

# Data Structures and Algorithms

## Lab 01

Aasiya Ahmad Kiyani | 393037

### Task 1.

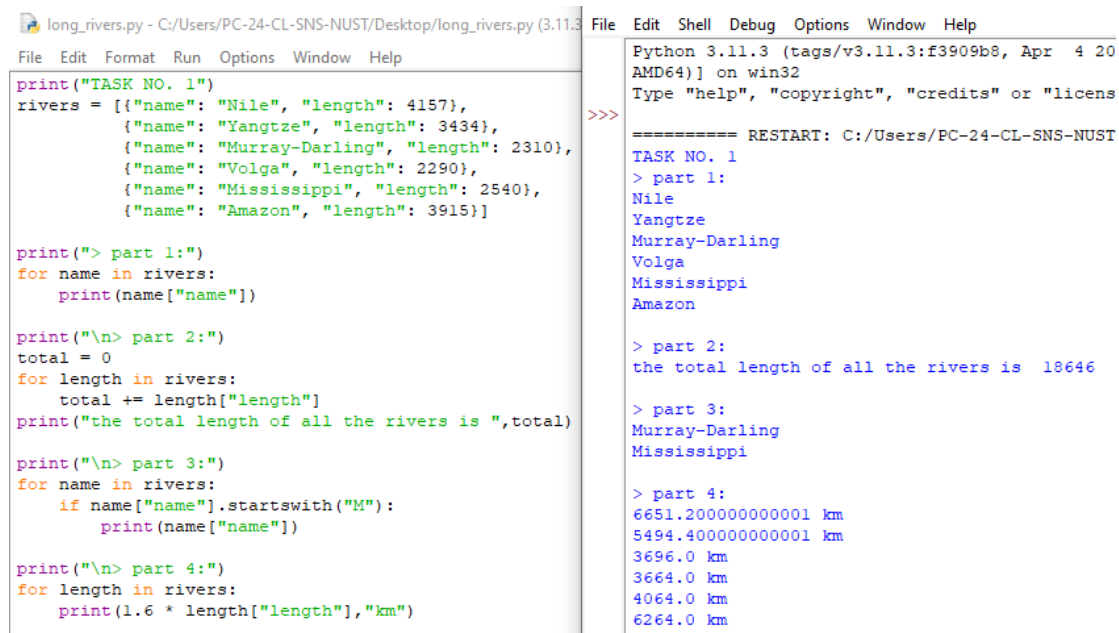
```
print("TASK NO. 1")
rivers = [{"name": "Nile", "length": 4157},
          {"name": "Yangtze", "length": 3434},
          {"name": "Murray-Darling", "length": 2310},
          {"name": "Volga", "length": 2290},
          {"name": "Mississippi", "length": 2540},
          {"name": "Amazon", "length": 3915}]

print("> part 1:")
for name in rivers:
    print(name["name"])

print("\n> part 2:")
total = 0
for length in rivers:
    total += length["length"]
print("the total length of all the rivers is ",total)

print("\n> part 3:")
for name in rivers:
    if name["name"].startswith("M"):
        print(name["name"])

print("\n> part 4:")
for length in rivers:
    print(1.6 * length["length"], "km")
```



```
long_rivers.py - C:/Users/PC-24-CL-SNS-NUST/Desktop/long_rivers.py (3.11.3) File Edit Shell Debug Options Window Help
File Edit Format Run Options Window Help
print("TASK NO. 1")
rivers = [{"name": "Nile", "length": 4157},
          {"name": "Yangtze", "length": 3434},
          {"name": "Murray-Darling", "length": 2310},
          {"name": "Volga", "length": 2290},
          {"name": "Mississippi", "length": 2540},
          {"name": "Amazon", "length": 3915}]

print("> part 1:")
for name in rivers:
    print(name["name"])

print("\n> part 2:")
total = 0
for length in rivers:
    total += length["length"]
print("the total length of all the rivers is ",total)

print("\n> part 3:")
for name in rivers:
    if name["name"].startswith("M"):
        print(name["name"])

print("\n> part 4:")
for length in rivers:
    print(1.6 * length["length"], "km")

Python 3.11.3 (tags/v3.11.3:f3909b8, Apr  4 20
AMD64) on win32
Type "help", "copyright", "credits" or "licens
>>>
===== RESTART: C:/Users/PC-24-CL-SNS-NUST
TASK NO. 1
> part 1:
Nile
Yangtze
Murray-Darling
Volga
Mississippi
Amazon

> part 2:
the total length of all the rivers is 18646

> part 3:
Murray-Darling
Mississippi

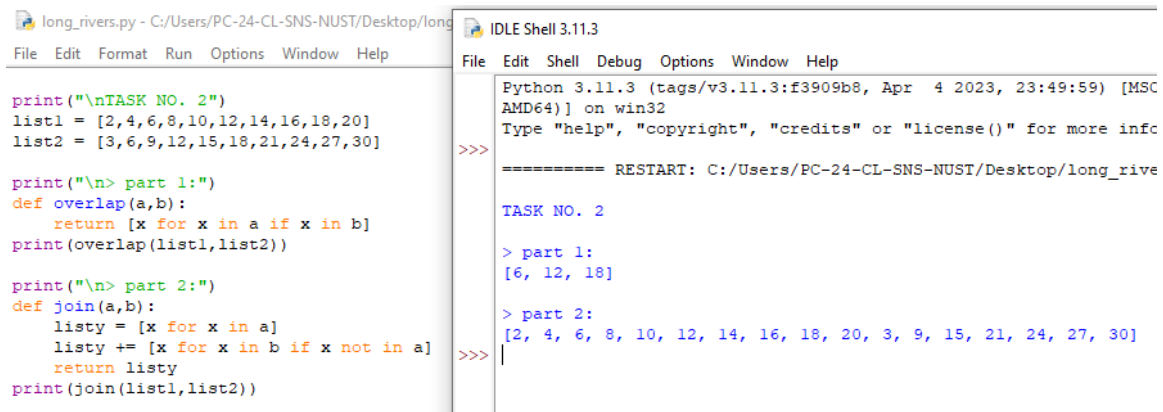
> part 4:
6651.200000000001 km
5494.400000000001 km
3696.0 km
3664.0 km
4064.0 km
6264.0 km
```

