

## Lab4a

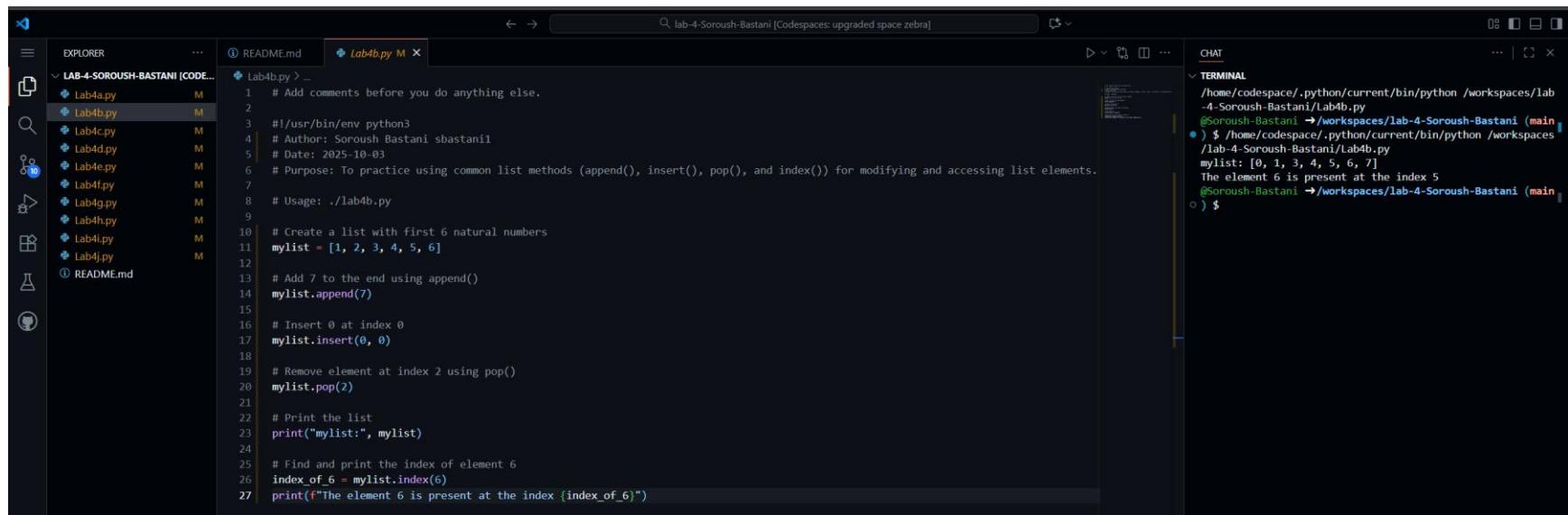


The screenshot shows a VS Code editor with a workspace named 'lab-4-Soroush-Bastani'. The Explorer panel on the left shows a file tree with 'Lab4a.py' selected. The main editor displays the content of 'Lab4a.py', which includes a README-style header, a shebang line, author information, a date, a purpose statement, and a usage instruction. The code defines two lists, 'mylist1' and 'mylist2', and prints their concatenation. The terminal on the right shows the command to run the script, which outputs the concatenated list.

```
1 # Add comments before you do anything else.
2
3 #!/usr/bin/env python3
4 # Author: Soroush Bastani sbastani1
5 # Date: 2025-10-03
6 # Purpose: Create two lists and join them
7 # Usage: ./lab4a.py
8
9 # Follow the specific instructions given in the README.md file
10 mylist1=[1,3,5]
11 mylist2=[0,2,4]
12 mylist=mylist1+mylist2
13 print(mylist),
```

```
/home/codespace/.python/current/bin/python /workspaces/lab-4-Soroush-Bastani/Lab4a.py
@Soroush-Bastani →/workspaces/lab-4-Soroush-Bastani (main)
$ /home/codespace/.python/current/bin/python /workspaces/lab-4-Soroush-Bastani/Lab4a.py
[1, 3, 5, 0, 2, 4]
@Soroush-Bastani →/workspaces/lab-4-Soroush-Bastani (main)
$
```

