

**Name** : Omkar Rameshwar Dokhale

**Reg no.** : 2018BIT004

**Roll no.** : A03

**Branch** : IT

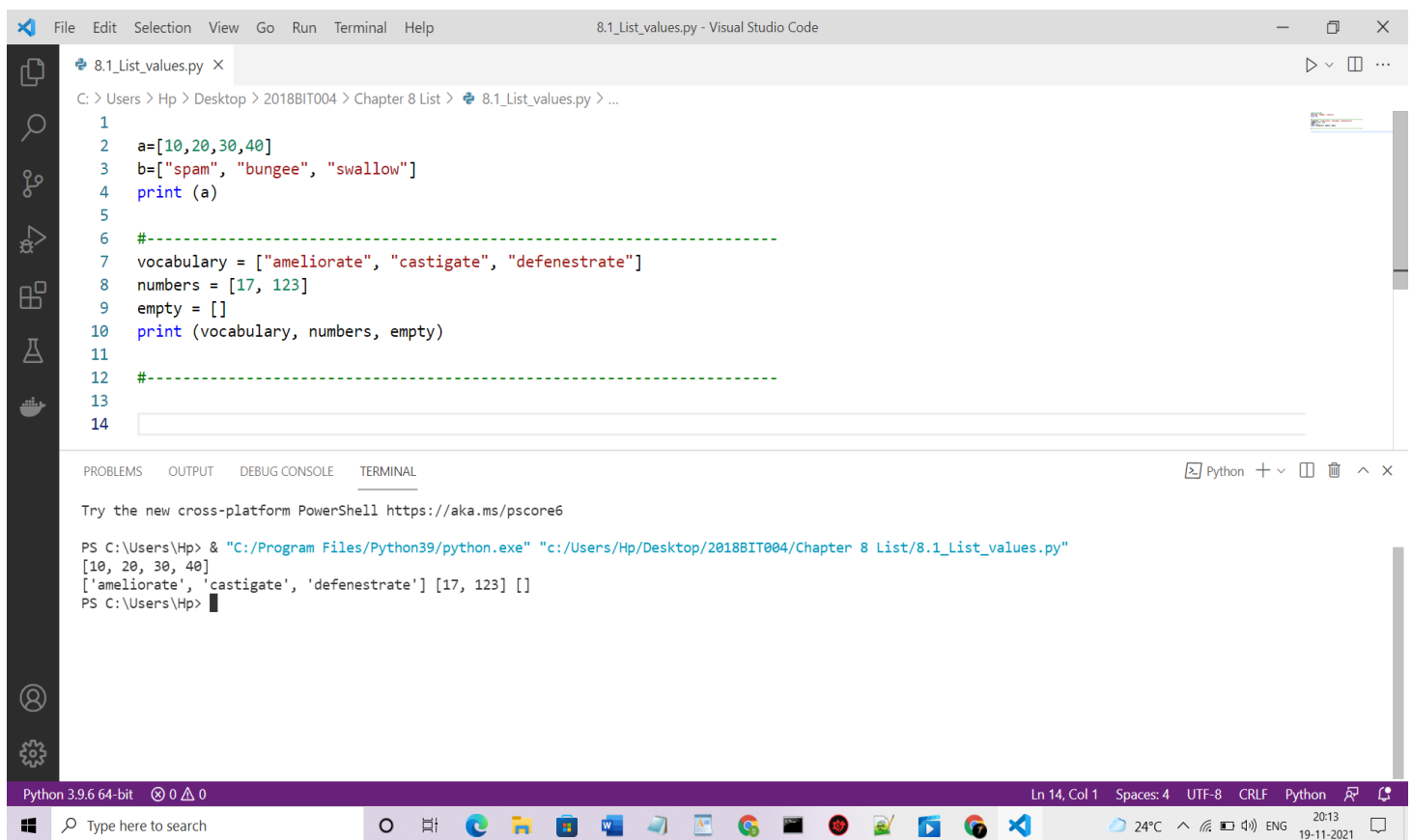
**Class** : TY

**Sub** : Python

---

## Chapter 8 Lists Programs

### 8.1 List values



The screenshot displays the Visual Studio Code interface. The editor window shows a file named `8.1_List_values.py` with the following Python code:

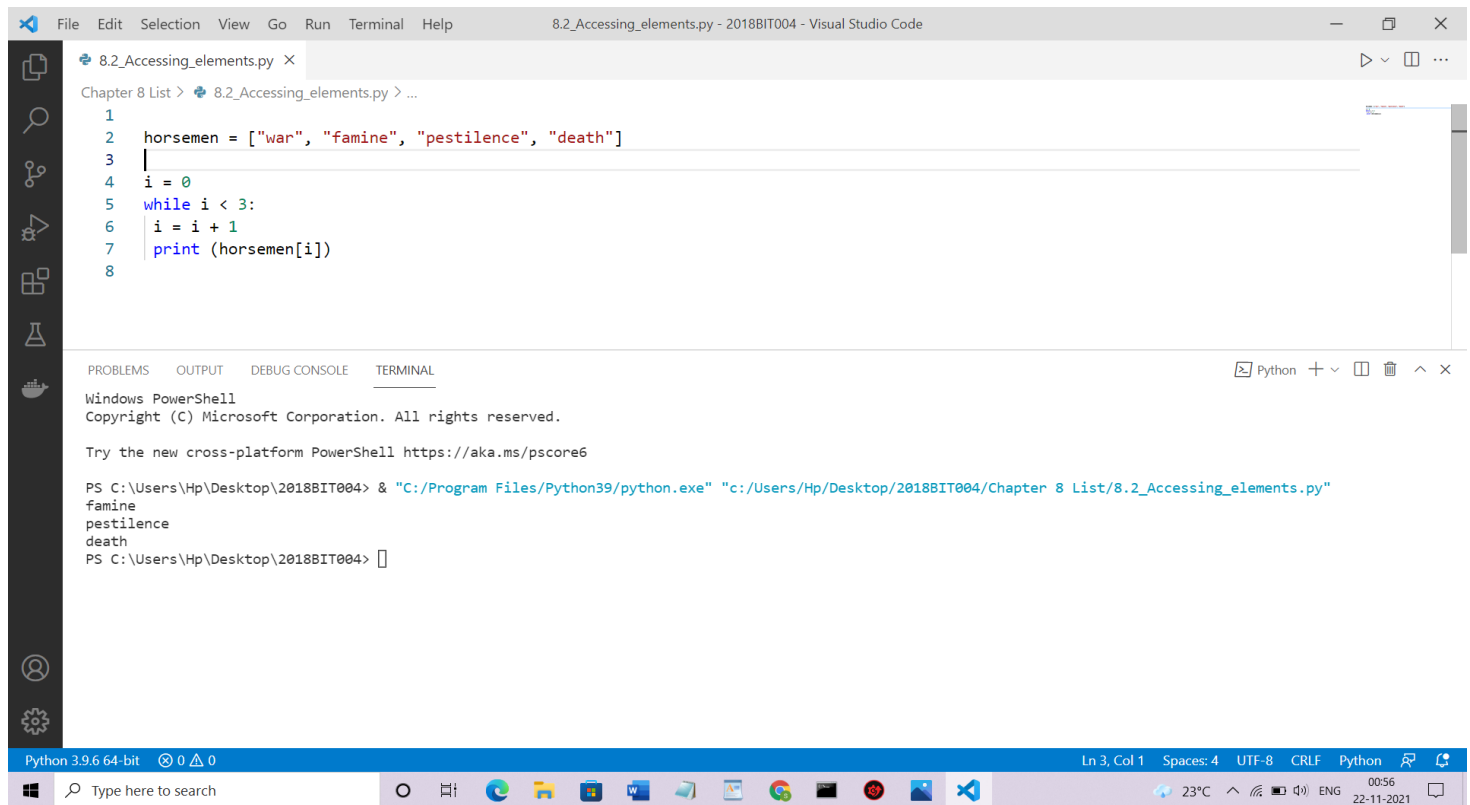
```
1
2 a=[10,20,30,40]
3 b=["spam", "bungee", "swallow"]
4 print (a)
5
6 #-----
7 vocabulary = ["ameliorate", "castigate", "defenestrate"]
8 numbers = [17, 123]
9 empty = []
10 print (vocabulary, numbers, empty)
11
12 #-----
13
14
```

The terminal window at the bottom shows the execution of the script using the command `python.exe "c:/Users/Hp/Desktop/2018BIT004/Chapter 8 List/8.1_List_values.py"`. The output is:

```
[10, 20, 30, 40]
['ameliorate', 'castigate', 'defenestrate'] [17, 123] []
```

The status bar at the bottom indicates the Python version is 3.9.6 64-bit, and the file encoding is UTF-8 with CRLF line endings.

## 8.2 Accessing elements



The screenshot shows the Visual Studio Code editor with a file named `8.2_Accessing_elements.py`. The code defines a list `horsemen` and uses a `while` loop to print its elements. The terminal window shows the command to run the script and the resulting output.

```
1 horsemen = ["war", "famine", "pestilence", "death"]
2
3
4 i = 0
5 while i < 3:
6     i = i + 1
7     print(horsemen[i])
8
```

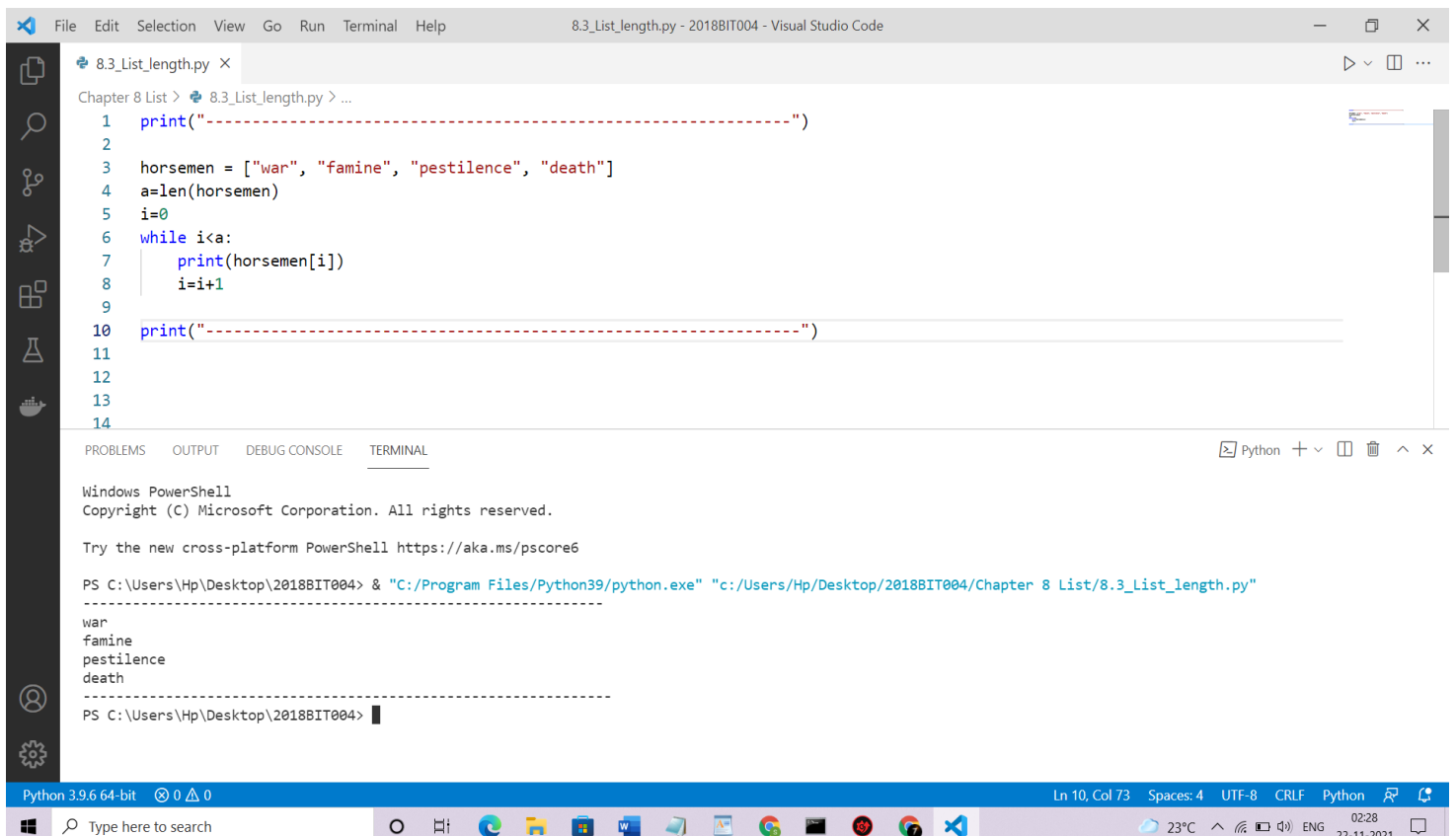
Terminal Output:

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 8 List/8.2_Accessing_elements.py"
famine
pestilence
death
PS C:\Users\Hp\Desktop\2018BIT004>
```

## 8.3 List length



The screenshot shows the Visual Studio Code editor with a file named `8.3_List_length.py`. The code defines a list `horsemen`, calculates its length, and uses a `while` loop to print its elements. The terminal window shows the command to run the script and the resulting output.

```
1 print("-----")
2
3 horsemen = ["war", "famine", "pestilence", "death"]
4 a=len(horsemen)
5 i=0
6 while i<a:
7     print(horsemen[i])
8     i=i+1
9
10 print("-----")
11
12
13
14
```

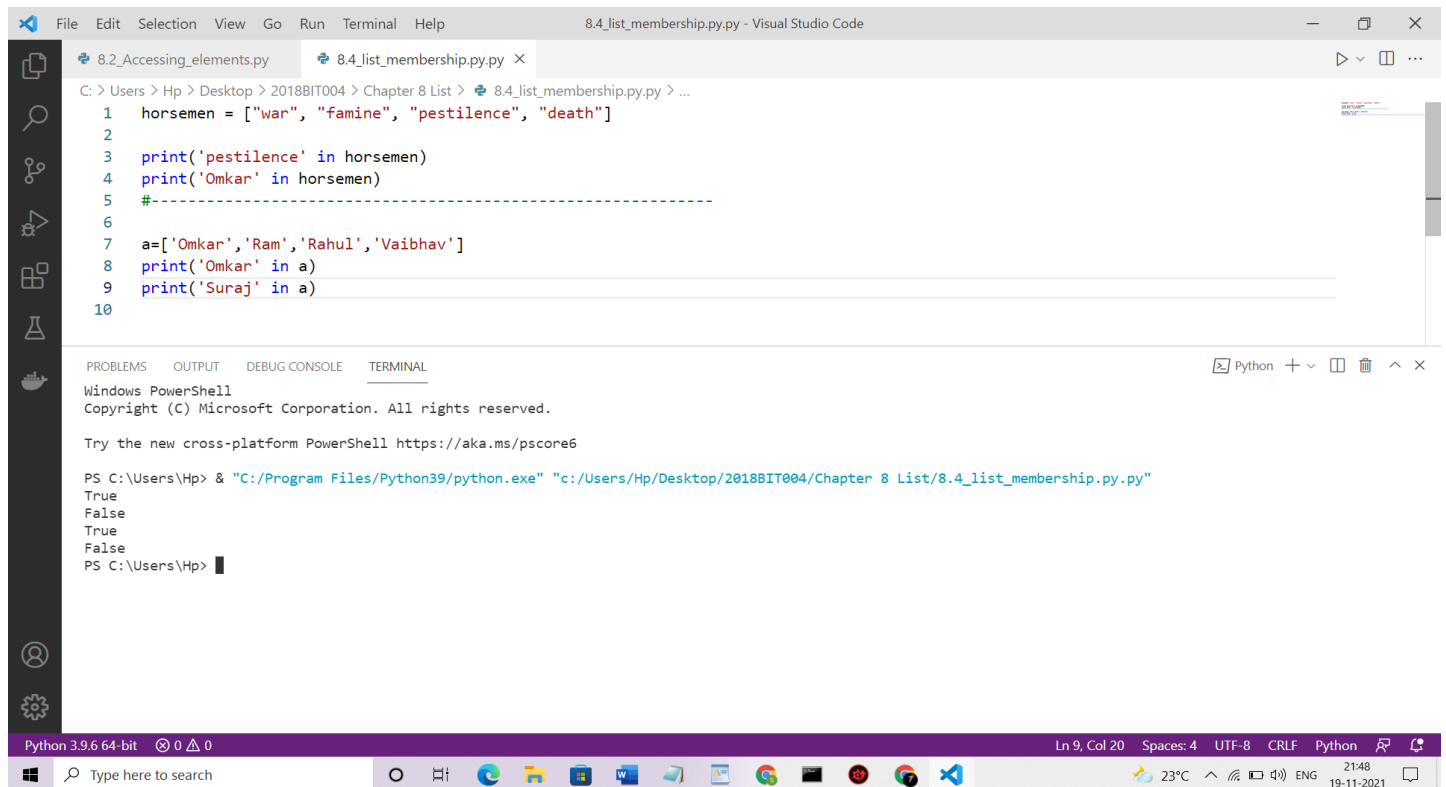
Terminal Output:

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 8 List/8.3_List_length.py"
-----
war
famine
pestilence
death
-----
PS C:\Users\Hp\Desktop\2018BIT004>
```

## 8.4 List membership



The screenshot shows the Visual Studio Code editor with a file named `8.4_list_membership.py.py`. The code defines a list `horsemen` and checks for membership of 'pestilence' and 'Omkar' in it. It also defines a list `a` and checks for membership of 'Omkar' and 'Suraj' in it. The terminal output shows the execution of the script, which prints `True` for 'pestilence' and 'Omkar', and `False` for 'Omkar' and 'Suraj'.

```
1 horsemen = ["war", "famine", "pestilence", "death"]
2
3 print('pestilence' in horsemen)
4 print('Omkar' in horsemen)
5 #-----
6
7 a=['Omkar','Ram','Rahul','Vaibhav']
8 print('Omkar' in a)
9 print('Suraj' in a)
10
```

