

# BBM101 Introduction to Programming Sample Exam

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1. (6 points) **File Comparator:** Define a *compareFiles* function, that takes two file names as parameter. Returns True if contents of the files are exactly the same. False otherwise.
2. (20 points) **Fibonacci List:** Define a function named *createFibonacci*. It will take one parameter *n* and it will return a list, containing first n element of the fibonacci sequence.

```
>>> createFibonacci(8)
[0, 1, 1, 2, 3, 5, 8, 13]
```

Figure 1: Sample return value for fibonacci function

- (a) (12 points) Explain your algorithm. Clearly indicate the purpose of the function, what are the parameters and expected output (return value) and indicate each step of your solution.
  - (b) (8 points) Convert your algorithm to the code.
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3. (24 points) Below you see three built in python methods. Teach me all the methods. You should mention about how they are used, why do we use them, when they are usefull etc. Also for each method, give at least 2 examples using them.
    - (a) **chr**
    - (b) **enumerate**
    - (c) **map**

4. (25 Points) **Min-Max Scaler Function:** You are expected to define a min-max scaler. Here is how does this scaler function works:

This function will take a list of numbers as parameter. But we want to scale these numbers between some values. For example, the numbers are given between 0 and 2.00. But you want them to be scaled between 0 and 50. User of this function will specify two numbers: scaleMin and scaleMax and your function will fit all the numbers between this range. You will create and return a new list, you won't change the original list. Below you can see some outputs:

```
>>> list_1 = [0, 0.3, 0.45, 0.7, 0.95, 1, 0.65]
>>> min_max_scaler(list_1, 0, 50)
[0.0, 15.0, 22.5, 35.0, 47.5, 50.0, 32.5]
```

Figure 2: Some sample output for scaler function. All values in the list are scaled between 0 and 50. Note that the smallest number in the list became 0 and max value of the list became 50. And all others are scaled between them.

```
>>> list_2 = [17, 8, 14, 21, 25, 32, 3, 15, 6]
>>> min_max_scaler(list_2, 50, 100)
[74.14, 58.62, 68.97, 81.03, 87.93, 100.0, 50.0, 70.69, 55.17]
```

Figure 3: Another return value of the function. This time numbers are scaled between 50 and 100. Note that all float numbers are rounded to 2 digits.

- (a) (15 points) Explain your algorithmic approach step by step, what does this function produce from given parameters and what are the steps? Indicate all parts of your algorithm clearly.
  - (b) (10 points) Convert your algorithm to the Python code.
5. (25 points) Implement your own question for this step. Find a problem that you can solve by defining a function.
- (a) (8 points) Define your problem. What are the inputs (parameters) and output (return value) for your problem?
  - (b) (9 points) Explain your solution algorithm step by step. Clearly indicate each part of your solution.
  - (c) (8 points) Convert your algorithm to the Python code.