## Lab4b



The screenshot shows a VS Code editor with a workspace named 'lab-4-Soroush-Bastani'. The Explorer panel on the left shows a file tree with 'Lab4b.py' selected. The main editor displays the content of 'Lab4b.py', which includes a README-style header, a shebang line, author information, a date, a purpose statement, and a usage instruction. The code creates a list 'mylist' with the first 6 natural numbers, appends 7, inserts 0 at index 0, removes the element at index 2, and prints the list. It also finds the index of the element 6 and prints it. The terminal on the right shows the command to run the script, which outputs the modified list and the index of the element 6.

```
1 # Add comments before you do anything else.
2
3 #!/usr/bin/env python3
4 # Author: Soroush Bastani sbastani1
5 # Date: 2025-10-03
6 # Purpose: To practice using common list methods (append(), insert(), pop(), and index()) for modifying and accessing list elements.
7 # Usage: ./lab4b.py
8
9 # Create a list with first 6 natural numbers
10 mylist = [1, 2, 3, 4, 5, 6]
11
12 # Add 7 to the end using append()
13 mylist.append(7)
14
15 # Insert 0 at index 0
16 mylist.insert(0, 0)
17
18 # Remove element at index 2 using pop()
19 mylist.pop(2)
20
21 # Print the list
22 print("mylist:", mylist)
23
24 # Find and print the index of element 6
25 index_of_6 = mylist.index(6)
26 print(f"The element 6 is present at the index {index_of_6}")
```

```
/home/codespace/.python/current/bin/python /workspaces/lab-4-Soroush-Bastani/Lab4b.py
@Soroush-Bastani →/workspaces/lab-4-Soroush-Bastani (main)
$ /home/codespace/.python/current/bin/python /workspaces/lab-4-Soroush-Bastani/Lab4b.py
mylist: [0, 1, 3, 4, 5, 6, 7]
The element 6 is present at the index 5
@Soroush-Bastani →/workspaces/lab-4-Soroush-Bastani (main)
$
```

# Lab4c

The screenshot shows a VS Code editor interface with a dark theme. The Explorer panel on the left shows a file tree for 'LAB-4-SORUSH-BASTANI [CODESPACE]'. The file 'Lab4c.py' is selected and open in the editor. The code in 'Lab4c.py' is as follows:

```
1 # Add comments before you do anything else.
2
3 #!/usr/bin/env python3
4 # Author: Soroush Bastani sbastani1
5 # Date: 2025-10-03
6 # Purpose: Create a list and update its elements.
7 # Usage: ./lab4c.py
8
9 # Follow the specific instructions given in the README.md file
10
11 students = ["Ama", "Eden", "Maija", "Daniel", "Ibrahim"]
12
13 students[1] = "Maggy"
14
15 for student in students:
16     print(student)
17
```

The TERMINAL panel on the right shows the execution of the script. The command prompt is at the root of the workspace, and the script has been run, producing the following output:

```
/home/codespace/.python/current/bin/python /workspaces/lab-4-Sorush-Bastani/Lab4c.py
@Soroush-Bastani → /workspaces/lab-4-Sorush-Bastani (main)
$ /home/codespace/.python/current/bin/python /workspaces/lab-4-Sorush-Bastani/Lab4c.py
Ama
Maggy
Maija
Daniel
Ibrahim
@Soroush-Bastani → /workspaces/lab-4-Sorush-Bastani (main)
$
```

