello: db '.'
     helloLen: equ $-hello                ; length of the string
     section .text
     global _start
     _start:
     mov ecx, 500000

     l1:
         mov esi,ecx          ;The system call for wright(sys_write)
         mov eax,1            ;File descriptor 1- standard output
         mov ecx,hello        ;Put the offset of hello in ecx
         mov edx,helloLen     ;helloLen is a constant
         int 80h              ;??

         mov ecx,1            ;0
         loop l1

         mov eax,1            ;??
         mov ebx,0            ;??
         int 80h
```

PROBLEMS   OUTPUT   **TERMINAL**   DEBUG CONSOLE

```
noman@noman-siddique:~/nasm-lab$ nasm -f elf64 HellO.asm
noman@noman-siddique:~/nasm-lab$ ld -s -o HellO HellO.o
noman@noman-siddique:~/nasm-lab$ ./HellO
noman@noman-siddique:~/nasm-lab$ time ./ HellO > /dev/null
bash: ./: Is a directory

real    0m0.001s
user    0m0.001s
sys     0m0.000s
noman@noman-siddique:~/nasm-lab$
```

HellO.asm   **HellO2.asm ×**   runner.sh   hello.txt   hello2.txt

```asm
     section:data
     hello: db '.'
     helloLen: equ $-hello                ; length of the string
     section .text
     global _start
     _start:
     mov ecx, 500000

     l1:
         mov ebx,ecx
         mov rdi,1            ;where to write (1 is console)
         mov rsi,hello
         mov rdx,helloLen
         mov rax,1            ;syscall number
         syscall

         mov ecx,ebx          ;0
         loop l1

         mov rdi,0
         mov rax,60
         syscall
```

runner.sh

```
HellO.asm    HellO2.asm    runner.sh ×    hello.txt    hello2.txt

runner.sh
1    x=1
2    while [ $x -le 50 ]
3    do
4            (time ./hello2 > /dev/null)  &>> hello2.txt
5            (time ./hello  > /dev/null)  &>> hello.txt
6      x=$(( $x + 1 ))
7    done
```

```
HellO.asm    HellO2.asm    runner.sh    hello.txt ×    hello2.txt

hello.txt
222
223    real    0m0.004s
224    user    0m0.001s
225    sys 0m0.000s
226    ./runner.sh: line 5: ./hello: No such file or directory
227
228    real    0m0.006s
229    user    0m0.001s
230    sys 0m0.000s
231    ./runner.sh: line 5: ./hello: No such file or directory
232
233    real    0m0.002s
234    user    0m0.001s
235    sys 0m0.000s
236    ./runner.sh: line 5: ./hello: No such file or directory
237
238    real    0m0.001s
239    user    0m0.001s
240    sys 0m0.000s
241    ./runner.sh: line 5: ./hello: No such file or directory
242
243    real    0m0.003s
244    user    0m0.001s
245    sys 0m0.000s
246    ./runner.sh: line 5: ./hello: No such file or directory
247
248    real    0m0.004s
249    user    0m0.001s
250    sys 0m0.000s
251
```

```
ASM HelloO.asm        ASM HelloO2.asm        runner.sh        hello.txt  ×        hello2.txt  ×

 hello2.txt
218    real     0m0.001s
219    user     0m0.001s
220    sys 0m0.000s
221    ./runner.sh: line 4: ./hello2: No such file or directory
222
223    real     0m0.003s
224    user     0m0.001s
225    sys 0m0.000s
226    ./runner.sh: line 4: ./hello2: No such file or directory
227
228    real     0m0.001s
229    user     0m0.001s
230    sys 0m0.000s
231    ./runner.sh: line 4: ./hello2: No such file or directory
232
233    real     0m0.001s
234    user     0m0.001s
235    sys 0m0.000s
236    ./runner.sh: line 4: ./hello2: No such file or directory
237
238    real     0m0.001s
239    user     0m0.001s
240    sys 0m0.000s
241    ./runner.sh: line 4: ./hello2: No such file or directory
242
243    real     0m0.004s
244    user     0m0.001s
245    sys 0m0.000s
246    ./runner.sh: line 4: ./hello2: No such file or directory
247
248    real     0m0.003s
249    user     0m0.001s
250    sys 0m0.000s
```

No of experiments run   N=50

Average 'user time' for HellO (int-based calls)   I =0.0092

Average 'user time' for HellO2 (syscall-based calls)   S =0.0094

Percentage speedup   (I-S) * 100 /I   =-921.74