## Task 2.

```
print("\nTASK NO. 2")
list1 = [2,4,6,8,10,12,14,16,18,20]
list2 = [3,6,9,12,15,18,21,24,27,30]

print("\n> part 1:")
def overlap(a,b):
    return [x for x in a if x in b]
print(overlap(list1,list2))

print("\n> part 2:")
def join(a,b):
    listy = [x for x in a]
    listy += [x for x in b if x not in a]
    return listy
print(join(list1,list2))
```



The screenshot displays a Python IDE with two panes. The left pane shows the source code for 'Task 2', which defines two lists, 'list1' and 'list2', and two functions: 'overlap' and 'join'. The right pane shows the output of the code execution. It starts with the prompt 'TASK NO. 2', followed by the output of the 'overlap' function for 'part 1' ([6, 12, 18]), and then the output of the 'join' function for 'part 2' ([2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 3, 9, 15, 21, 24, 27, 30]).

```
long_rivers.py - C:/Users/PC-24-CL-SNS-NUST/Desktop/long_rivers.py
File Edit Format Run Options Window Help

print("\nTASK NO. 2")
list1 = [2,4,6,8,10,12,14,16,18,20]
list2 = [3,6,9,12,15,18,21,24,27,30]

print("\n> part 1:")
def overlap(a,b):
    return [x for x in a if x in b]
print(overlap(list1,list2))

print("\n> part 2:")
def join(a,b):
    listy = [x for x in a]
    listy += [x for x in b if x not in a]
    return listy
print(join(list1,list2))

IDLE Shell 3.11.3
File Edit Shell Debug Options Window Help

Python 3.11.3 (tags/v3.11.3:f3909b8, Apr 4 2023, 23:49:59) [MSC
AMD64] on win32
Type "help", "copyright", "credits" or "license()" for more info
>>>
===== RESTART: C:/Users/PC-24-CL-SNS-NUST/Desktop/long_rive

TASK NO. 2

> part 1:
[6, 12, 18]

> part 2:
[2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 3, 9, 15, 21, 24, 27, 30]
>>>
```