# Lab4d

The screenshot displays a VS Code editor interface with a dark theme. The Explorer panel on the left shows a project named 'LAB-4-SORUSH-BASTANI' containing several files, with 'Lab4d.py' selected. The main editor area shows the code for 'Lab4d.py', which includes a docstring, a shebang, a loop to build a set of numbers divisible by a given divisor, and a main function that calls 'buildtheSet' with divisors 3, 5, 7, and 11. The CHAT panel on the right shows the execution output of the script, displaying the sets for each divisor: s3, s5, s7, and s11.

```
1 # Add comments before you do anything else.
2
3 #!/usr/bin/env python3
4
5 # Author: Soroush Bastani
6 # Date: 2025-10-03
7 # Purpose: Creating sets with numbers divisible by a given divisor
8 # Usage: ./lab4d.py
9
10 # TO DO 1: Complete the functions below.
11 def buildtheSet(divisor):
12     # Create an empty set
13     result_set = set()
14
15     # Loop through numbers 0 to 50 (inclusive)
16     for num in range(0, 51):
17         # Check if the number is divisible by the divisor
18         if num % divisor == 0:
19             result_set.add(num)
20     return result_set
21
22 def main():
23     s3 = buildtheSet(3)
24     print("s3: ", s3)
25     print("-----")
26
27     s5 = buildtheSet(5)
28     print("s5: ", s5)
29     print("-----")
30
31     s7 = buildtheSet(7)
32     print("s7: ", s7)
33     print("-----")
34
35     s11 = buildtheSet(11)
36     print("s11: ", s11)
37
38     main()
```

CHAT

```
/home/codespace/.python/current/bin/python /workspaces/lab-4-Sorush-Bastani/Lab4d.py
@Soroush-Bastani → /workspaces/Lab-4-Sorush-Bastani (main)
) $ /home/codespace/.python/current/bin/python /workspaces/Lab-4-Sorush-Bastani/Lab4d.py
s3: {0, 33, 3, 36, 6, 39, 9, 42, 12, 45, 15, 48, 18, 21, 24, 27, 30}
-----
s5: {0, 35, 5, 40, 10, 45, 15, 50, 20, 25, 30}
-----
s7: {0, 35, 7, 42, 14, 49, 21, 28}
-----
s11: {0, 33, 11, 44, 22}
@Soroush-Bastani → /workspaces/Lab-4-Sorush-Bastani (main)
) $
```

# Lab4e

The image shows a VS Code editor interface with a dark theme. The Explorer panel on the left shows a file tree for 'LAB-4-SOROUSH-BASTANI' containing files 'Lab4a.py' through 'Lab4j.py' and a 'README.md' file. The 'Lab4e.py' file is selected and open in the main editor. The code in 'Lab4e.py' is a Python script that defines a function 'buildtheSet(divisor)' to create a set of numbers from 0 to 51 that are divisible by the divisor. It also defines a function 's3\_or\_s5(s3, s5)' to return the union of two sets. The 'main()' function calls 'buildtheSet(3)' and 'buildtheSet(5)', prints the resulting sets, and then calls 's3\_or\_s5(s3, s5)' to print the union of the two sets.

```
1 # Add comments before you do anything else.
2 #!/usr/bin/env python3
3 # Author: Soroush Bastani sbastani1
4 # Date: 2025-10-03
5 # Purpose: Practice Set Operations.
6 # Usage: ./lab4e.py
7 # TO DO 1: Copy the code from lab4d.py and paste here.
8 # Add comments before you do anything else.
9 #!/usr/bin/env python3
10
11 def buildtheSet(divisor):
12     result_set = set()
13
14     for num in range(0, 51):
15         if num % divisor == 0:
16             result_set.add(num)
17
18     return result_set
19
20 def s3_or_s5(s3, s5):
21     # Return elements in s3 or s5 but NOT in both
22     return s3 ^ s5
23
24 def main():
25     s3 = buildtheSet(3)
26     print("s3: ", s3)
27     print("-----")
28
29     s5 = buildtheSet(5)
30     print("s5: ", s5)
31     print("-----")
32
33     # Call the new function
34     result = s3_or_s5(s3, s5)
35     print("s3_or_s5: ", result)
36
37 main()
```

The TERMINAL panel on the right shows the execution of the script. The command prompt is `/home/codespace/.python/current/bin/python /workspaces/lab-4-Soroush-Bastani/Lab4e.py`. The output shows the sets `s3: {0, 33, 3, 36, 6, 39, 9, 42, 12, 45, 15, 48, 18, 21, 24, 27, 30}` and `s5: {0, 35, 5, 40, 10, 45, 15, 50, 20, 25, 30}`. The final output is `s3 or s5: {3, 5, 6, 9, 10, 12, 18, 20, 21, 24, 25, 27, 33, 35, 36, 39, 40, 42, 48, 50}`.

