United International University

CSE 3812: Artifical Intelligence lab

Lab 1: Python basics

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Contents

1 Question 1: List Processing

Task: Create a list of integers from 1 to 10.

- Remove all even numbers.
- Multiply each remaining number by 5.
- Print the final list.

Sample Input: List of integers from 1 to 10.

Sample Output:

```
[5, 15, 25, 35, 45]
```

2 Question 2: Shallow vs Deep Copy

Task: Given a list of lists:

- Create a shallow copy and a deep copy.
- Modify the first element of the first sublist in both copies.
- Print all three lists to compare the changes.

Sample Input: Original list: `[[1, 2], [3, 4]]` Modify shallow copy: change `[0][0]` to 100 Modify deep copy: change `[0][0]` to 999

Sample Output:

```
Original: [[100, 2], [3, 4]]
Shallow: [[100, 2], [3, 4]]
Deep: [[999, 2], [3, 4]]
```

3 Question 3: Dictionary with Nested Data

Task: Create a dictionary with student info:

- Update math grade to 95.
- Add a new subject "english" with grade 88.
- Calculate and print the average grade.
- Remove the "passed" key.

Sample Input:

- name: "Alice"
- grades: math = 85, science = 92
- passed: True

Sample Output:

```
Average Grade: 91.66666666666667
{'name': 'Alice', 'grades': {'math': 95, 'science': 92, 'english'
    : 88}}
```

4 Question 4: NumPy Array Operations

Task:

- Create a 2D NumPy array of shape (3, 4) with values from 1 to 12.
- Multiply all elements by 2.
- Extract and print the second column.
- Print the sum of each row.

Sample Input: 2D array with values:

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \end{bmatrix}$$

Sample Output:

```
Second column: [ 4 12 20]
Row sums: [20 52 84]
```