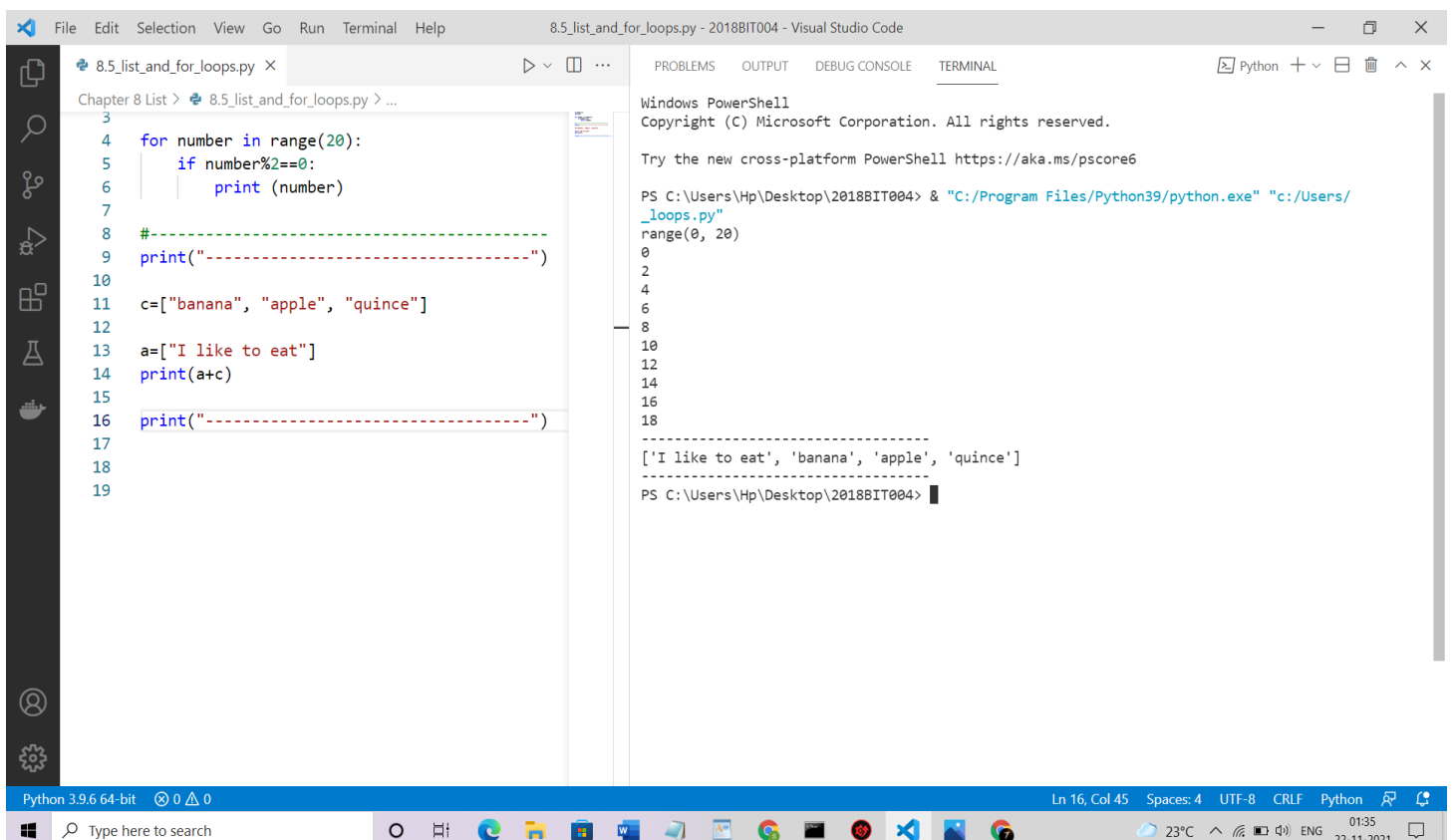
Windows PowerShell  
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell <https://aka.ms/pscore6>

PS C:\Users\Hp> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 8 List/8.4\_list\_membership.py.py"

```
True
False
True
False
PS C:\Users\Hp>
```

## 8.5 Lists and for loops



The screenshot shows the Visual Studio Code editor with a file named `8.5_list_and_for_loops.py`. The code uses a `for` loop to iterate over the range 0 to 19, printing each number. It also defines a list `c` and a string `a`, and prints the concatenation of `a` and `c`. The terminal output shows the execution of the script, which prints the numbers 0 to 19 and the concatenated string `['I like to eat', 'banana', 'apple', 'quince']`.

```
3
4 for number in range(20):
5     if number%2==0:
6         print (number)
7
8 #-----
9 print("-----")
10
11 c=["banana", "apple", "quince"]
12
13 a=["I like to eat"]
14 print(a+c)
15
16 print("-----")
17
18
19
```

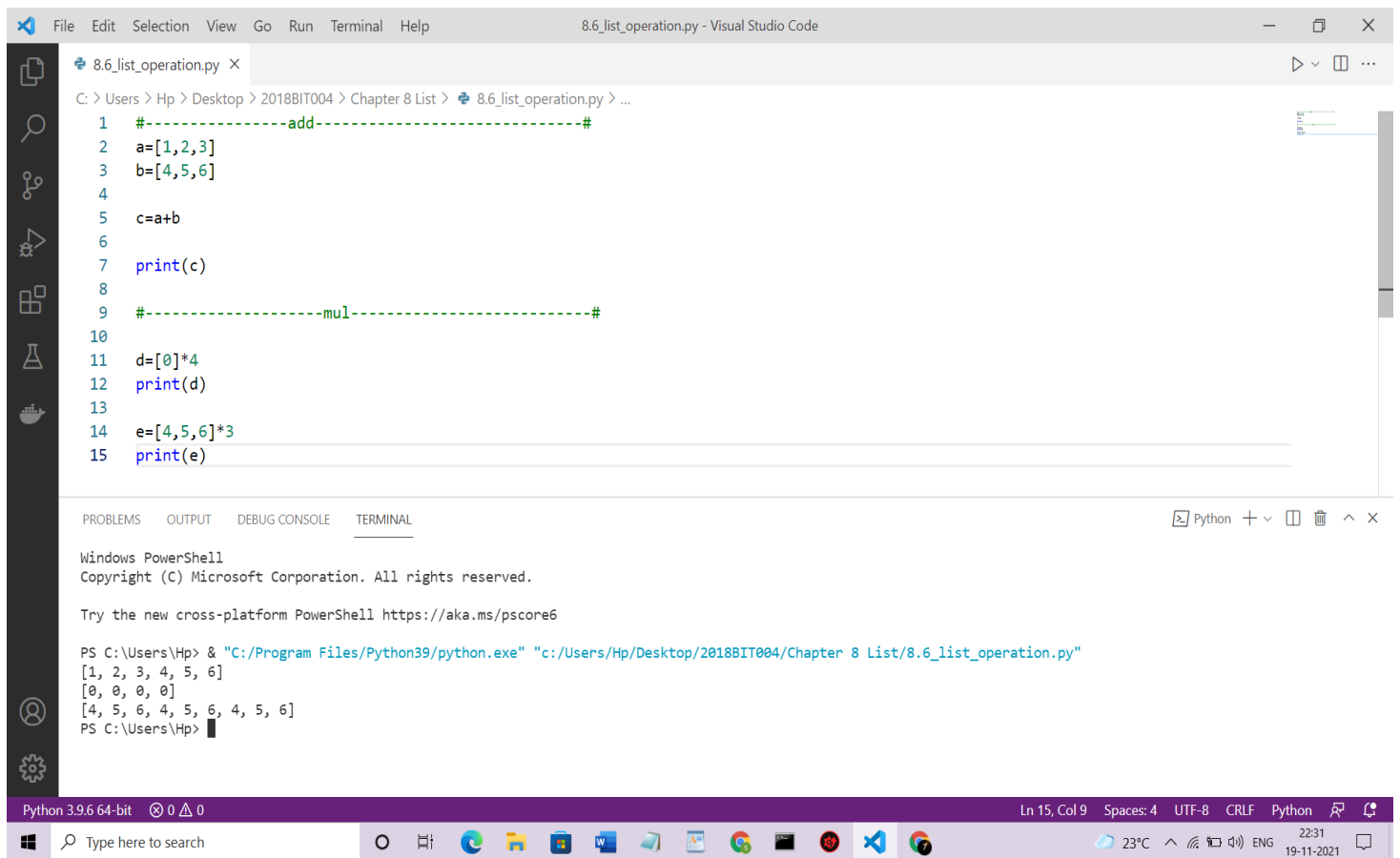
Windows PowerShell  
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell <https://aka.ms/pscore6>

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/\_loops.py"

```
range(0, 20)
0
2
4
6
8
10
12
14
16
18
-----
['I like to eat', 'banana', 'apple', 'quince']
-----
PS C:\Users\Hp\Desktop\2018BIT004>
```

## 8.6 List operations



The screenshot shows the Visual Studio Code editor with a file named `8.6_list_operation.py`. The code defines two lists, `a` and `b`, and performs several operations on them. The terminal window shows the output of the script, which includes the sum of the lists and the result of multiplying each element by 4 and 3.

```
1 #-----add-----#
2 a=[1,2,3]
3 b=[4,5,6]
4
5 c=a+b
6
7 print(c)
8
9 #-----mul-----#
10
11 d=[0]*4
12 print(d)
13
14 e=[4,5,6]*3
15 print(e)
```

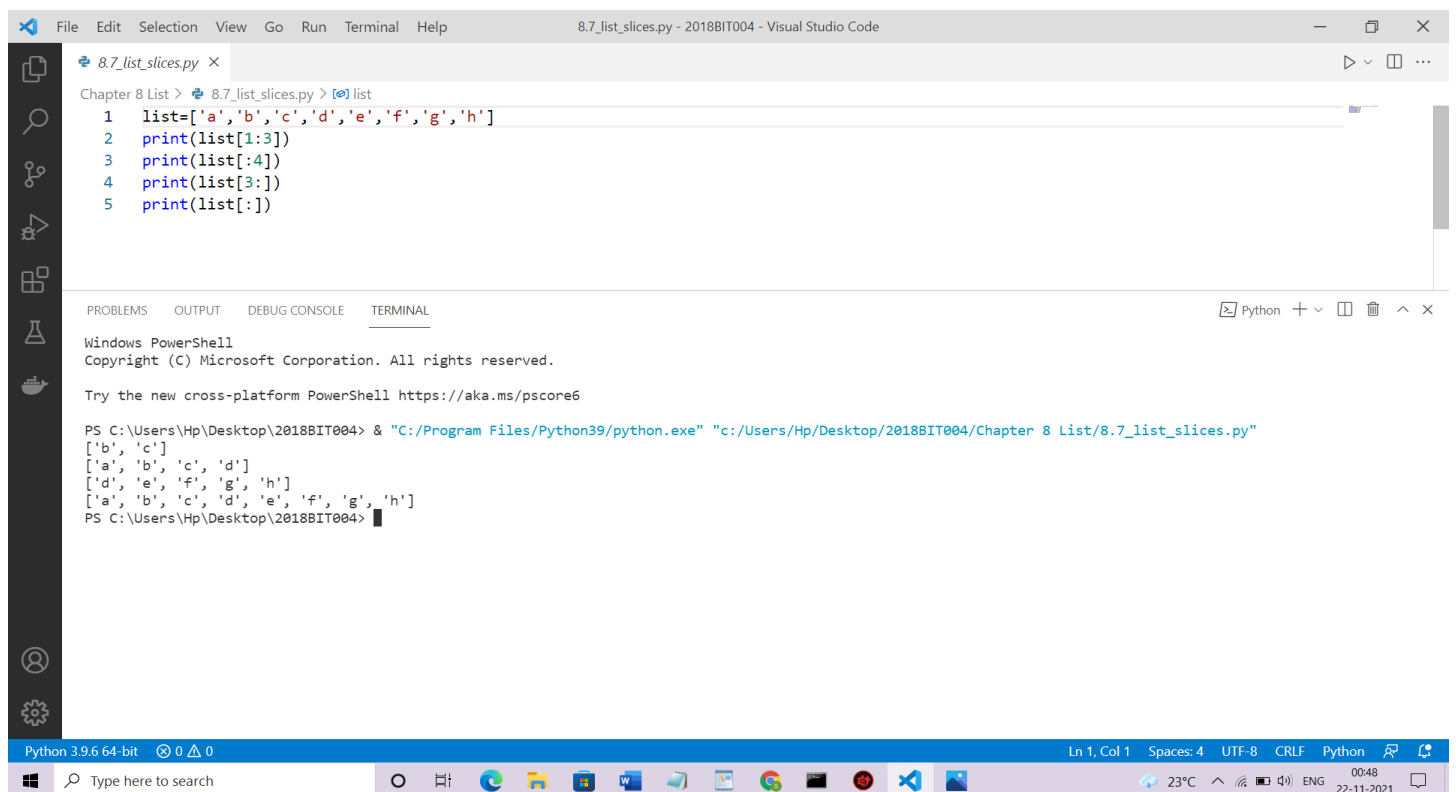
Terminal output:

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Hp> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 8 List/8.6_list_operation.py"
[1, 2, 3, 4, 5, 6]
[0, 0, 0, 0]
[4, 5, 6, 4, 5, 6, 4, 5, 6]
PS C:\Users\Hp>
```

## 8.7 List slices



The screenshot shows the Visual Studio Code editor with a file named `8.7_list_slices.py`. The code creates a list of characters and demonstrates various slicing operations. The terminal window shows the output of these operations, including slicing by index, by step, and by range.

```
1 list=['a','b','c','d','e','f','g','h']
2 print(list[1:3])
3 print(list[:4])
4 print(list[3:])
5 print(list[:])
```

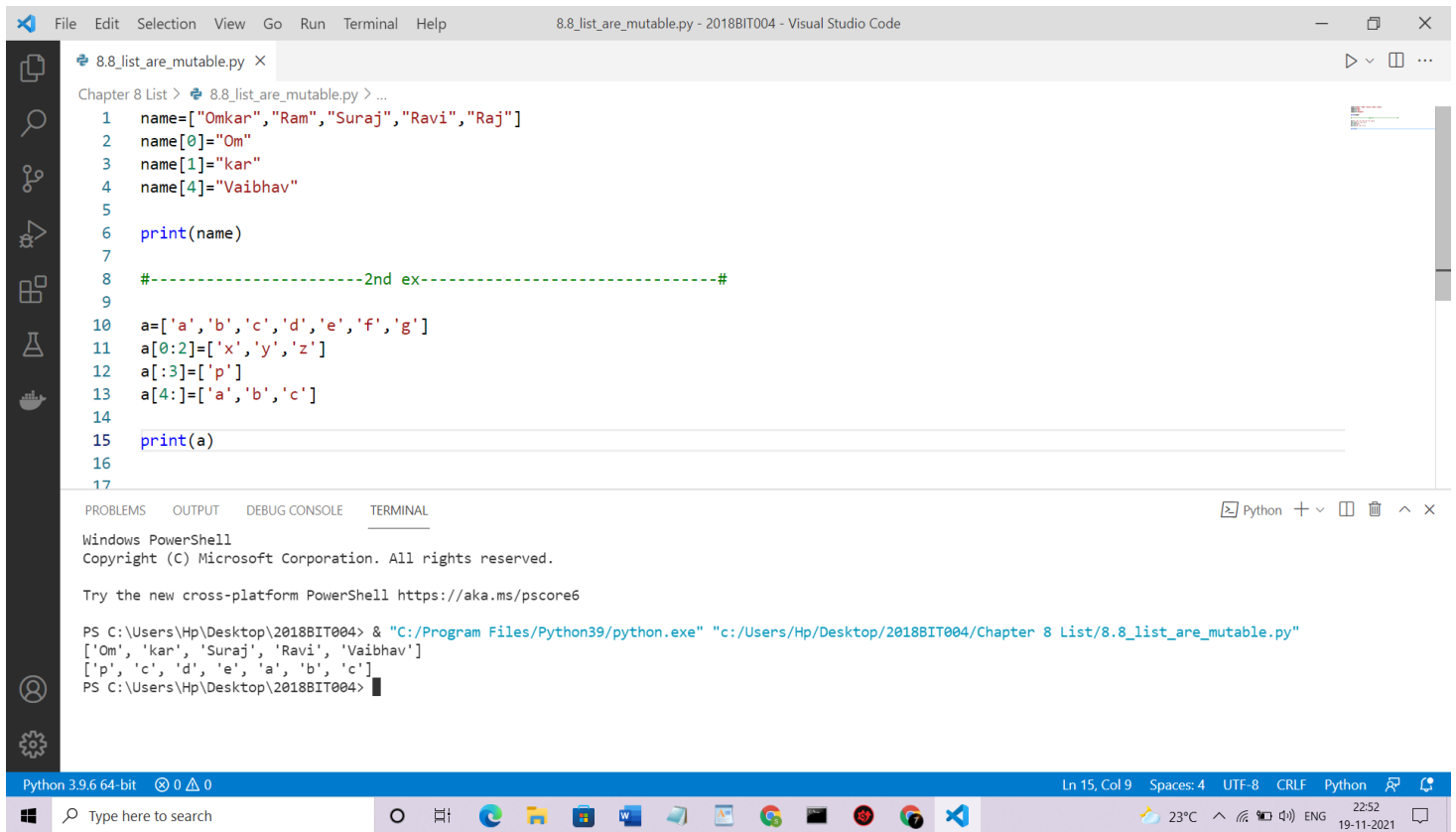
Terminal output:

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 8 List/8.7_list_slices.py"
['b', 'c']
['a', 'b', 'c', 'd']
['d', 'e', 'f', 'g', 'h']
['a', 'b', 'c', 'd', 'e', 'f', 'g', 'h']
PS C:\Users\Hp\Desktop\2018BIT004>
```

## 8.8 Lists are mutable



The screenshot shows the Visual Studio Code editor with a file named `8.8_list_are_mutable.py`. The code defines a list `name` with five string elements and a list `a` with seven character elements. It then modifies elements at specific indices and prints the lists. The terminal output shows the execution of the script, displaying the modified lists.

```
Chapter 8 List > 8.8_list_are_mutable.py > ...
1 name=["Omkar","Ram","Suraj","Ravi","Raj"]
2 name[0]="Om"
3 name[1]="kar"
4 name[4]="Vaibhav"
5
6 print(name)
7
8 #-----2nd ex-----#
9
10 a=['a','b','c','d','e','f','g']
11 a[0:2]=['x','y','z']
12 a[:3]=['p']
13 a[4:]=['a','b','c']
14
15 print(a)
16
17
```

Windows PowerShell  
Copyright (C) Microsoft Corporation. All rights reserved.