# Lab4f

The screenshot displays a VS Code editor window with a dark theme. The Explorer panel on the left shows a project named 'LAB-4-SORUSH-BASTANI' containing several Python files (Lab4a.py through Lab4j.py) and a README.md file. The main editor area shows the content of 'Lab4f.py', which includes a function 'buildtheSet' and a 'main' function. The 'buildtheSet' function takes a divisor and returns a set of numbers from 0 to 51 that are divisible by the divisor. The 'main' function calls 'buildtheSet' with divisors 3, 5, and 7, and then calls a function 's3\_and\_s5\_not\_s7' which returns the set difference of s3 and s5. The output of the script is shown in the Terminal panel on the right, which displays the sets s3, s5, s7, and the result of the set difference operation.

```
1 # Add comments before you do anything else.
2
3 #!/usr/bin/env python3
4 # Author: Soroush Bastani sbastani1
5 # Date: 2025-10-03
6 # Purpose: Practice Set Operations.
7 # Usage: ./lab4f.py
8
9 def buildtheSet(divisor):
10     result_set = set()
11
12     for num in range(0, 51):
13         if num % divisor == 0:
14             result_set.add(num)
15
16     return result_set
17
18 def s3_and_s5_not_s7(s3, s5, s7):
19     # Find numbers in BOTH s3 and s5, but NOT in s7
20     return (s3 & s5) - s7
21
22 def main():
23     s3 = buildtheSet(3)
24     print("s3: ", s3)
25     print("-----")
26
27     s5 = buildtheSet(5)
28     print("s5: ", s5)
29     print("-----")
30
31     s7 = buildtheSet(7)
32     print("s7: ", s7)
33     print("-----")
34
35     # Call the new function
36     result = s3_and_s5_not_s7(s3, s5, s7)
37     print("s3_and_s5_not_s7: ", result)
38
39 main()
```

Terminal Output:

```
/home/codespace/.python/current/bin/python /workspaces/lab-4-Soroush-Bastani/Lab4f.py
@soroush-bastani → /workspaces/lab-4-Soroush-Bastani (main)
$ /home/codespace/.python/current/bin/python /workspaces/lab-4-Soroush-Bastani/Lab4f.py
s3: {0, 33, 3, 36, 6, 39, 9, 42, 12, 45, 15, 48, 18, 21, 24, 27, 30}
-----
s5: {0, 35, 5, 40, 10, 45, 15, 50, 20, 25, 30}
-----
s7: {0, 35, 7, 42, 14, 49, 21, 28}
-----
s3 and s5 not s7: {45, 30, 15}
@soroush-bastani → /workspaces/lab-4-Soroush-Bastani (main)
$
```

# Lab4g



```
1 # Add comments before you do anything else.
2
3 #!/usr/bin/env python3
4 # Author: Soroush Bastani sbastani1
5 # Date: 2025-10-03
6 # Purpose: Creating dictionary.
7 # Usage: ./lab4g.py
8
9 def times_ten(start_index: int, end_index: int):
10     # Create an empty dictionary
11     my_dict = {}
12
13     # Loop through the range from start_index to end_index (inclusive)
14     for num in range(start_index, end_index + 1):
15         # Add key-value pair: key = num, value = num * 10
16         my_dict[num] = num * 10
17
18     # Return the dictionary
19     return my_dict
20
21 def main():
22     my_dictionary = times_ten(2, 6)
23     print(my_dictionary)
24
25 main()
```

Output:

```
/home/codespace/.python/current/bin/python /workspaces/lab-4-Soroush-Bastani/Lab4g.py
@Soroush-Bastani → /workspaces/lab-4-Soroush-Bastani (main)
$ /home/codespace/.python/current/bin/python /workspaces/lab-4-Soroush-Bastani/Lab4g.py
{2: 20, 3: 30, 4: 40, 5: 50, 6: 60}
@Soroush-Bastani → /workspaces/lab-4-Soroush-Bastani (main)
$
```

