

The screenshot shows a code editor with a file explorer on the left and a terminal at the bottom. The file explorer shows a project named 'NASM-LAB' with files like 'Hello.asm', 'rdoff', 'AFD.EXE', 'cwsdpmi.doc', 'cwsdpmi.exe', 'Hello', 'hello.asm', 'Hello.o', 'LICENSE', 'nasm.exe', 'nasmdoc.txt', 'ndisasm.exe', 'README', 'README.md', and 'setup.sh'. The main editor window shows the assembly code for 'Hello.asm'.

```
1 section:data
2 hello: db '.'
3 helloLen: equ $-hello ; length of the string
4 section .text
5 global _start
6 _start:
7 mov ecx, 500000
8
9 l1:
10 mov esi,ecx ;The system call for wright(sys_write)
11 mov eax,1 ;File descriptor 1- standard output
12 mov ecx,hello ;Put the offset of hello in ecx
13 mov edx,helloLen ;helloLen is a constant
14 int 80h ;??
15
16 mov ecx,1 ;0
17 loop l1
18
19 mov eax,1 ;??
20 mov ebx,0 ;??
21 int 80h
22
```

The terminal shows the execution of the assembly code:

```
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$
```

The screenshot shows a code editor with multiple tabs: 'HelloO.asm', 'HelloO2.asm', 'runner.sh', 'hello.txt', and 'hello2.txt'. The main editor window shows the assembly code for 'HelloO2.asm'.

```
1 section:data
2 hello: db '.'
3 helloLen: equ $-hello ; length of the string
4 section .text
5 global _start
6 _start:
7 mov ecx, 500000
8
9 l1:
10 mov ebx,ecx
11 mov rdi,1 ;where to write (1 is console)
12 mov rsi,hello
13 mov rdx,helloLen
14 mov rax,1 ;syscall number
15 syscall
16
17 mov ecx,ebx ;0
18 loop l1
19
20 mov rdi,0
21 mov rax,60
22 syscall
```

```
ASM Hello.asm  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
```

```
ASM Hello.asm  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
```

```
ASH Hello.asm  ASH Hello2.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