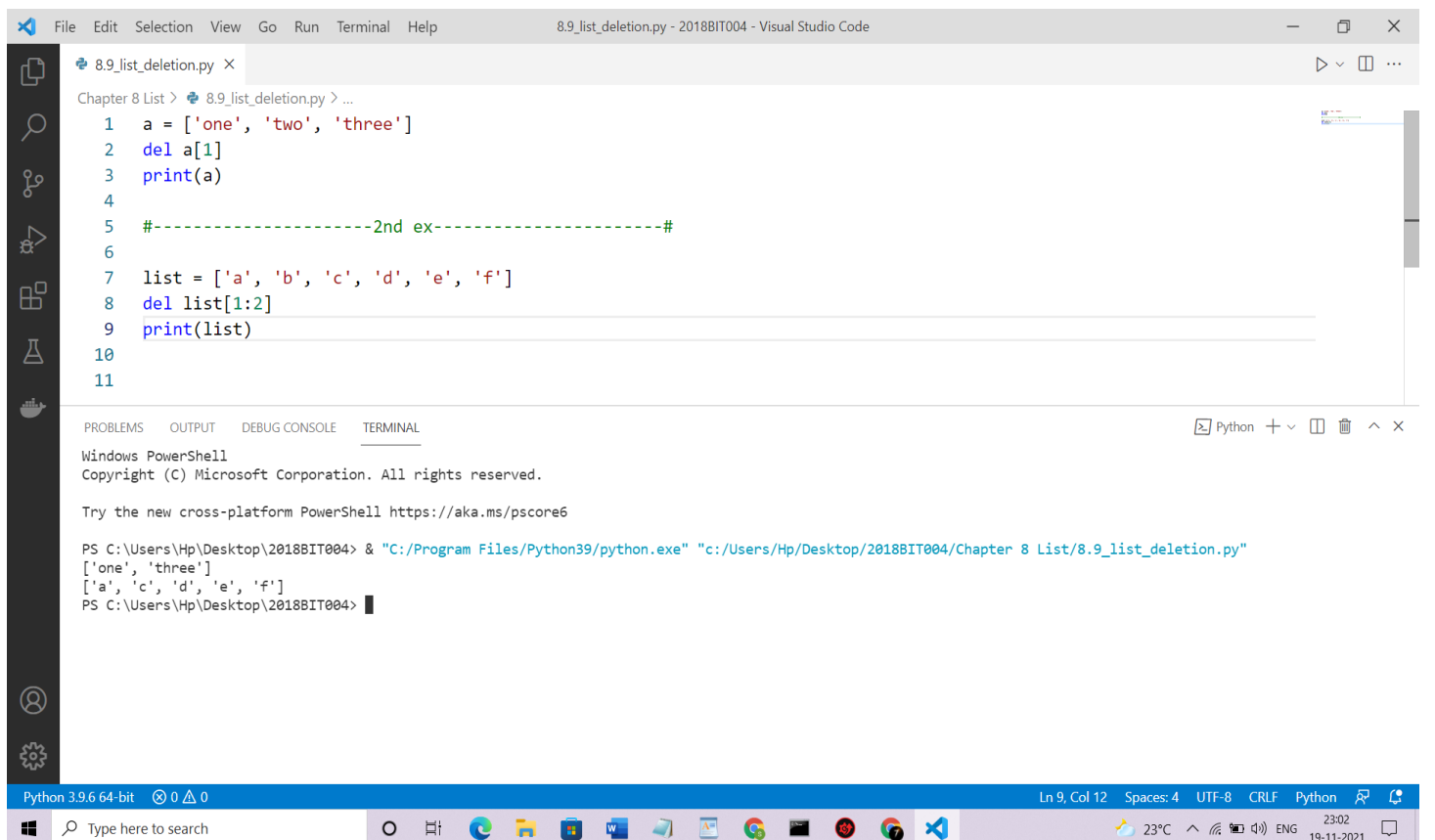
Try the new cross-platform PowerShell <https://aka.ms/pscore6>

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 8 List/8.8\_list\_are\_mutable.py"

```
['Om', 'kar', 'Suraj', 'Ravi', 'Vaibhav']
['p', 'c', 'd', 'e', 'a', 'b', 'c']
PS C:\Users\Hp\Desktop\2018BIT004>
```

Python 3.9.6 64-bit 0 0 0 Ln 15, Col 9 Spaces: 4 UTF-8 CRLF Python

## 8.9 List deletion



The screenshot shows the Visual Studio Code editor with a file named `8.9_list_deletion.py`. The code defines a list `a` with three string elements and a list `list` with seven character elements. It then deletes elements at specific indices and prints the remaining lists. The terminal output shows the execution of the script, displaying the modified lists.

```
Chapter 8 List > 8.9_list_deletion.py > ...
1 a = ['one', 'two', 'three']
2 del a[1]
3 print(a)
4
5 #-----2nd ex-----#
6
7 list = ['a', 'b', 'c', 'd', 'e', 'f']
8 del list[1:2]
9 print(list)
10
11
```

Windows PowerShell  
Copyright (C) Microsoft Corporation. All rights reserved.

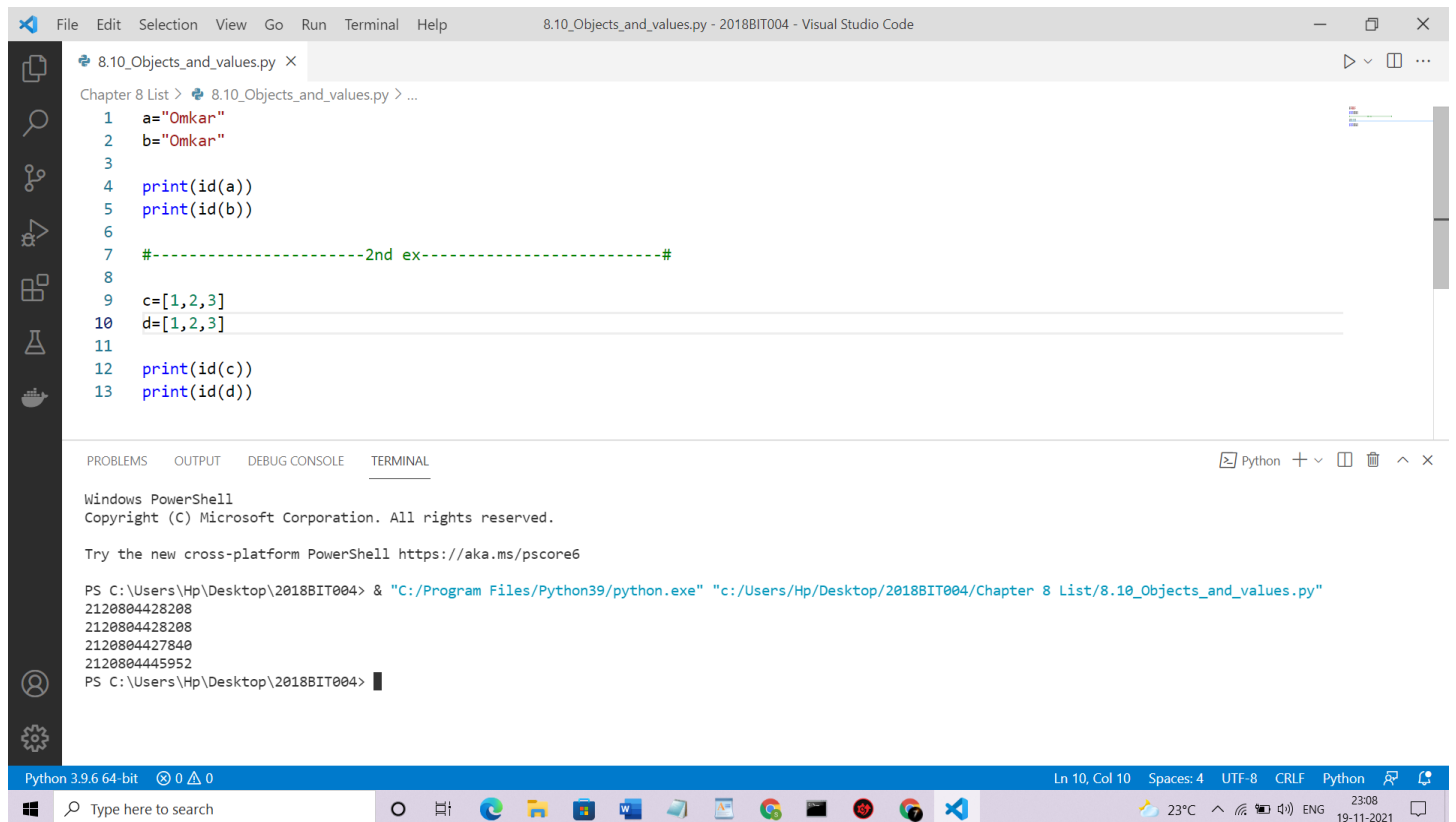
Try the new cross-platform PowerShell <https://aka.ms/pscore6>

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 8 List/8.9\_list\_deletion.py"

```
['one', 'three']
['a', 'c', 'd', 'e', 'f']
PS C:\Users\Hp\Desktop\2018BIT004>
```

Python 3.9.6 64-bit 0 0 0 Ln 9, Col 12 Spaces: 4 UTF-8 CRLF Python

## 8.10 Objects and values



The screenshot shows the Visual Studio Code interface with a file named `8.10_Objects_and_values.py` open. The editor displays the following Python code:

```
Chapter 8 List > 8.10_Objects_and_values.py > ...
1  a="Omkar"
2  b="Omkar"
3
4  print(id(a))
5  print(id(b))
6
7  #-----2nd ex-----#
8
9  c=[1,2,3]
10 d=[1,2,3]
11
12 print(id(c))
13 print(id(d))
```

The terminal window at the bottom shows the output of the script:

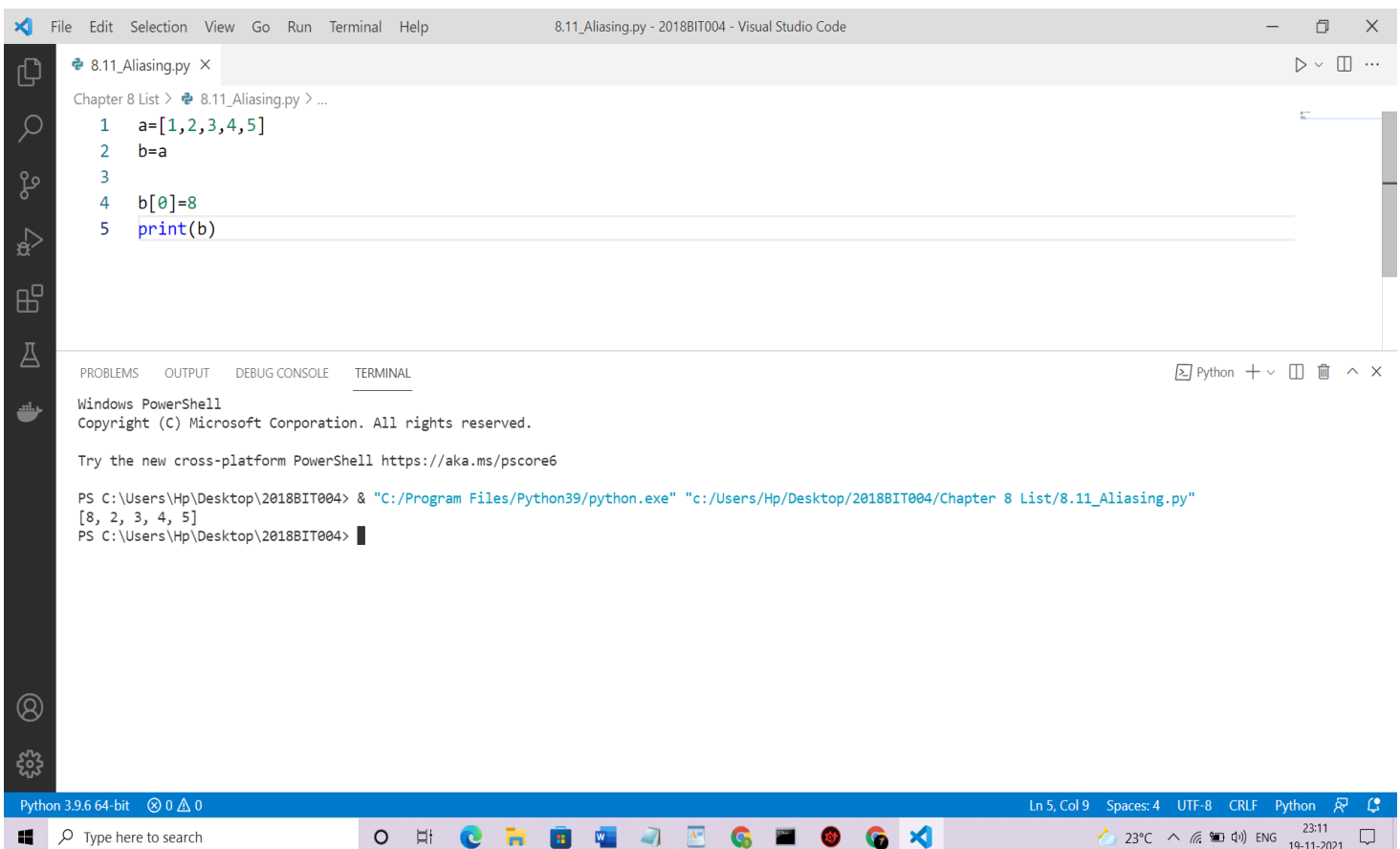
```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 8 List/8.10_Objects_and_values.py"
2120804428208
2120804428208
2120804427840
2120804445952
PS C:\Users\Hp\Desktop\2018BIT004>
```

The status bar at the bottom indicates the file is a Python 3.9.6 64-bit script, with 10 lines and 10 columns selected. The system tray shows the date and time as 19-11-2021, 23:08.

## 8.11 Aliasing



The screenshot shows the Visual Studio Code interface with a file named `8.11_Aliasing.py` open. The editor displays the following Python code:

```
Chapter 8 List > 8.11_Aliasing.py > ...
1  a=[1,2,3,4,5]
2  b=a
3
4  b[0]=8
5  print(b)
```

The terminal window at the bottom shows the output of the script:

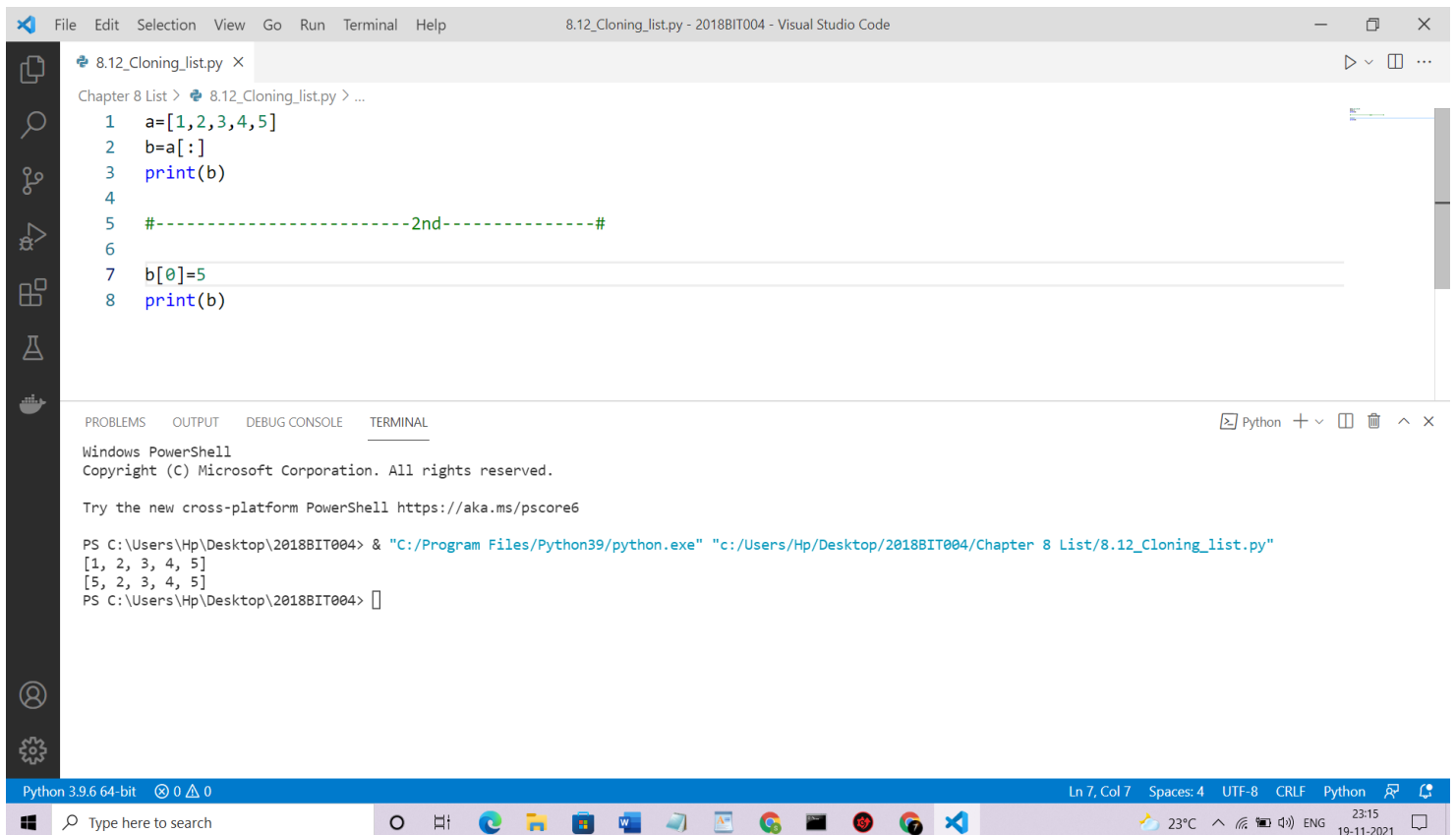
```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 8 List/8.11_Aliasing.py"
[8, 2, 3, 4, 5]
PS C:\Users\Hp\Desktop\2018BIT004>
```

The status bar at the bottom indicates the file is a Python 3.9.6 64-bit script, with 5 lines and 9 columns selected. The system tray shows the date and time as 19-11-2021, 23:11.