# Lab4h

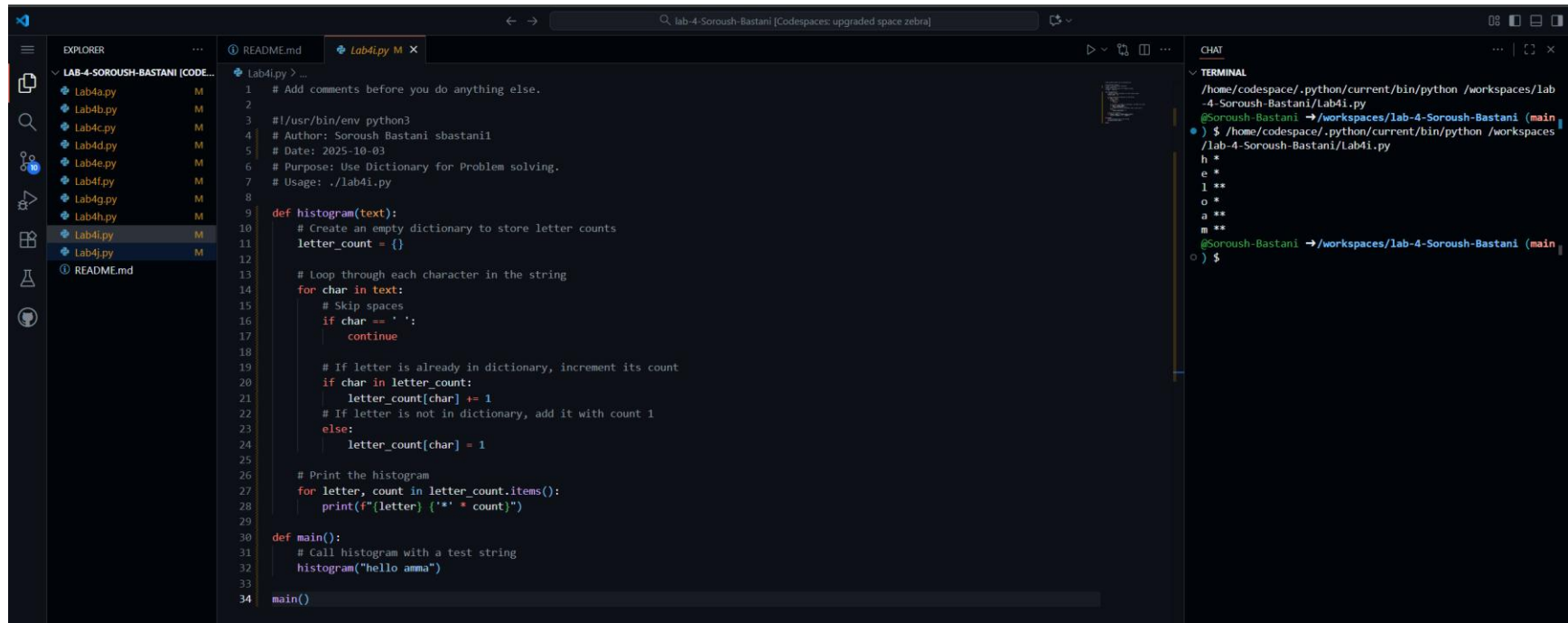


```
1 # Add comments before you do anything else.
2
3 #!/usr/bin/env python3
4 # Author: Soroush Bastani sbastani1
5 # Date: 2025-10-03
6 # Purpose: Traverse dictionary.
7 # Usage: ./lab4h.py
8
9 my_dict = {"switzerland": "Alps", "United States": "Alaska Range", "Armenia": "Caucasus", "Argentina": "Andes", "Pakistan": "Kai
10
11 # Traverse the dictionary using .items()
12 for key, value in my_dict.items():
13     print(f"{key} : {value}")
```

Output:

```
/home/codespace/.python/current/bin/python /workspaces/lab-4-Soroush-Bastani/Lab4h.py
@Soroush-Bastani → /workspaces/lab-4-Soroush-Bastani (main)
$ /home/codespace/.python/current/bin/python /workspaces/lab-4-Soroush-Bastani/Lab4h.py
switzerland : Alps
United States : Alaska Range
Armenia : Caucasus
Argentina : Andes
Pakistan : Karakoram
@Soroush-Bastani → /workspaces/lab-4-Soroush-Bastani (main)
$
```

