

CIS 103 Homework Assignment 2: Python Loops and Object Types Due 09/13/2024 @11:59pm

Part 1: Theoretical Questions

1. Explain the difference between `while` and `for` loops in Python.
2. Describe the use of `nested loops` and provide a scenario where you would use one.
3. What are `strings` in Python? Why are strings immutable?
4. Explain the `slice operator` in Python with an example.
5. Why is `formatting` important when working with strings in Python?
6. What is the difference between `lists` and `tuples` in Python? Provide examples.
7. Explain what a `dictionary` is and describe a scenario where it would be useful.

Part 2: Coding Exercises

1. `While Loop`:

Write a Python program using a `while` loop that prints numbers from 1 to 10 but exits the loop early if the number is greater than 5.

2. `For Loop`:

Write a Python program that uses a `for` loop to iterate over the string "CIS103" and prints each character along with its ASCII value.

3. `Nested Loop`:

Write a program to generate the following pattern using nested loops:

```
...
```

```
*
```

```
**
```

```
***
```

```
****
```

```
...
```

4. ****String Operations****:

- Write a Python function that takes a string and returns it reversed using slicing.
- Write a Python function that formats the following output for given variables:

...

Name: John, Age: 30, Salary: \$50000.50

...

Use appropriate field widths to align the output.

5. ****List Operations****:

- Create a list of integers. Write Python code to:
 - Append a number to the list.
 - Insert a number at a specific index.
 - Sort the list in ascending order.
 - Pop the last element of the list and print it.
 - Remove a specific number from the list.

6. ****Tuples****:

Write a Python program that creates a tuple with 5 elements and prints the first and last elements. Then, attempt to modify one of the elements and explain the result.

7. ****Dictionary Operations****:

- Create a dictionary with the following key-value pairs: `{'name': 'John', 'age': 25, 'city': 'New York'}`.
- Write Python code to:
 - Add a new key-value pair to the dictionary.
 - Update the value of the `'age'` key.
 - Remove the `'city'` key from the dictionary.
 - Print all the keys and values in the dictionary.

8. ****Break and Continue****:

Write a Python program that uses a `'while'` loop and breaks out of the loop when a certain condition is met. Include an option to `'continue'`, skipping an iteration.

Please submit all items on Brightspace and upload any code parts to your GitHub account.