### Task 3.

```
print("\nTASK NO. 3")

spicy_foods = [
    {
        "name": "Green Curry",
        "cuisine": "Thai",
        "heat_level": 9,
    },
    {
        "name": "Buffalo Wings",
        "cuisine": "American",
        "heat_level": 3,
    },
    {
        "name": "Mapo Tofu",
        "cuisine": "Sichuan",
        "heat_level": 6,
    },
]

def get_names(spicy_foods):
    for i in spicy_foods: return i["name"]

def get_spiciest_foods(spicy_foods):
    list1 = []
    for i in spicy_foods:
        if i['heat_level'] > 5:
            list1.append(i)
    return list1

def print_spicy_foods(spicy_foods):
    for i in spicy_foods:
        print(i['name'], '(' + i['cuisine'], ') | Heat Level:', i['heat_level']*'🌶️')

def get_spicy_food_by_cuisine(spicy_foods, cuisine):
    for i in spicy_foods:
        if i['cuisine'].lower() == cuisine.lower():
            print(i)

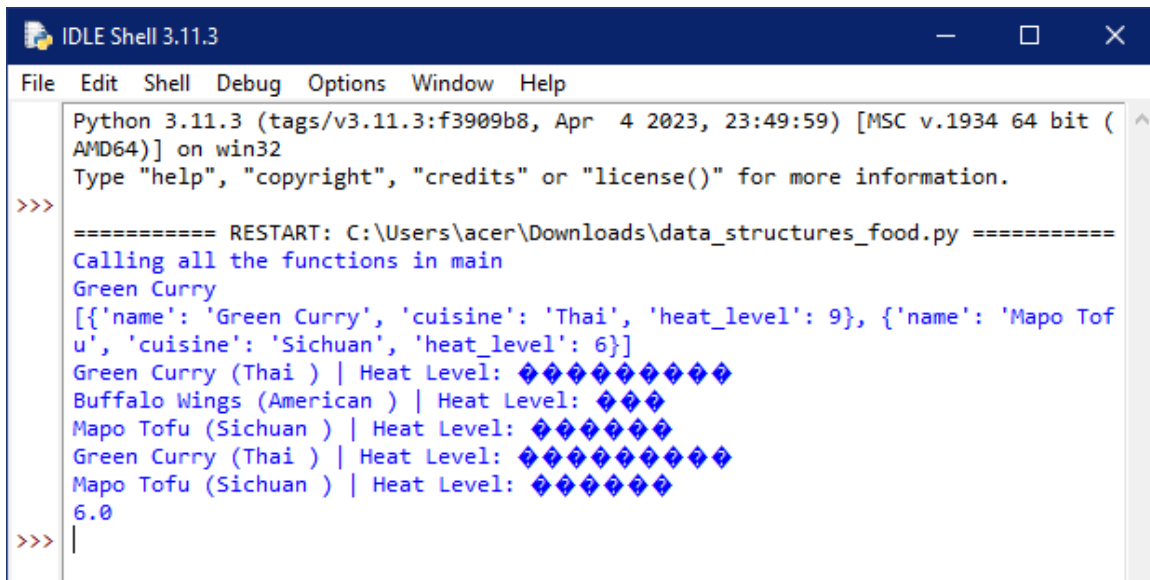
def print_spiciest_foods(spicy_foods):
    print_spicy_foods(get_spiciest_foods(spicy_foods))

def get_average_heat_level(spicy_foods):
    total = 0
    j = 0
    for i in spicy_foods:
        total += i['heat_level']
        j += 1
    return total/j

def create_spicy_food(spicy_foods, spicy_food):
    spicy_foods.append(spicy_food)
    print(spicy_foods)
```

```
def main():
    print("Calling all the functions in main")
    print(get_names(spicy_foods))
    print(get_spiciest_foods(spicy_foods))
    print_spicy_foods(spicy_foods)
    print_spiciest_foods(spicy_foods)
    print(get_average_heat_level(spicy_foods))

if __name__=="__main__":
    main()
```



```
IDLE Shell 3.11.3
File Edit Shell Debug Options Window Help
Python 3.11.3 (tags/v3.11.3:f3909b8, Apr 4 2023, 23:49:59) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\Users\acer\Downloads\data_structures_food.py =====
Calling all the functions in main
Green Curry
[{'name': 'Green Curry', 'cuisine': 'Thai', 'heat_level': 9}, {'name': 'Mapo Tofu', 'cuisine': 'Sichuan', 'heat_level': 6}]
Green Curry (Thai ) | Heat Level: 🔥🔥🔥🔥🔥🔥🔥🔥
Buffalo Wings (American ) | Heat Level: 🔥🔥🔥
Mapo Tofu (Sichuan ) | Heat Level: 🔥🔥🔥🔥🔥
Green Curry (Thai ) | Heat Level: 🔥🔥🔥🔥🔥🔥🔥🔥
Mapo Tofu (Sichuan ) | Heat Level: 🔥🔥🔥🔥🔥
6.0
>>> |
```