# Lab4i



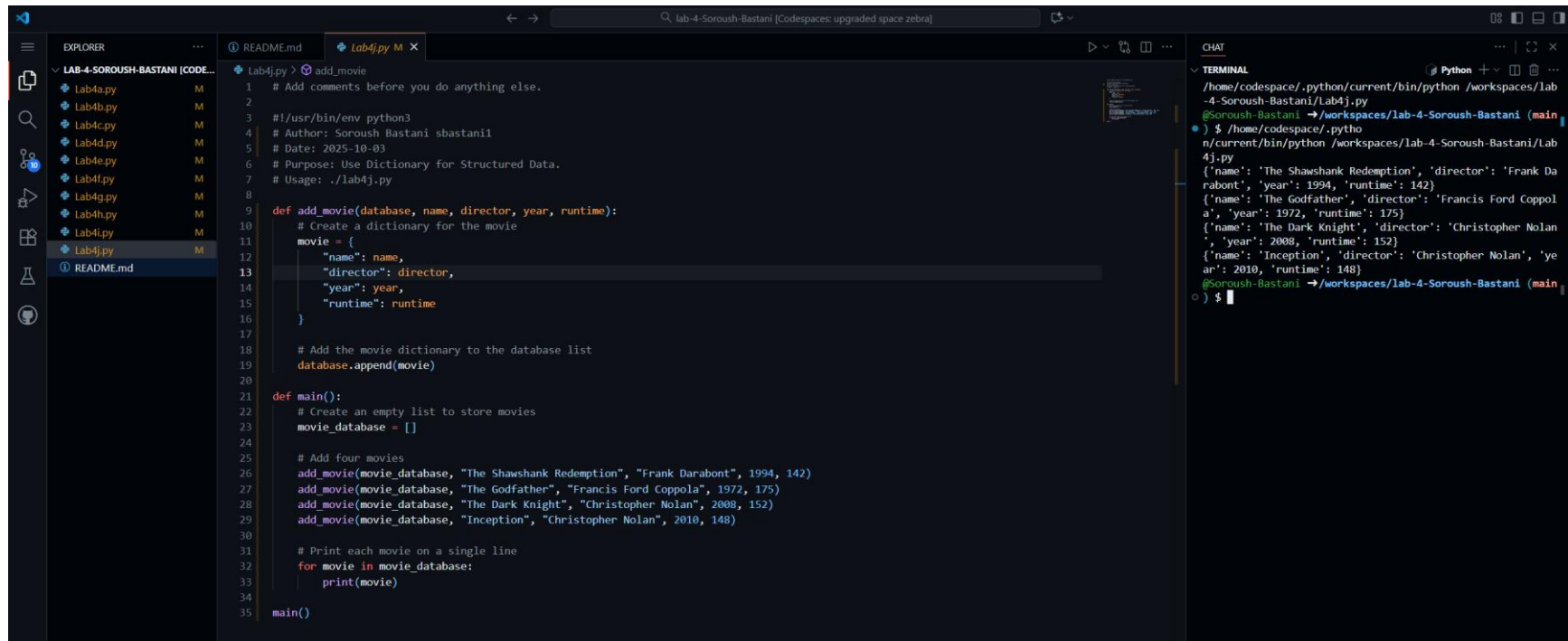
The image shows a VS Code editor interface with a dark theme. The Explorer panel on the left shows a project named 'LAB-4-SORUSH-BASTANI (CODE...)' with several Python files (Lab4a.py through Lab4j.py) and a README.md file. The main editor window displays the content of 'Lab4i.py'. The code is a Python script that defines a 'histogram' function to count the frequency of characters in a string and a 'main' function to test it with the string 'hello amma'.

```
1 # Add comments before you do anything else.
2
3 #!/usr/bin/env python3
4 # Author: Soroush Bastani sbastani1
5 # Date: 2025-10-03
6 # Purpose: Use Dictionary for Problem solving.
7 # Usage: ./lab4i.py
8
9 def histogram(text):
10     # Create an empty dictionary to store letter counts
11     letter_count = {}
12
13     # Loop through each character in the string
14     for char in text:
15         # Skip spaces
16         if char == ' ':
17             continue
18
19         # If letter is already in dictionary, increment its count
20         if char in letter_count:
21             letter_count[char] += 1
22         # If letter is not in dictionary, add it with count 1
23         else:
24             letter_count[char] = 1
25
26     # Print the histogram
27     for letter, count in letter_count.items():
28         print(f'{letter} {'*' * count}')
29
30 def main():
31     # Call histogram with a test string
32     histogram("hello amma")
33
34 main()
```