## 8.12 Cloning lists



The screenshot shows the Visual Studio Code editor with a file named `8.12_Cloning_list.py`. The code defines a list `a` with values `[1, 2, 3, 4, 5]`, creates a shallow copy `b = a[:]`, prints `b`, and then modifies `b[0]` to `5` before printing `b` again. A comment indicates this is the 2nd example. The terminal window shows the execution of the script using Python 3.9.6, displaying the output of the print statements.

```
Chapter 8 List > 8.12_Cloning_list.py > ...
1  a=[1,2,3,4,5]
2  b=a[:]
3  print(b)
4
5  #-----2nd-----#
6
7  b[0]=5
8  print(b)
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

Windows PowerShell  
Copyright (C) Microsoft Corporation. All rights reserved.

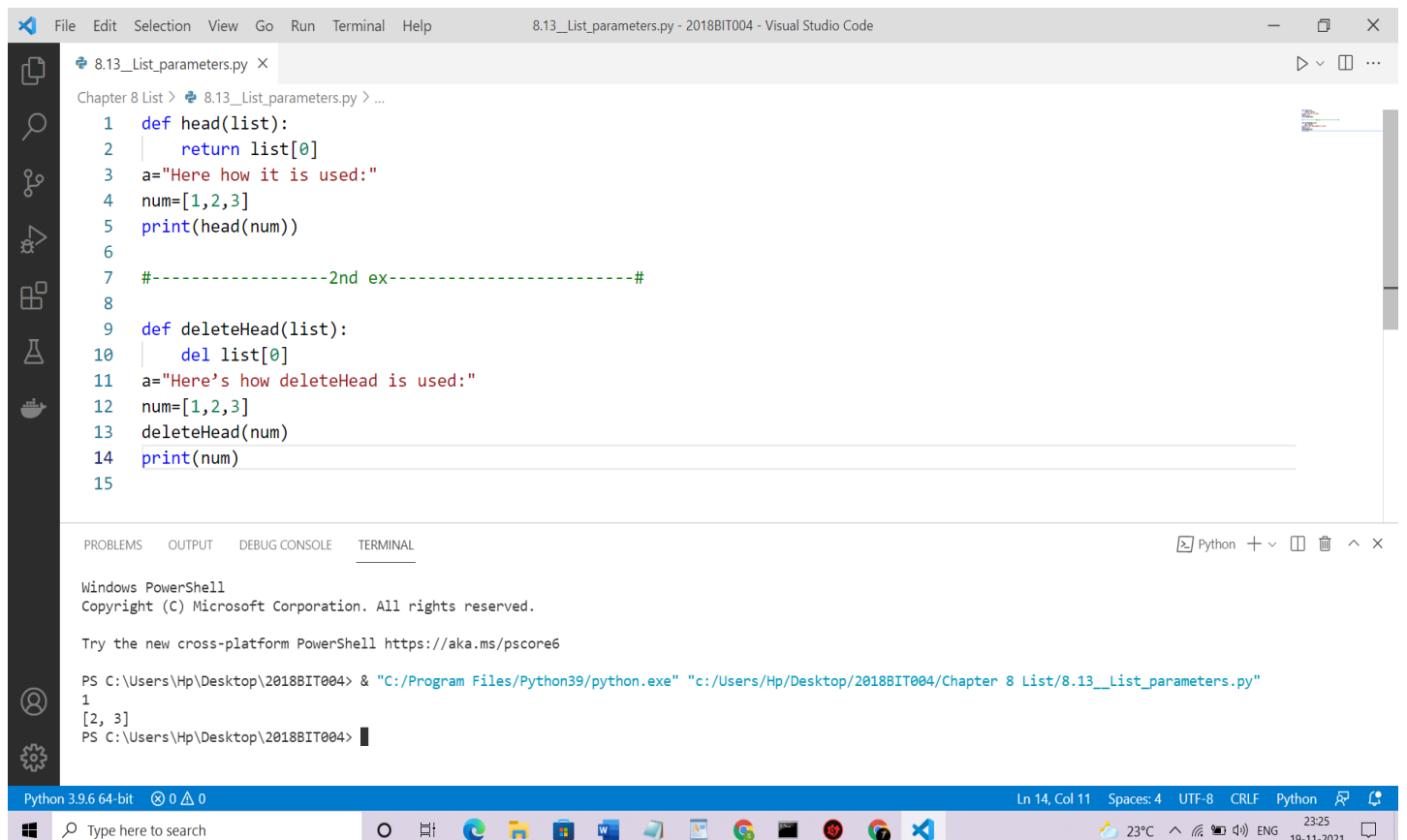
Try the new cross-platform PowerShell <https://aka.ms/pscore6>

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 8 List/8.12\_Cloning\_list.py"

```
[1, 2, 3, 4, 5]
[5, 2, 3, 4, 5]
```

Python 3.9.6 64-bit 0 0 0 Ln 7, Col 7 Spaces: 4 UTF-8 CRLF Python 23:15 19-11-2021

## 8.13 List parameters



The screenshot shows the Visual Studio Code editor with a file named `8.13_List_parameters.py`. The code defines two functions: `head(list)` which returns the first element of the list, and `deleteHead(list)` which removes the first element. Both functions are demonstrated with a list `num = [1, 2, 3]`. A comment indicates this is the 2nd example. The terminal window shows the execution of the script using Python 3.9.6, displaying the output of the print statements.

```
Chapter 8 List > 8.13_List_parameters.py > ...
1  def head(list):
2      return list[0]
3  a="Here how it is used:"
4  num=[1,2,3]
5  print(head(num))
6
7  #-----2nd ex-----#
8
9  def deleteHead(list):
10     del list[0]
11     a="Here's how deleteHead is used:"
12     num=[1,2,3]
13     deleteHead(num)
14     print(num)
15
```

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

Windows PowerShell  
Copyright (C) Microsoft Corporation. All rights reserved.

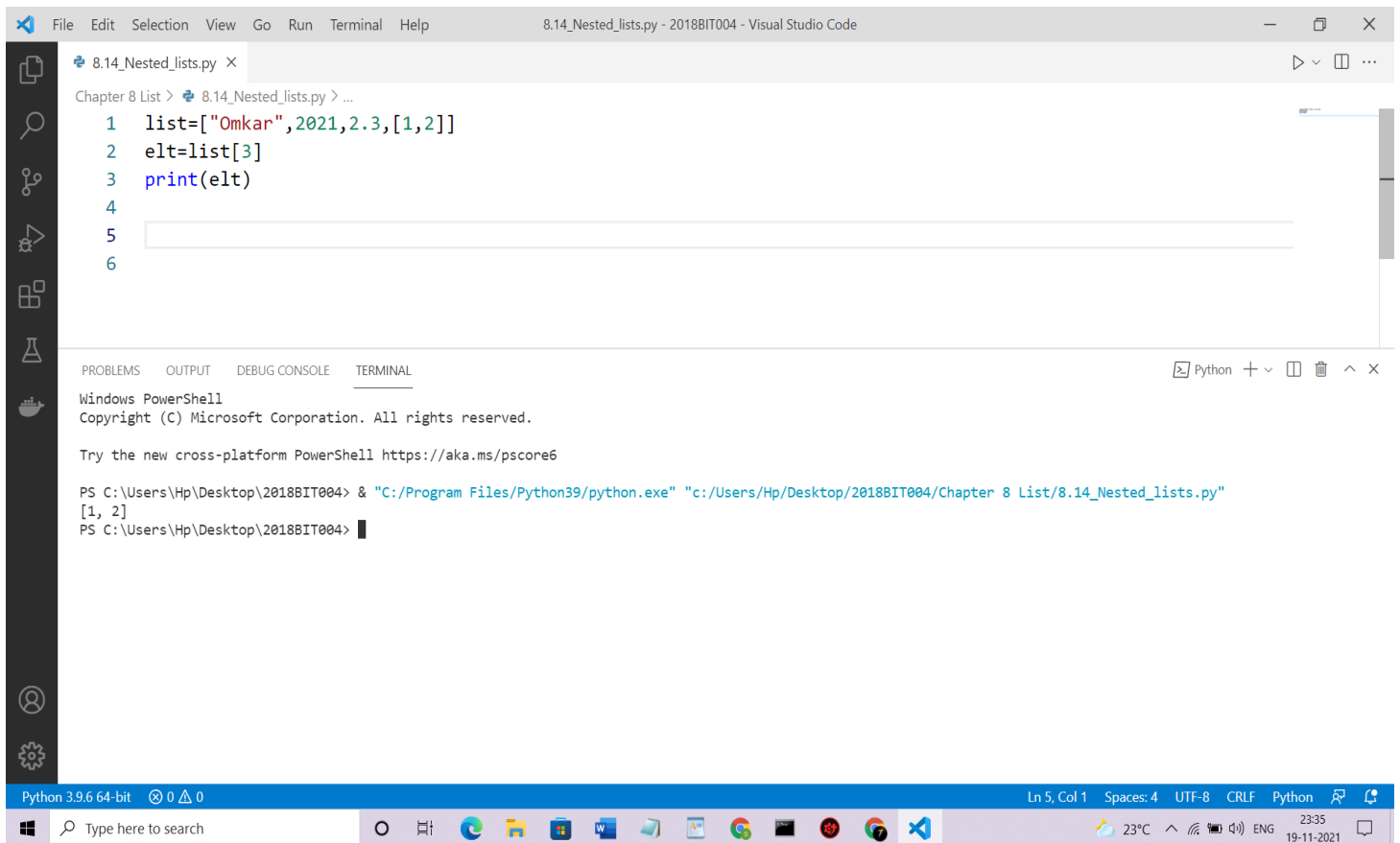
Try the new cross-platform PowerShell <https://aka.ms/pscore6>

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 8 List/8.13\_List\_parameters.py"

```
1
[2, 3]
```

Python 3.9.6 64-bit 0 0 0 Ln 14, Col 11 Spaces: 4 UTF-8 CRLF Python 23:25 19-11-2021

## 8.14 Nested lists



The screenshot shows the Visual Studio Code editor with a file named `8.14_Nested_lists.py`. The code in the editor is as follows:

```
1 list=["Omkar",2021,2.3,[1,2]]
2 elt=list[3]
3 print(elt)
4
5
6
```

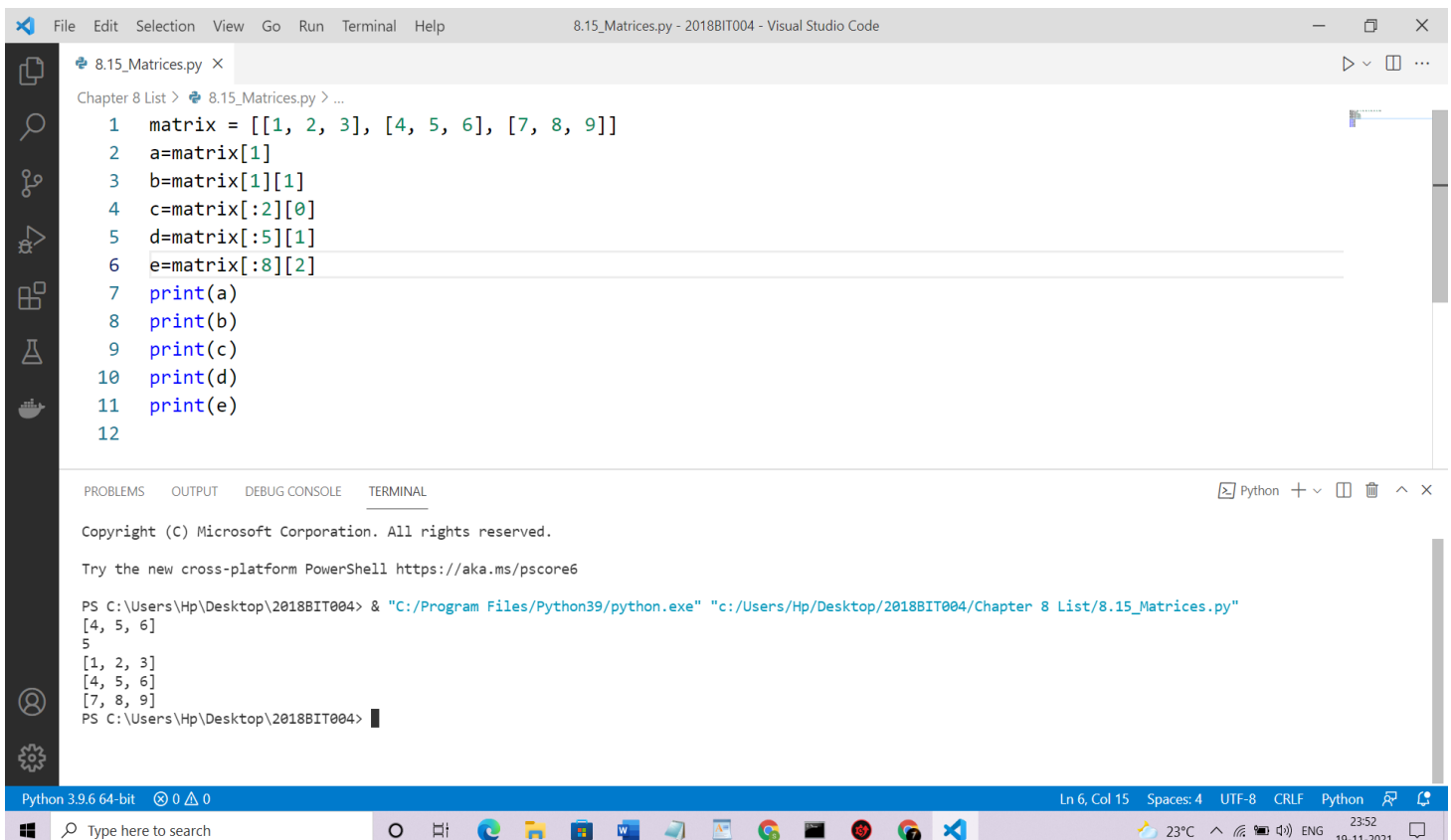
The terminal output shows the execution of the script:

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 8 List/8.14_Nested_lists.py"
[1, 2]
PS C:\Users\Hp\Desktop\2018BIT004>
```

## 8.15 Matrices



The screenshot shows the Visual Studio Code editor with a file named `8.15_Matrices.py`. The code in the editor is as follows:

```
1 matrix = [[1, 2, 3], [4, 5, 6], [7, 8, 9]]
2 a=matrix[1]
3 b=matrix[1][1]
4 c=matrix[:2][0]
5 d=matrix[:5][1]
6 e=matrix[:8][2]
7 print(a)
8 print(b)
9 print(c)
10 print(d)
11 print(e)
12
```

The terminal output shows the execution of the script:

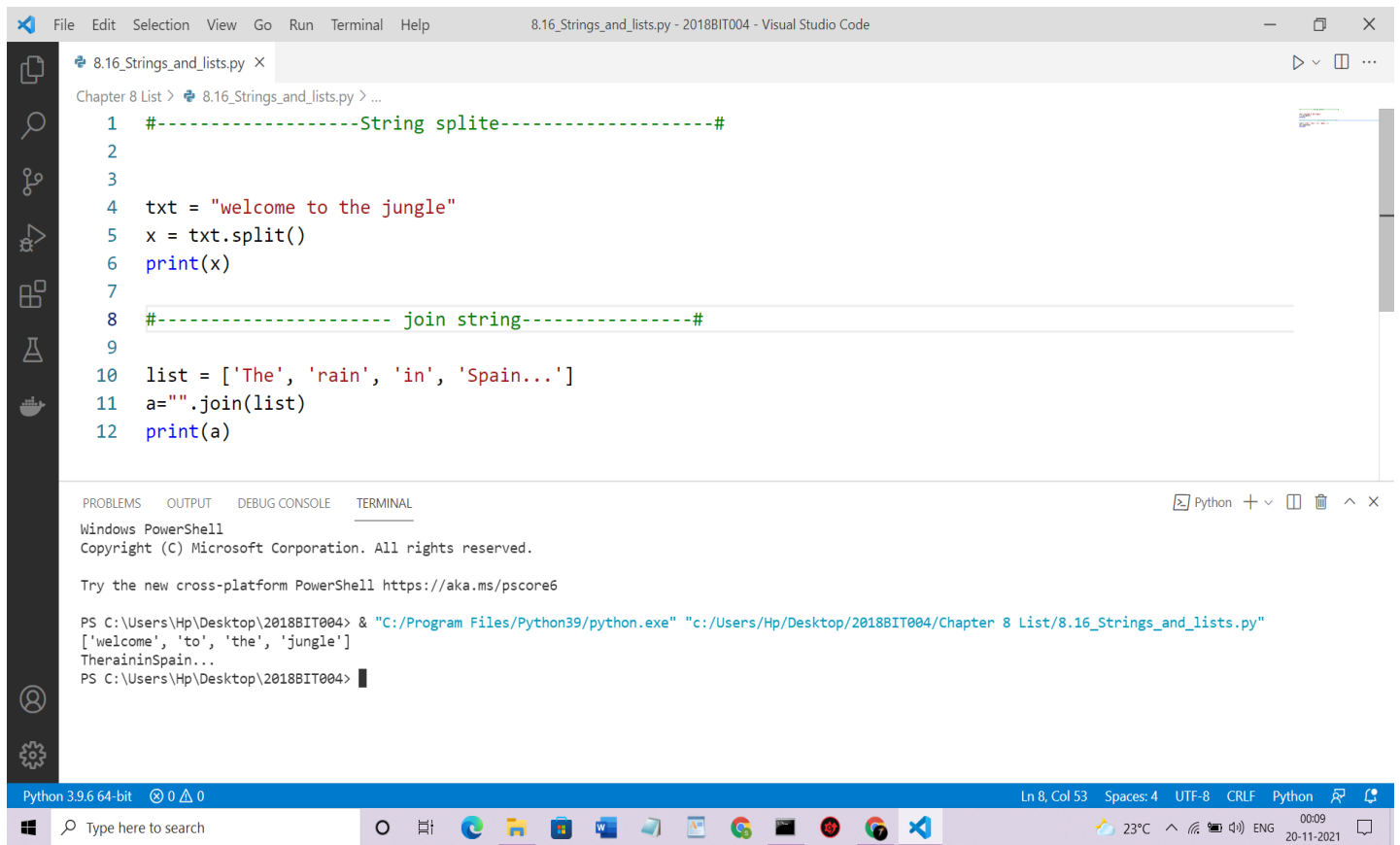
```
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 8 List/8.15_Matrices.py"
[4, 5, 6]
5
[1, 2, 3]
[4, 5, 6]
[7, 8, 9]
PS C:\Users\Hp\Desktop\2018BIT004>
```



