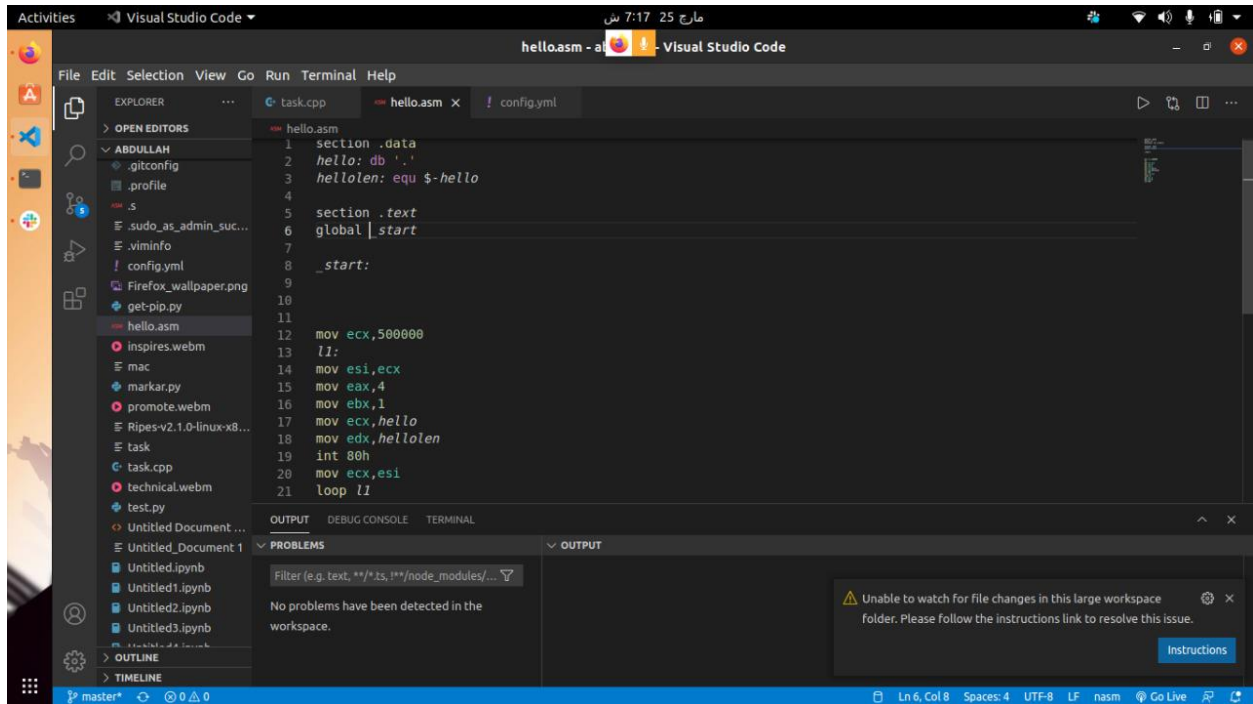


Number of experiment run : 50

Average “user time” for hello (int -based calls): 0.07884

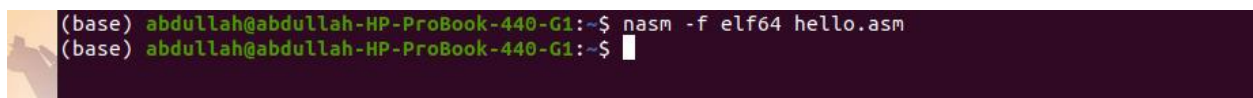
Average “user time” for hello2 (syscall-based): 0.0122

Percentage Speed Up: 84.5256



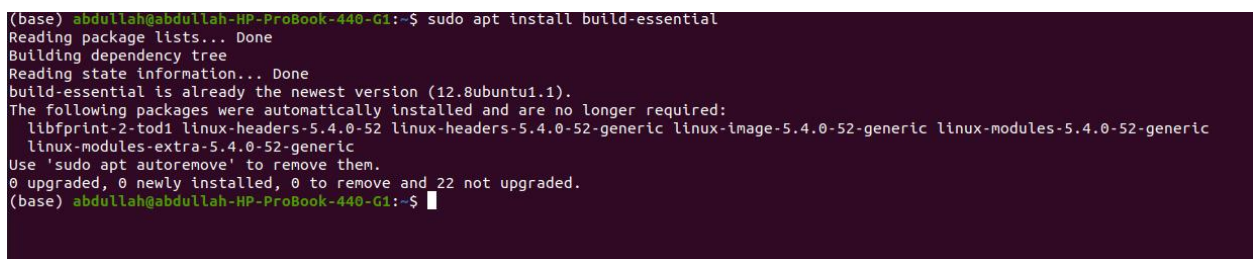
The screenshot shows the Visual Studio Code interface with the file 'hello.asm' open. The code is written in assembly language and includes a data section, a text section, and a global start symbol. The code is as follows:

```
1 section .data
2 hello: db '.',
3 hellolen: equ $-hello
4
5 section .text
6 global _start
7
8 _start:
9
10
11
12 mov ecx,5000000
13 li:
14 mov esi,ecx
15 mov eax,4
16 mov ebx,1
17 mov ecx,hello
18 mov edx,hellolen
19 int 80h
20 mov ecx,esi
21 loop li
```



The terminal shows the command to assemble the 'hello.asm' file using the nasm assembler:

```
(base) abdullah@abdullah-HP-ProBook-440-G1:~$ nasm -f elf64 hello.asm
(base) abdullah@abdullah-HP-ProBook-440-G1:~$
```



The terminal shows the command to install 'build-essential' using apt:

```
(base) abdullah@abdullah-HP-ProBook-440-G1:~$ sudo apt install build-essential
Reading package lists... Done
Building dependency tree
Reading state information... Done
build-essential is already the newest version (12.8ubuntu1.1).
The following packages were automatically installed and are no longer required:
  libfprint-2-tod1 linux-headers-5.4.0-52 linux-headers-5.4.0-52-generic linux-image-5.4.0-52-generic linux-modules-5.4.0-52-generic
  linux-modules-extra-5.4.0-52-generic
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 22 not upgraded.
(base) abdullah@abdullah-HP-ProBook-440-G1:~$
```



```

ifstream file;
file.open(name);
string string_1;
char char_1, char_2;
int integer;
double average=0.0, x=0.0;
while(!file.eof())
{
    for(int i=0; i<2; i++)
    {
        file>>string_1;
        file>>integer;
        file>>char_1;
        file>>x;
        file>>char_2;
    }

    average=average+x;
    file>>string_1;
    file>>integer;
}

```

```

        file>>integer;
        file>>char_1;
        file>>x;
        file>>char_2;
    }
    average =average/50;
    return average;

int main()

```

```

}
int main()
{
    double x,y;
    x=file("hello.txt");
    y=file("hello2.txt");
    cout<<endl<<"hello average time"<<x;
    cout<<endl<<"hello2 average time"<<y;
    double a=((x-y)*100)/a;
    cout<<endl<<"percentage speed up is : "<<a;

}

```