The right-hand side of the editor shows the 'TERMINAL' panel. It displays the command to run the script using Python 3 and the resulting output, which shows the frequency of each letter in the string 'hello amma'.

```
/home/codespace/.python/current/bin/python /workspaces/lab-4-Soroush-Bastani/Lab4i.py
@Soroush-Bastani → /workspaces/lab-4-Soroush-Bastani (main)
$ /home/codespace/.python/current/bin/python /workspaces/lab-4-Soroush-Bastani/Lab4i.py
h *
e *
l **
o **
a **
m **
$
@Soroush-Bastani → /workspaces/lab-4-Soroush-Bastani (main)
$
```

# Lab4j



The screenshot displays a VS Code editor interface with a dark theme. The Explorer panel on the left shows a project named 'LAB-4-SORUSH-BASTANI' containing several files: Lab4a.py, Lab4b.py, Lab4c.py, Lab4d.py, Lab4e.py, Lab4f.py, Lab4g.py, Lab4h.py, Lab4i.py, Lab4j.py, and a README.md file. The Lab4j.py file is selected and its content is visible in the main editor. The script includes a shebang, a docstring, a function to add movies to a database, and a main function that runs the program. The terminal on the right shows the command to run the script and its output.

```
1 # Add comments before you do anything else.
2
3 #!/usr/bin/env python3
4 # Author: Soroush Bastani sbastani1
5 # Date: 2025-10-03
6 # Purpose: Use Dictionary for Structured Data.
7 # Usage: ./lab4j.py
8
9 def add_movie(database, name, director, year, runtime):
10     # Create a dictionary for the movie
11     movie = {
12         "name": name,
13         "director": director,
14         "year": year,
15         "runtime": runtime
16     }
17
18     # Add the movie dictionary to the database list
19     database.append(movie)
20
21 def main():
22     # Create an empty list to store movies
23     movie_database = []
24
25     # Add four movies
26     add_movie(movie_database, "The Shawshank Redemption", "Frank Darabont", 1994, 142)
27     add_movie(movie_database, "The Godfather", "Francis Ford Coppola", 1972, 175)
28     add_movie(movie_database, "The Dark Knight", "Christopher Nolan", 2008, 152)
29     add_movie(movie_database, "Inception", "Christopher Nolan", 2010, 148)
30
31     # Print each movie on a single line
32     for movie in movie_database:
33         print(movie)
34
35 main()
```

Terminal output:

```
/home/codespace/.python/current/bin/python /workspaces/lab-4-Soroush-Bastani/Lab4j.py
@Soroush-Bastani → /workspaces/lab-4-Soroush-Bastani (main)
$ /home/codespace/.python/current/bin/python /workspaces/lab-4-Soroush-Bastani/Lab4j.py
{'name': 'The Shawshank Redemption', 'director': 'Frank Darabont', 'year': 1994, 'runtime': 142}
{'name': 'The Godfather', 'director': 'Francis Ford Coppola', 'year': 1972, 'runtime': 175}
{'name': 'The Dark Knight', 'director': 'Christopher Nolan', 'year': 2008, 'runtime': 152}
{'name': 'Inception', 'director': 'Christopher Nolan', 'year': 2010, 'runtime': 148}
@Soroush-Bastani → /workspaces/lab-4-Soroush-Bastani (main)
$
```