## 8.16 Strings and lists



The screenshot shows the Visual Studio Code editor with a file named `8.16_Strings_and_lists.py`. The code in the editor is as follows:

```
1 #-----String splite-----#
2
3
4 txt = "welcome to the jungle"
5 x = txt.split()
6 print(x)
7
8 #----- join string-----#
9
10 list = ['The', 'rain', 'in', 'Spain...']
11 a=".".join(list)
12 print(a)
```

The terminal output shows the execution of the script:

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

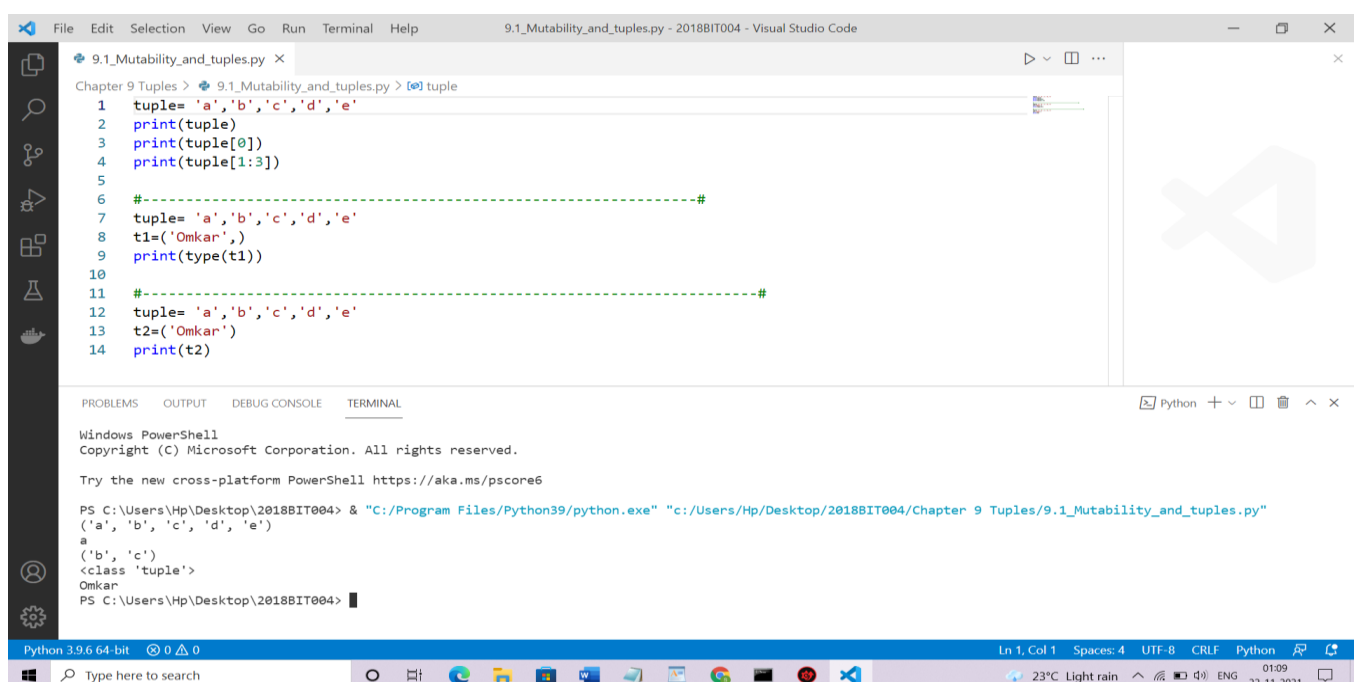
Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 8 List/8.16_Strings_and_lists.py"
['welcome', 'to', 'the', 'jungle']
TherainSpain...
PS C:\Users\Hp\Desktop\2018BIT004>
```

The status bar at the bottom indicates the file is encoded in UTF-8 with CRLF line endings, using Python 3.9.6 64-bit.

## Chapter 9 Tuples Programs

### 9.1 Mutability and tuples



The screenshot shows the Visual Studio Code editor with a file named `9.1_Mutability_and_tuples.py`. The code in the editor is as follows:

```
1 tuple= 'a','b','c','d','e'
2 print(tuple)
3 print(tuple[0])
4 print(tuple[1:3])
5
6 #-----#
7 tuple= 'a','b','c','d','e'
8 t1=('Omkar',)
9 print(type(t1))
10
11 #-----#
12 tuple= 'a','b','c','d','e'
13 t2=('Omkar')
14 print(t2)
```

The terminal output shows the execution of the script:

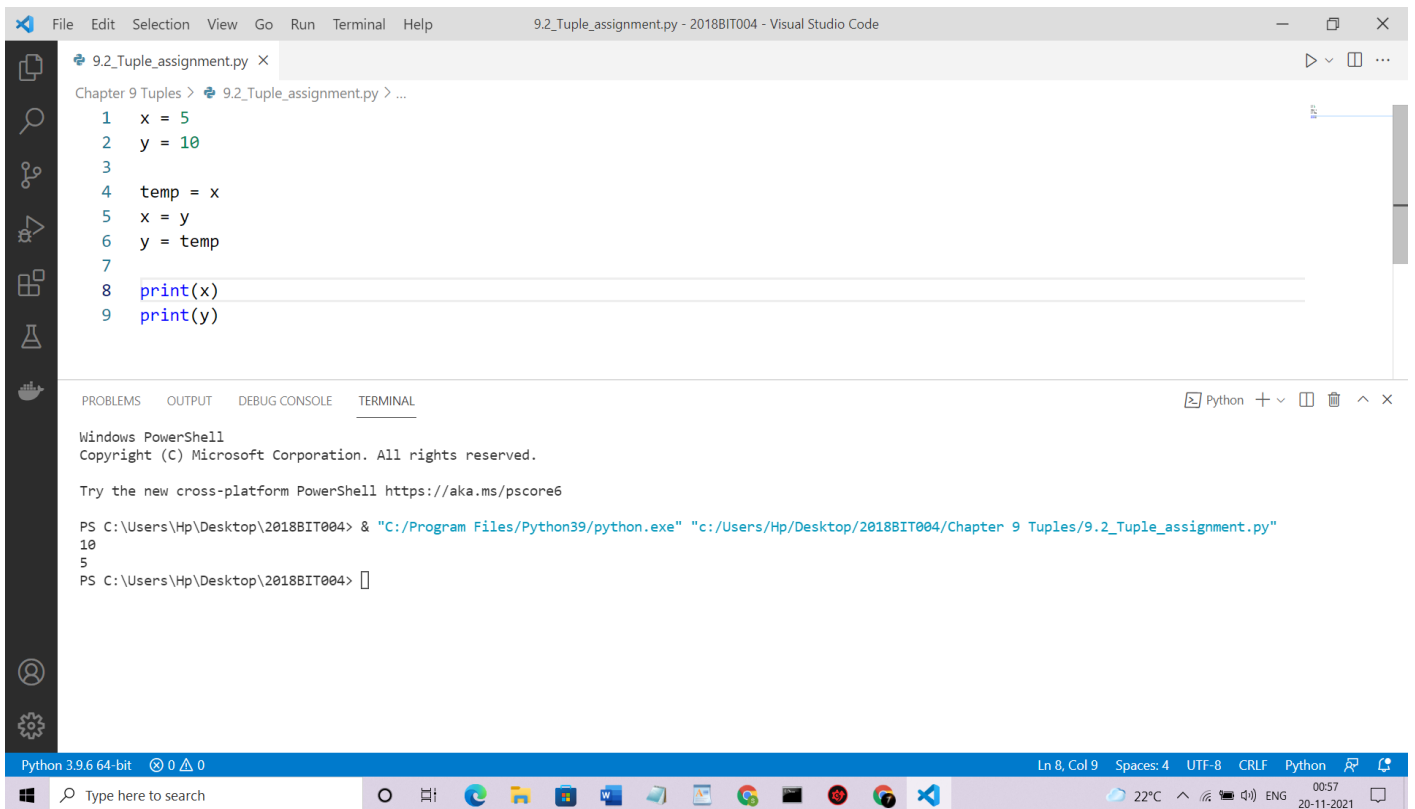
```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 9 Tuples/9.1_Mutability_and_tuples.py"
('a', 'b', 'c', 'd', 'e')
a
('b', 'c')
<class 'tuple'>
Omkar
PS C:\Users\Hp\Desktop\2018BIT004>
```

The status bar at the bottom indicates the file is encoded in UTF-8 with CRLF line endings, using Python 3.9.6 64-bit.

## 9.2 Tuple assignment



The screenshot shows the Visual Studio Code editor with a file named `9.2_Tuple_assignment.py`. The code in the editor is as follows:

```
1 x = 5
2 y = 10
3
4 temp = x
5 x = y
6 y = temp
7
8 print(x)
9 print(y)
```

The terminal window at the bottom shows the execution of the script using PowerShell:

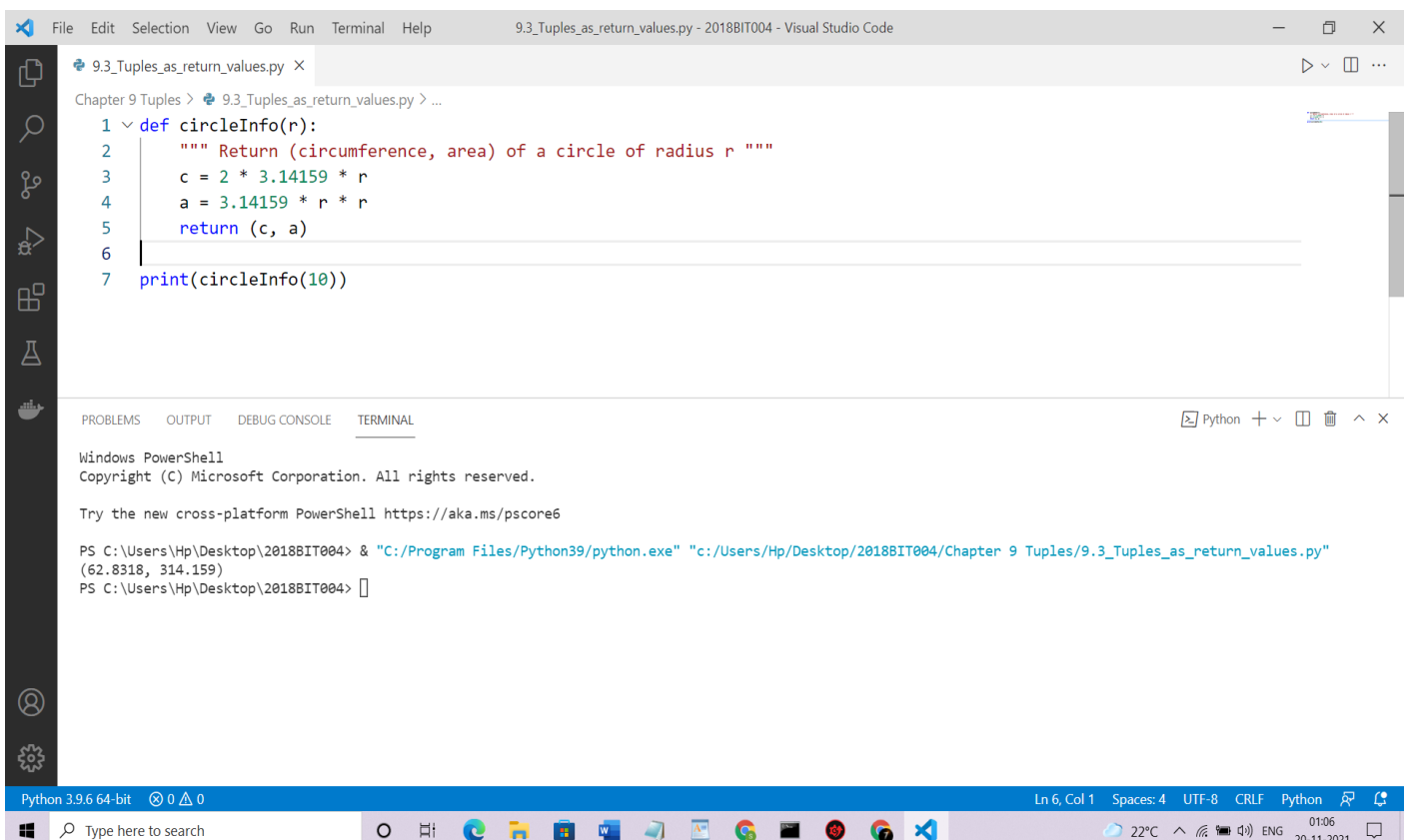
```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 9 Tuples/9.2_Tuple_assignment.py"
10
5
PS C:\Users\Hp\Desktop\2018BIT004>
```

The status bar at the bottom indicates the Python 3.9.6 64-bit environment is active, and the file is at line 8, column 9.

## 9.3 Tuples as return values



The screenshot shows the Visual Studio Code editor with a file named `9.3_Tuples_as_return_values.py`. The code in the editor is as follows:

```
1 def circleInfo(r):
2     """ Return (circumference, area) of a circle of radius r """
3     c = 2 * 3.14159 * r
4     a = 3.14159 * r * r
5     return (c, a)
6
7 print(circleInfo(10))
```

The terminal window at the bottom shows the execution of the script using PowerShell:

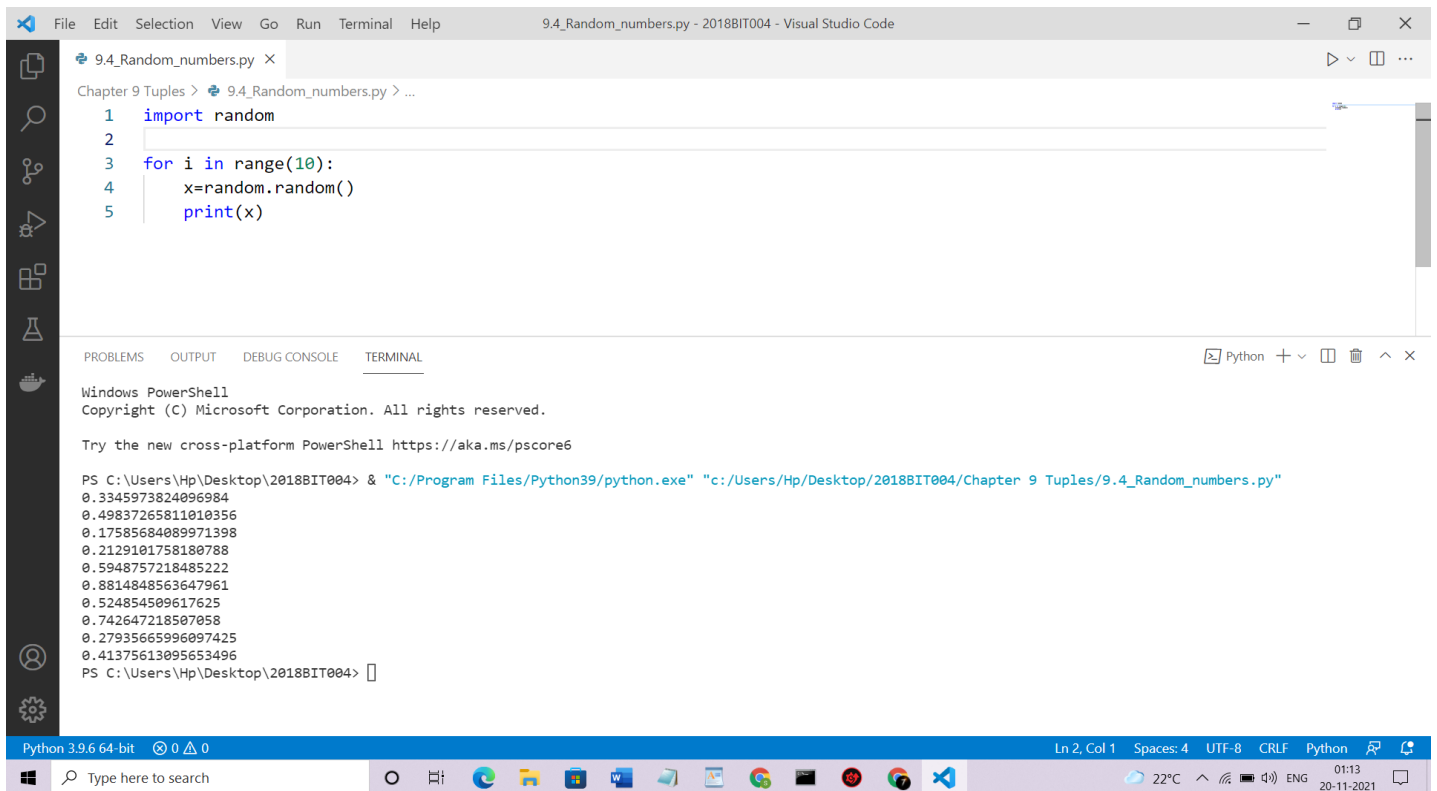
```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 9 Tuples/9.3_Tuples_as_return_values.py"
(62.8318, 314.159)
PS C:\Users\Hp\Desktop\2018BIT004>
```

The status bar at the bottom indicates the Python 3.9.6 64-bit environment is active, and the file is at line 6, column 1.

## 9.4 Random numbers



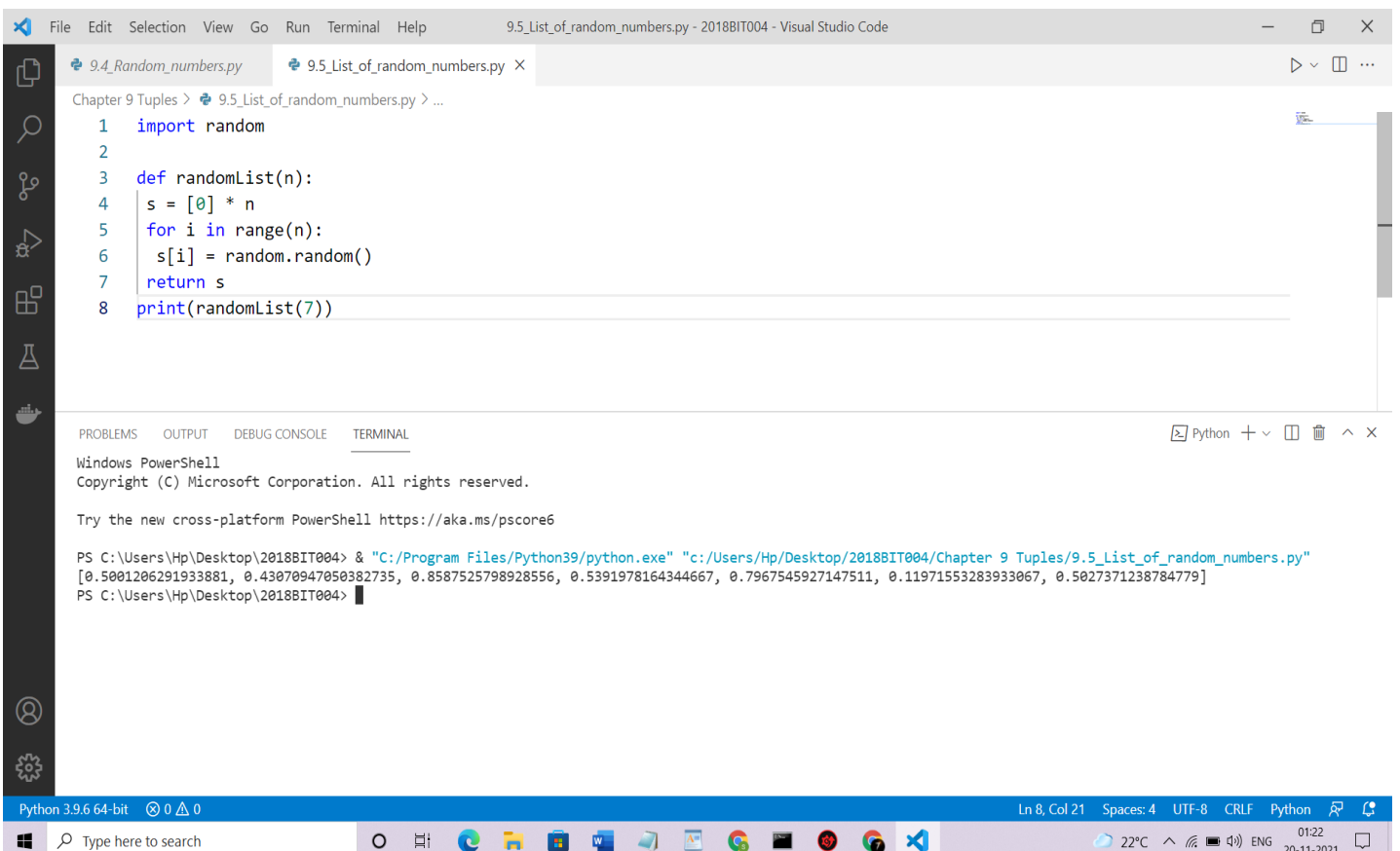
The screenshot shows the Visual Studio Code interface with a file named `9.4_Random_numbers.py` open. The code in the editor is as follows:

```
1 import random
2
3 for i in range(10):
4     x=random.random()
5     print(x)
```

Below the editor, the TERMINAL tab is active, showing the execution of the script using Python 3.9.6 64-bit. The output displays ten random floating-point numbers generated by `random.random()`.

```
PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 9 Tuples/9.4_Random_numbers.py"
0.3345973824096984
0.49837265811010356
0.17585684089971398
0.2129101758180788
0.5948757218485222
0.8814848563647961
0.524854509617625
0.742647218507058
0.27935665996097425
0.41375613095653496
PS C:\Users\Hp\Desktop\2018BIT004>
```

## 9.5 List of random numbers



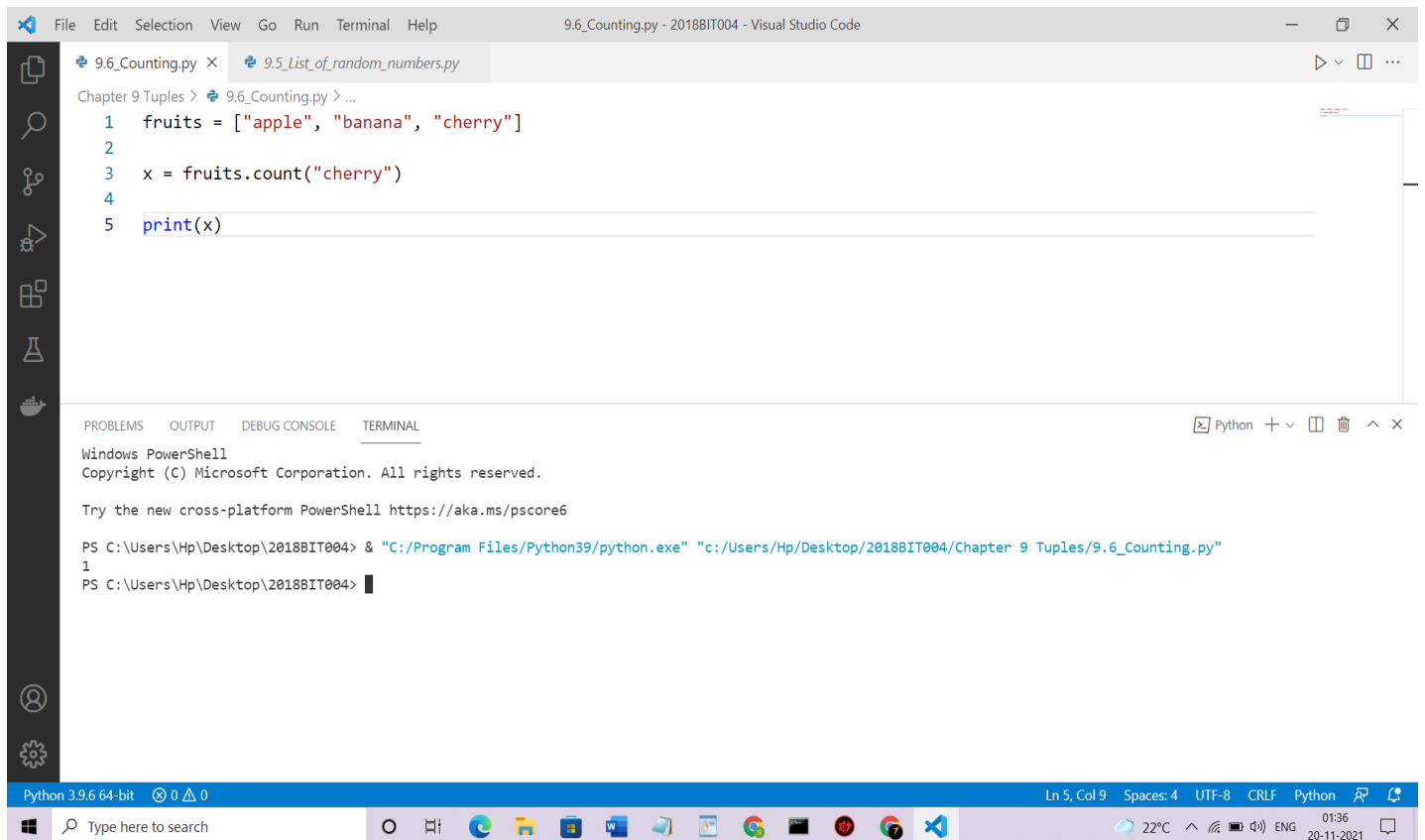
The screenshot shows the Visual Studio Code interface with two files open: `9.4_Random_numbers.py` and `9.5_List_of_random_numbers.py`. The code in the editor for `9.5_List_of_random_numbers.py` is as follows:

```
1 import random
2
3 def randomList(n):
4     s = [0] * n
5     for i in range(n):
6         s[i] = random.random()
7     return s
8 print(randomList(7))
```

Below the editor, the TERMINAL tab is active, showing the execution of the script. The output displays a list of seven random floating-point numbers generated by the `randomList` function.

```
PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 9 Tuples/9.5_List_of_random_numbers.py"
[0.5001206291933881, 0.43070947050382735, 0.8587525798928556, 0.5391978164344667, 0.7967545927147511, 0.11971553283933067, 0.5027371238784779]
PS C:\Users\Hp\Desktop\2018BIT004>
```

## 9.6 Counting



The screenshot shows the Visual Studio Code editor with a file named `9.6_Counting.py` open. The code defines a list of fruits and counts the occurrences of 'cherry'.

```
Chapter 9 Tuples > 9.6_Counting.py > ...
1  fruits = ["apple", "banana", "cherry"]
2
3  x = fruits.count("cherry")
4
5  print(x)
```

The terminal window shows the command prompt output:

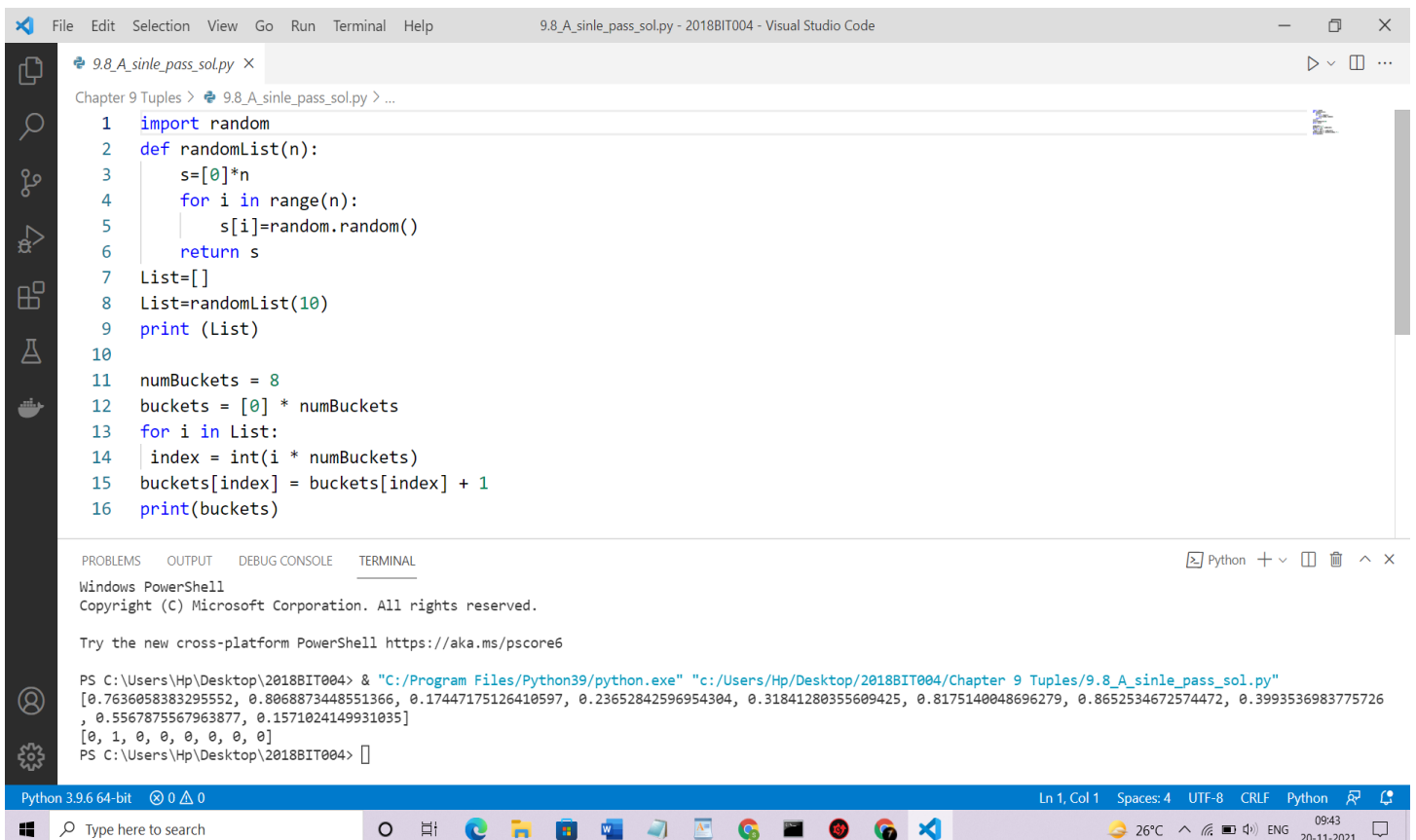
```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 9 Tuples/9.6_Counting.py"
1
PS C:\Users\Hp\Desktop\2018BIT004> █
```

The status bar at the bottom indicates the file is a Python 3.9.6 64-bit script.

## 9.8 A single-pass solution



The screenshot shows the Visual Studio Code editor with a file named `9.8_A_sinle_pass_sol.py` open. The code generates a list of random numbers and counts the occurrences of each number in a single pass.

```
Chapter 9 Tuples > 9.8_A_sinle_pass_sol.py > ...
1  import random
2  def randomList(n):
3      s=[0]*n
4      for i in range(n):
5          s[i]=random.random()
6      return s
7  List=[]
8  List=randomList(10)
9  print(List)
10
11 numBuckets = 8
12 buckets = [0] * numBuckets
13 for i in List:
14     index = int(i * numBuckets)
15     buckets[index] = buckets[index] + 1
16 print(buckets)
```

The terminal window shows the command prompt output:

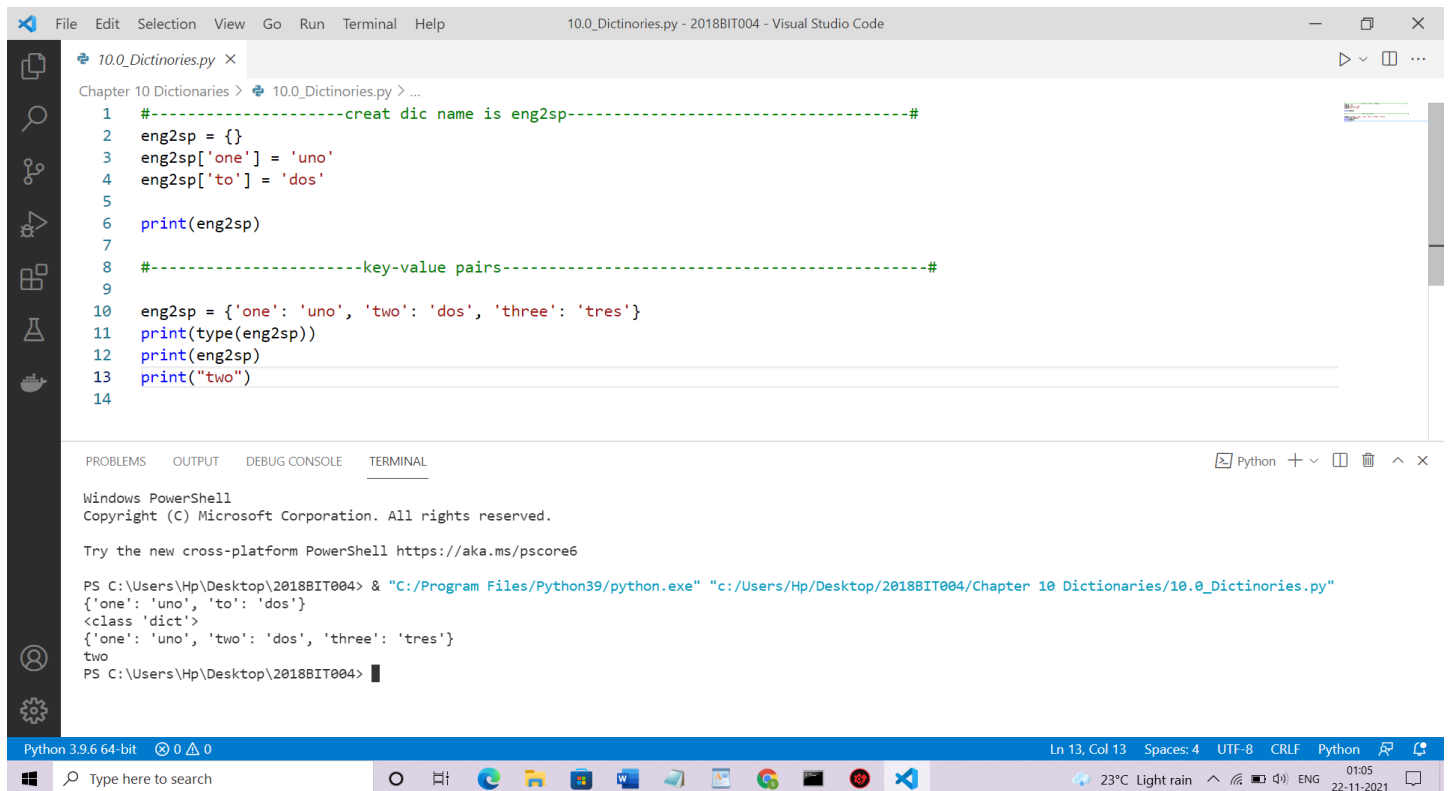
```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 9 Tuples/9.8_A_sinle_pass_sol.py"
[0.7636058383295552, 0.8068873448551366, 0.17447175126410597, 0.23652842596954304, 0.31841280355609425, 0.8175140048696279, 0.8652534672574472, 0.3993536983775726, 0.5567875567963877, 0.1571024149931035]
[0, 1, 0, 0, 0, 0, 0, 0]
PS C:\Users\Hp\Desktop\2018BIT004> █
```

The status bar at the bottom indicates the file is a Python 3.9.6 64-bit script.

# Chapter 10 Dictionaries Programs



The screenshot shows the Visual Studio Code editor with a file named `10.0_Dictionaries.py`. The code defines a dictionary `eng2sp` and prints its contents and a specific value.

```
1 #-----creat dic name is eng2sp-----#
2 eng2sp = {}
3 eng2sp['one'] = 'uno'
4 eng2sp['to'] = 'dos'
5
6 print(eng2sp)
7
8 #-----key-value pairs-----#
9
10 eng2sp = {'one': 'uno', 'two': 'dos', 'three': 'tres'}
11 print(type(eng2sp))
12 print(eng2sp)
13 print("two")
14
```

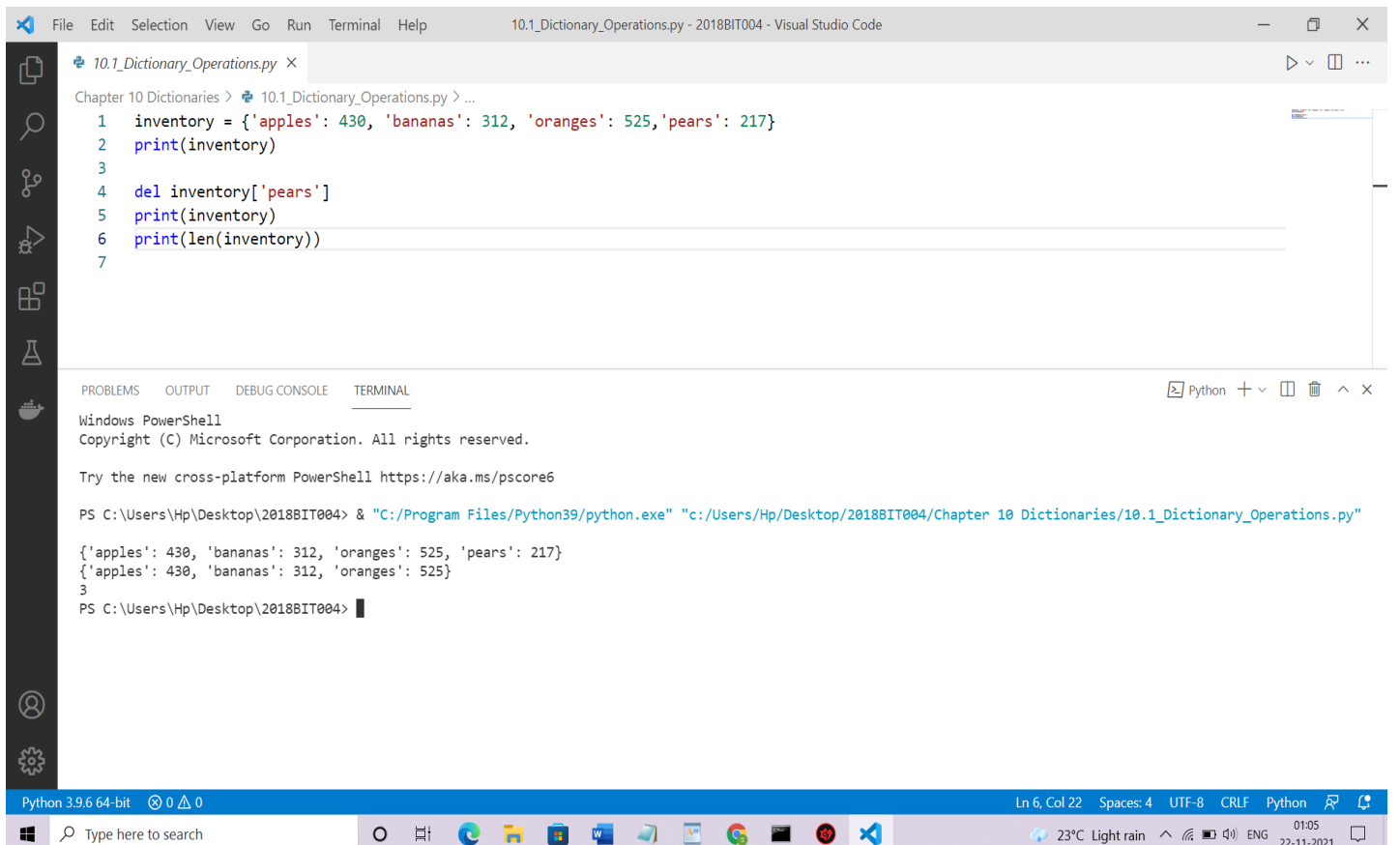
The terminal output shows the execution of the program:

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 10 Dictionaries/10.0_Dictionaries.py"
{'one': 'uno', 'to': 'dos'}
<class 'dict'>
{'one': 'uno', 'two': 'dos', 'three': 'tres'}
two
PS C:\Users\Hp\Desktop\2018BIT004>
```

## 10.1 Dictionary operations



The screenshot shows the Visual Studio Code editor with a file named `10.1_Dictionary_Operations.py`. The code performs operations on a dictionary, including deleting a key and printing the length.

```
1 inventory = {'apples': 430, 'bananas': 312, 'oranges': 525, 'pears': 217}
2 print(inventory)
3
4 del inventory['pears']
5 print(inventory)
6 print(len(inventory))
7
```

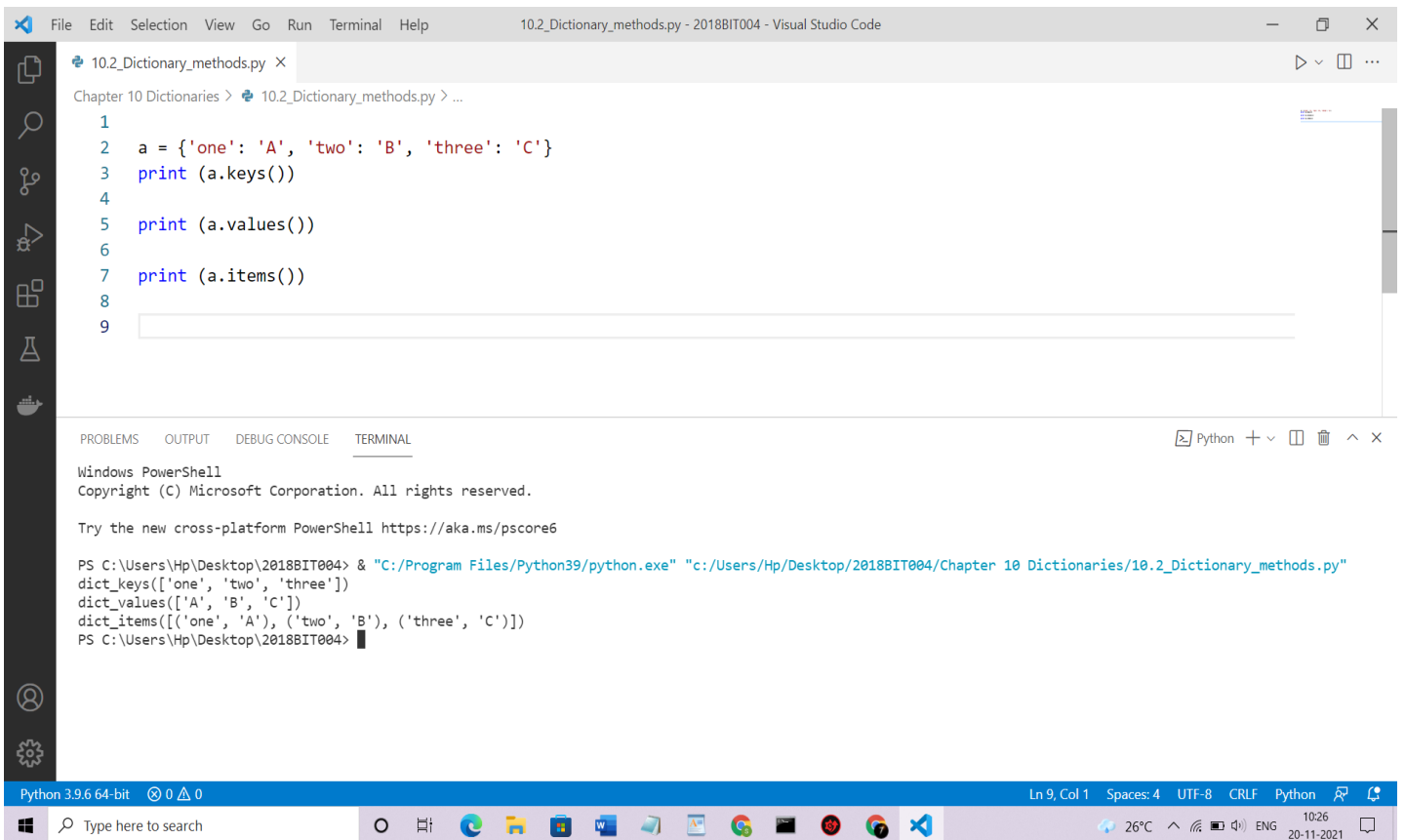
The terminal output shows the execution of the program:

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 10 Dictionaries/10.1_Dictionary_Operations.py"
{'apples': 430, 'bananas': 312, 'oranges': 525, 'pears': 217}
{'apples': 430, 'bananas': 312, 'oranges': 525}
3
PS C:\Users\Hp\Desktop\2018BIT004>
```

## 10.2 Dictionary methods



The screenshot shows the Visual Studio Code editor with a file named `10.2_Dictionary_methods.py`. The script defines a dictionary `a` with three key-value pairs and prints its keys, values, and items. Below the editor, the terminal window shows the output of the script, confirming the dictionary's contents.

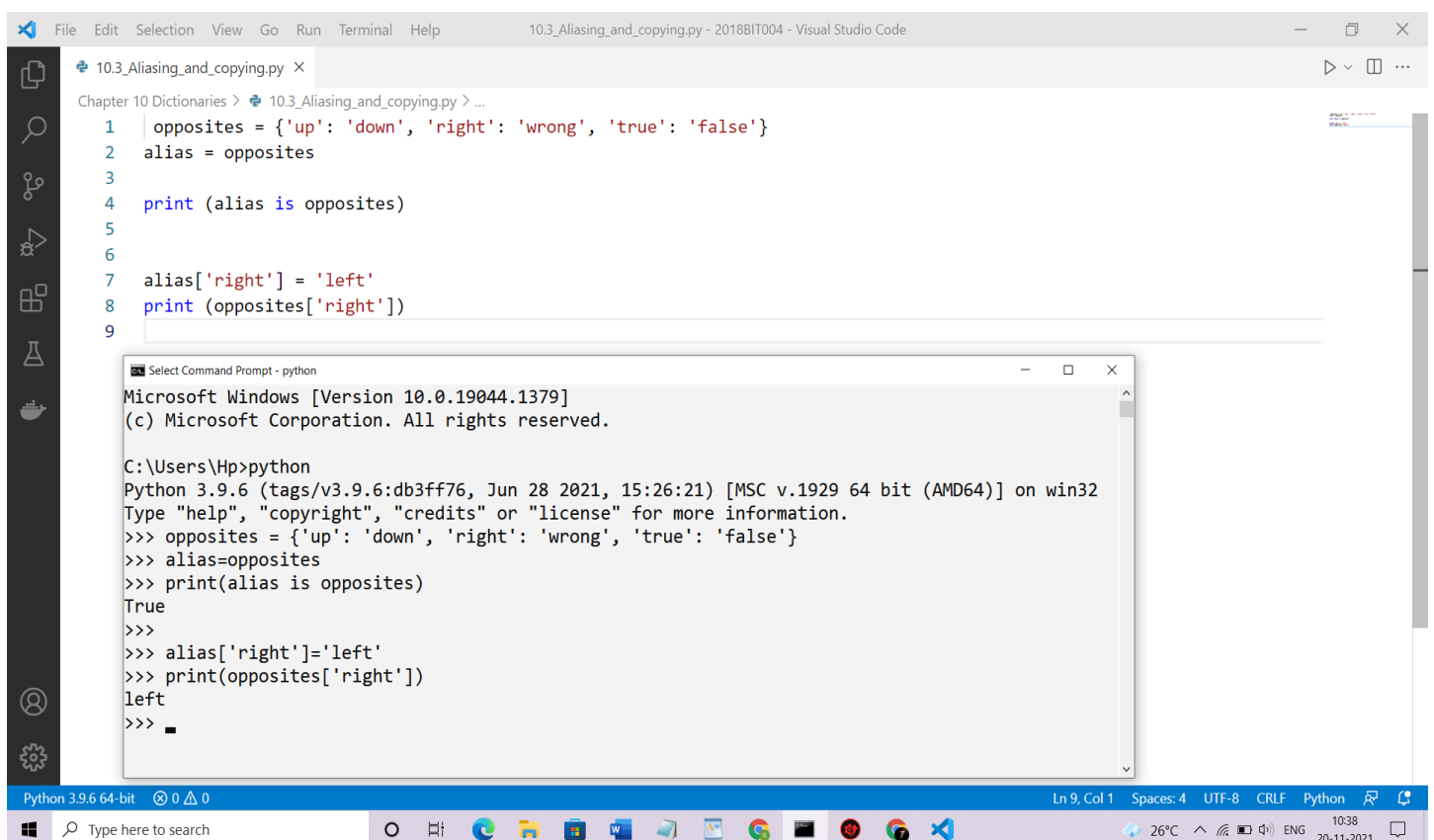
```
10.2_Dictionary_methods.py X
Chapter 10 Dictionaries > 10.2_Dictionary_methods.py > ...
1
2 a = {'one': 'A', 'two': 'B', 'three': 'C'}
3 print (a.keys())
4
5 print (a.values())
6
7 print (a.items())
8
9

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Try the new cross-platform PowerShell https://aka.ms/pscore6

PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 10 Dictionaries/10.2_Dictionary_methods.py"
dict_keys(['one', 'two', 'three'])
dict_values(['A', 'B', 'C'])
dict_items([('one', 'A'), ('two', 'B'), ('three', 'C')])
PS C:\Users\Hp\Desktop\2018BIT004>
```

## 10.3 Aliasing and copying



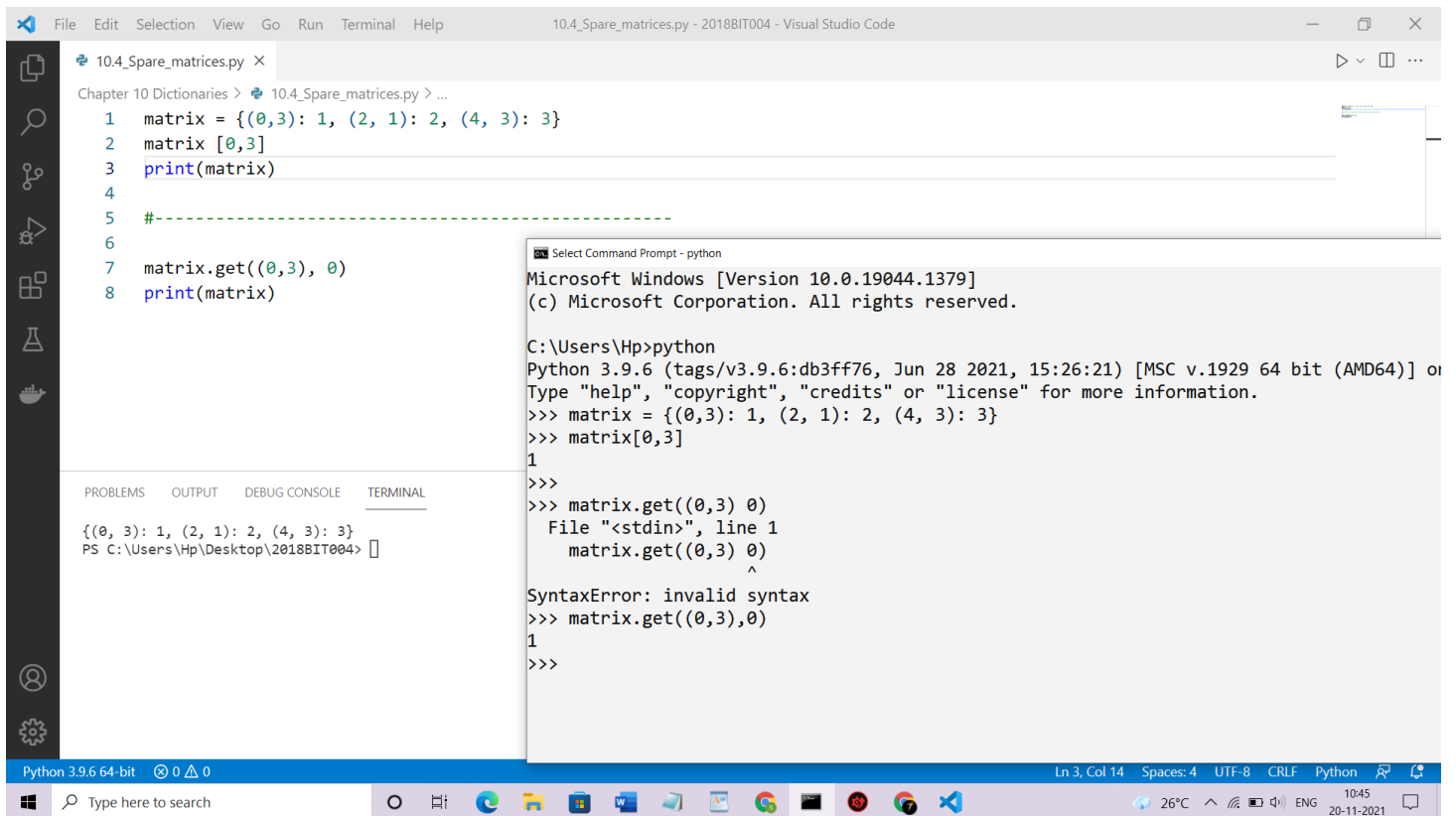
The screenshot shows the Visual Studio Code editor with a file named `10.3_Aliasing_and_copying.py`. The script demonstrates dictionary aliasing by creating an alias for a dictionary and then modifying it. Below the editor, a terminal window shows the execution of the script, confirming that the alias points to the same memory location as the original dictionary.

```
10.3_Aliasing_and_copying.py X
Chapter 10 Dictionaries > 10.3_Aliasing_and_copying.py > ...
1 opposites = {'up': 'down', 'right': 'wrong', 'true': 'false'}
2 alias = opposites
3
4 print (alias is opposites)
5
6
7 alias['right'] = 'left'
8 print (opposites['right'])
9

Select Command Prompt - python
Microsoft Windows [Version 10.0.19044.1379]
(c) Microsoft Corporation. All rights reserved.

C:\Users\Hp>python
Python 3.9.6 (tags/v3.9.6:db3ff76, Jun 28 2021, 15:26:21) [MSC v.1929 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> opposites = {'up': 'down', 'right': 'wrong', 'true': 'false'}
>>> alias=opposites
>>> print(alias is opposites)
True
>>>
>>> alias['right']='left'
>>> print(opposites['right'])
left
>>>
```

## 10.4 Sparse matrices



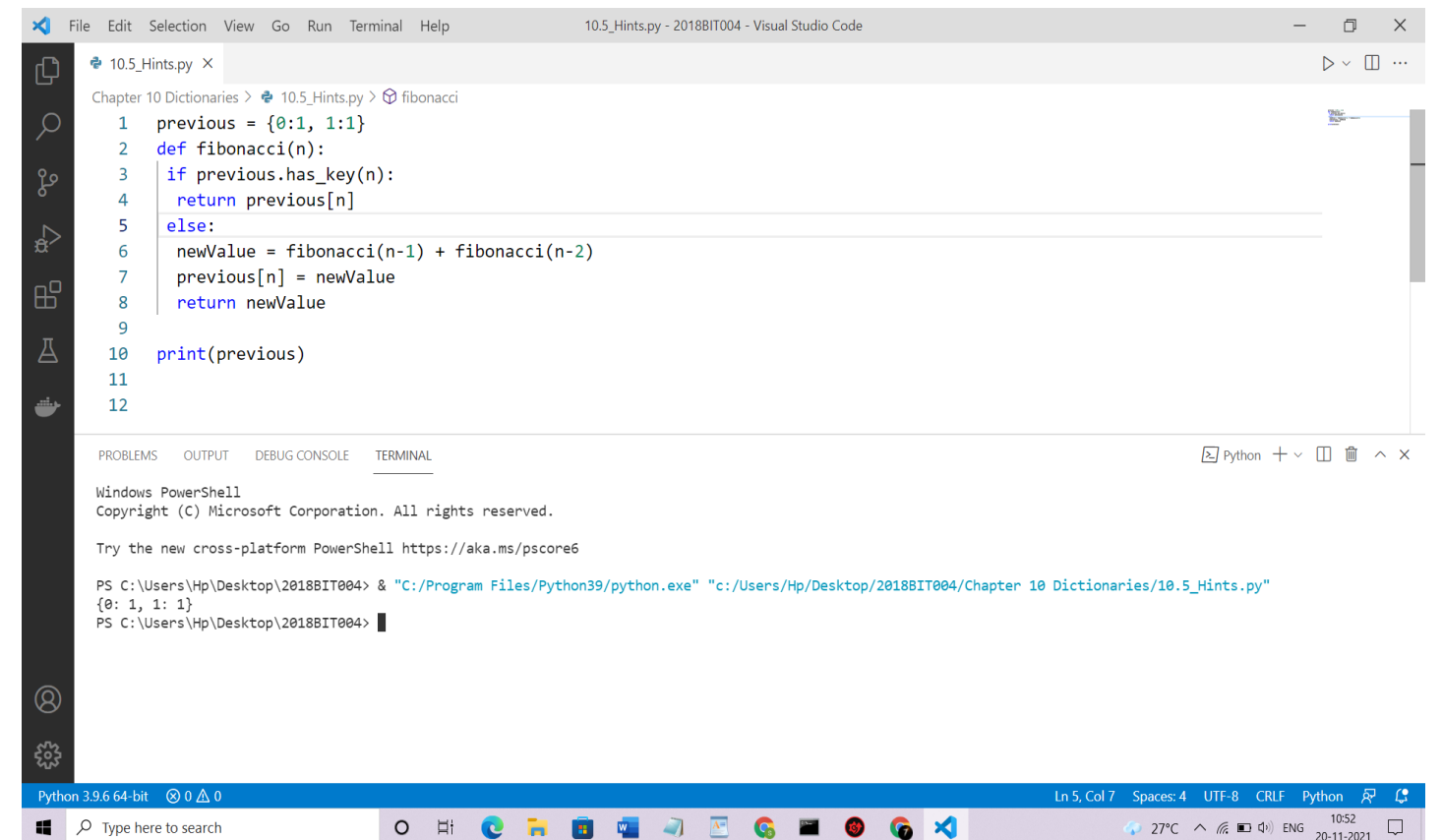
The screenshot shows the Visual Studio Code editor with a file named `10.4_Spare_matrices.py`. The code in the editor is as follows:

```
1 matrix = {(0,3): 1, (2, 1): 2, (4, 3): 3}
2 matrix [0,3]
3 print(matrix)
4
5 #-----
6
7 matrix.get((0,3), 0)
8 print(matrix)
```

The terminal window shows the execution of the script using Python 3.9.6. The output is:

```
>>> matrix = {(0,3): 1, (2, 1): 2, (4, 3): 3}
>>> matrix[0,3]
1
>>>
>>> matrix.get((0,3) 0)
File "<stdin>", line 1
    matrix.get((0,3) 0)
                    ^
SyntaxError: invalid syntax
>>> matrix.get((0,3),0)
1
>>>
```

## 10.5 Hints



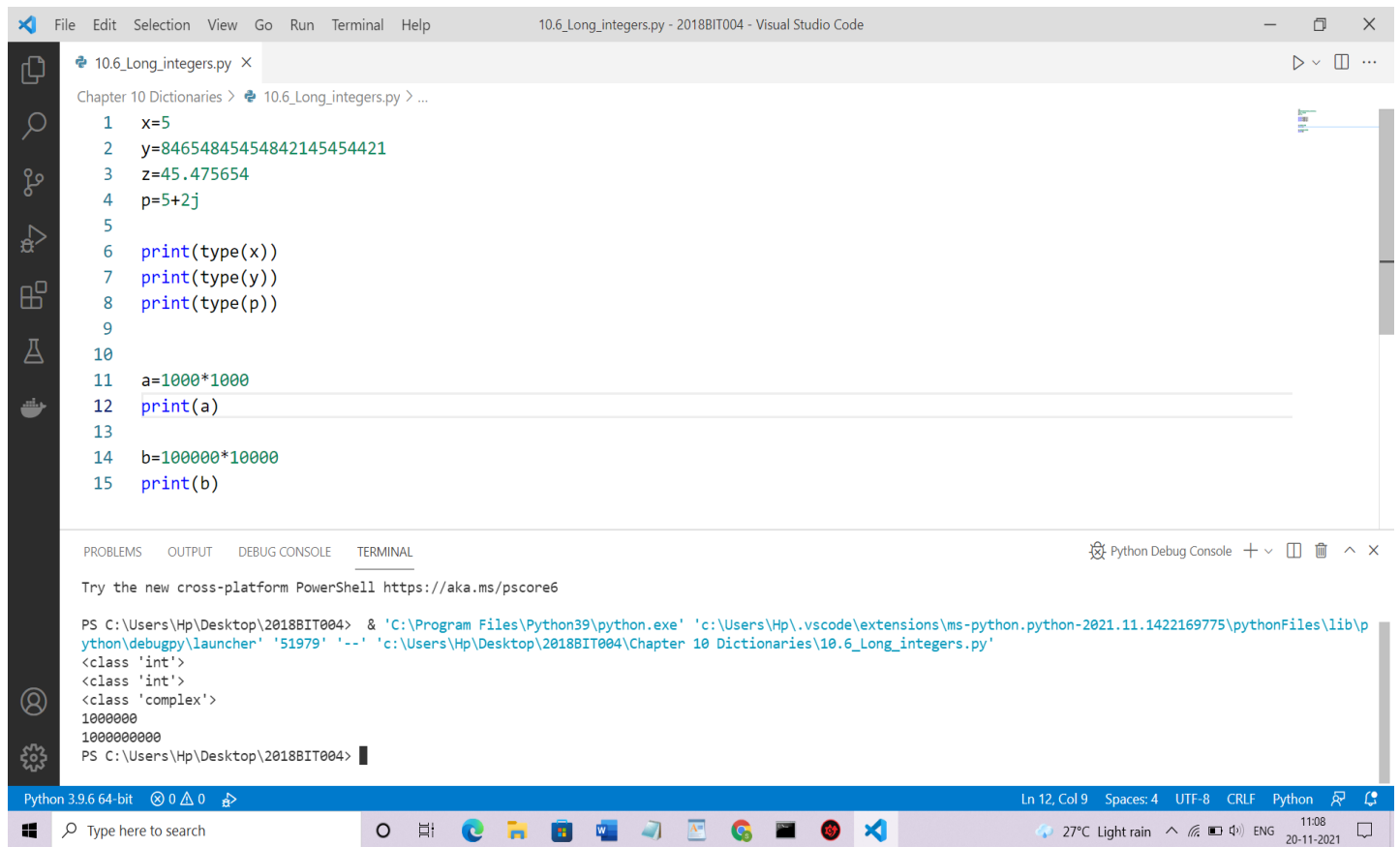
The screenshot shows the Visual Studio Code editor with a file named `10.5_Hints.py`. The code in the editor is as follows:

```
1 previous = {0:1, 1:1}
2 def fibonacci(n):
3     if previous.has_key(n):
4         return previous[n]
5     else:
6         newValue = fibonacci(n-1) + fibonacci(n-2)
7         previous[n] = newValue
8         return newValue
9
10 print(previous)
11
12
```

The terminal window shows the execution of the script using Python 3.9.6. The output is:

```
PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 10 Dictionaries/10.5_Hints.py"
{0: 1, 1: 1}
PS C:\Users\Hp\Desktop\2018BIT004>
```

## 10.6 Long integers



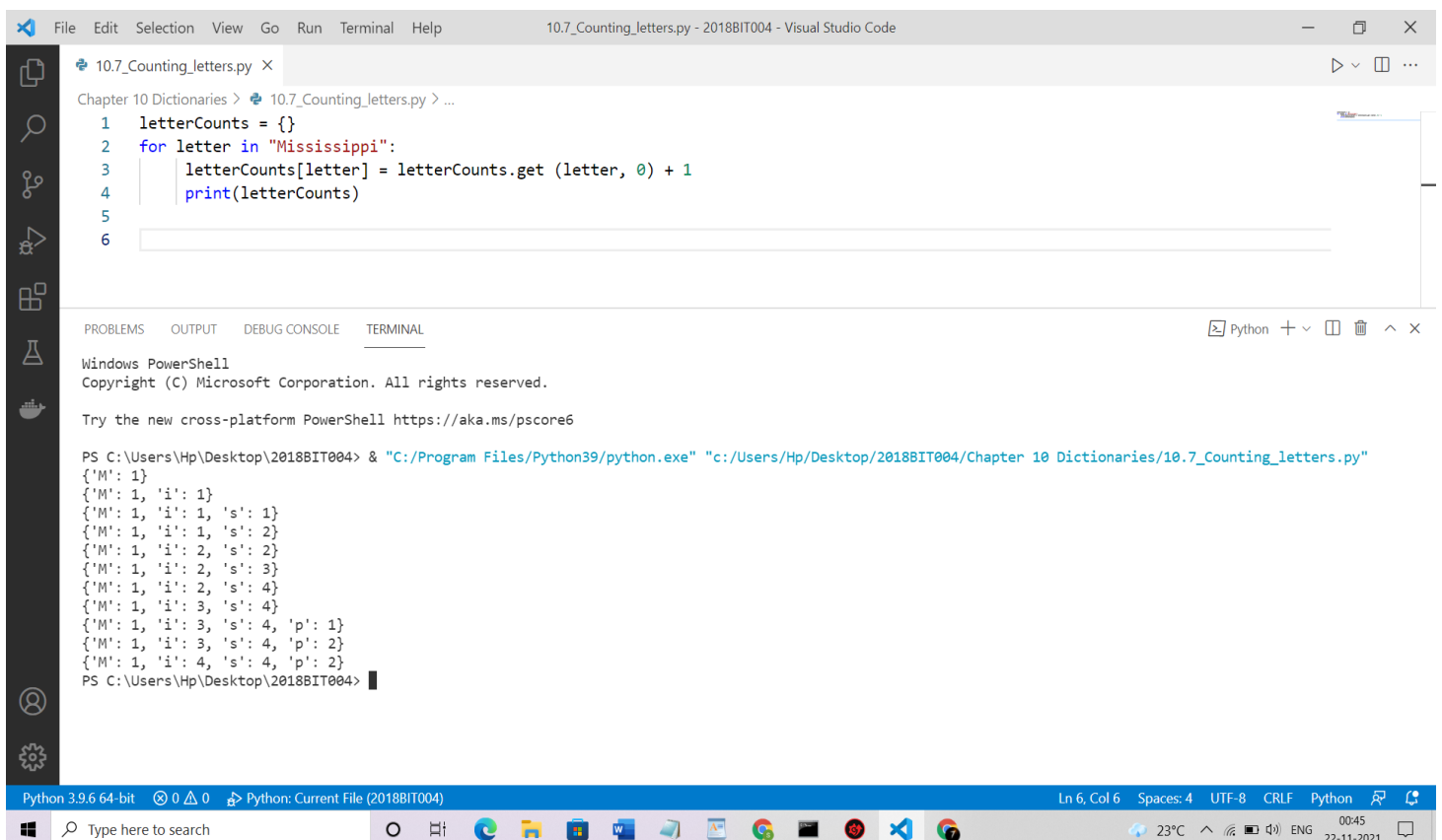
The screenshot shows the Visual Studio Code editor with a file named `10.6_Long_integers.py`. The code defines variables `x`, `y`, and `z`, and prints their types. It also defines `a` and `b` as long integers and prints them. The terminal shows the output of the script, including the types of `x`, `y`, and `p`, and the values of `a` and `b`.

```
1 x=5
2 y=84654845454842145454421
3 z=45.475654
4 p=5+2j
5
6 print(type(x))
7 print(type(y))
8 print(type(p))
9
10
11 a=1000*1000
12 print(a)
13
14 b=100000*10000
15 print(b)
```

Terminal output:

```
PS C:\Users\Hp\Desktop\2018BIT004> & 'C:\Program Files\Python39\python.exe' 'c:\Users\Hp\.vscode\extensions\ms-python.python-2021.11.1422169775\pythonFiles\lib\python\debugpy\launcher' '51979' '--' 'c:\Users\Hp\Desktop\2018BIT004\Chapter 10 Dictionaries\10.6_Long_integers.py'
<class 'int'>
<class 'int'>
<class 'complex'>
1000000
1000000000
PS C:\Users\Hp\Desktop\2018BIT004>
```

## 10.7 Counting letters



The screenshot shows the Visual Studio Code editor with a file named `10.7_Counting_letters.py`. The code uses a dictionary to count the frequency of each letter in the word "Mississippi". The terminal shows the output of the script, which is a list of dictionaries representing the state of the letter counts at each step.

```
1 letterCounts = {}
2 for letter in "Mississippi":
3     letterCounts[letter] = letterCounts.get (letter, 0) + 1
4     print(letterCounts)
5
6
```

Terminal output:

```
PS C:\Users\Hp\Desktop\2018BIT004> & "C:/Program Files/Python39/python.exe" "c:/Users/Hp/Desktop/2018BIT004/Chapter 10 Dictionaries/10.7_Counting_letters.py"
{'M': 1}
{'M': 1, 'i': 1}
{'M': 1, 'i': 1, 's': 1}
{'M': 1, 'i': 1, 's': 2}
{'M': 1, 'i': 2, 's': 2}
{'M': 1, 'i': 2, 's': 3}
{'M': 1, 'i': 2, 's': 4}
{'M': 1, 'i': 3, 's': 4}
{'M': 1, 'i': 3, 's': 4, 'p': 1}
{'M': 1, 'i': 3, 's': 4, 'p': 2}
{'M': 1, 'i': 4, 's': 4, 'p': 2}
PS C:\Users\Hp\Desktop\2018BIT004>
```