CodeStart Competition Questions

2024 Semester 2

Total time: 1 hour 30 minutes
Total questions: 20 questions
Total marks: 60 marks

NOTE: For all questions, DO NOT prompt for user input. Mark penalties will be incurred if ignored.

Section A

1. Multiply the sum of 15 and 62, by 4, and return the result using a single line of code, without using any variables. **[2]**

2. What will this expression evaluate to? **[2]**
```
print(len("Python is easy") == 6)
```

3. What will the output of this program be? **[2]**
```
print(False and True or False)
```

4. What will the output of this program be? **[2]**
```
a = 100
b = 3
print(round(a / b, 2))
```

5. What will the output of this program be? **[2]**
```
print("Coding", "Is" + "Fun", "if you are passionate")
```

6. There is an error in this code, please identify the error and fix the code. **[2]**
```
y = 7
print("The value of y is: " + y)
```

7. What will the output be if the variable drink is "tea"? **[2]**
```
if drink == "Water":
    print("Healthy choice!")
elif drink == "Soda":
    print("Too sweet!")
elif drink == "Tea":
    print("Relaxing!")
else:
    print("Unknown drink!")
```

8. What will the output be if the variable `age` is 20? **[2]**

```
if age < 10:
    print("Too young")
elif 10 < age < 20:
    print("Teenager")
elif 20 < age < 30:
    print("Young adult")
elif 30 < age < 40:
    print("Adult")
else:
    print("Mature adult")
```

9. What will the following code output? If it does not output anything, explain what changes can be made so that there is an output, and also give the output after being re-run after any changes made. **[2]**

```
counter = 0
while counter > 3 and counter < 5:
    counter += 1
    print(counter)
```

10. Write a line of code to print the second last element of a list of numbers that only contains integers. Its length might change when the program is running. Below are a few examples of the possible values of numbers. **[2]**
Note: You are not allowed to use negative indices in your code.

    Examples:

```
numbers = [10, 20, 30]          # second last element = 20
numbers = [5, 15, 25, 35]       # second last element = 25
```

Section B

11. Write a function **joinStringsWithHyphen(x, y)** that takes in two strings, x and y, which may contain any amount of leading and trailing whitespaces. The function should return a new string that concatenates x and y with a hyphen (-) in between, while removing all leading and trailing whitespaces from both strings. **[3]**
    (Hint: You may use a Python in-built function)

    Examples:
    - Input: x = " Hello ", y = " World   "
    - Output: "Hello-World"

12. Write a function **convertLength(cm)** that takes in cm as a non-negative floating point number representing centimetres, and returns the length converted to metres and kilometres as a list. **[3]**

    Examples:
    - Input: cm = 150.0
    - Output: [1.5,0.0015]

13. Write a function **doubleChars(x)** that takes in x as a string, and returns a modified string where each character is repeated twice. **[3]**

    Examples:
    - Input: x = "World"
    - Output: "WWoorrlldd"

14. Write a function **getUpperCase(s)** that takes in a string s and returns a new string with all the uppercase letters from the original string. **[3]**

    Examples:
    - Input: s = "PrograMmIng is Fun"
    - Output: "PMIF"

15. Write a function **countVowels(s)** that takes in a string s and returns the number of vowels (a, e, i, o, u) in the string. **[3]**

    Examples:
    - Input: s = "Programming"
    - Output: 3

Section C

16. Write a function **isAnagram(s1, s2)** that takes in two strings s1 and s2, and returns True if s1 and s2 are anagrams of each other, else returns False. **[5]**

    An anagram is a word, phrase, or name formed by rearranging the letters of another, such as cinema, formed from iceman.

    Examples:
    - Input: s1 = "listen", s2 = "silent"
    - Output: True

    - Input: s1 = "hello", s2 = "world"
    - Output: False

17. Write a function **sumOfSquares(x)** that takes in x as a list of integers, and returns the sum of the squares of all the elements in the list. **[5]**

    Examples:
    - Input: x = [1, 2, 3, 4]
    - Output: 30

    - Input: x = [2, 3, 5]
    - Output: 38

18. Write a function **longestCommonPrefix(strings)** that takes in a list of strings and returns the longest common prefix among all strings. If there is no common prefix, return an empty string. **[5]**

    Examples:
    - Input: strings = ["flower", "flow", "flight"]
    - Output: "fl"

    - Input: strings = ["dog", "racecar", "car"]
    - Output: ""

19. Write a function **findMissingNumber(arr)** that takes in a list of integers from 1 to n with one number missing, and returns the missing number. The list may not be in order. **[5]**

    Examples:
    - Input: arr = [3, 7, 1, 2, 8, 4, 5]
    - Output: 6

    - Input: arr = [1, 2, 3, 5]
    - Output: 4

20. Write a function **flattenNestedList(nestedList)** that takes in a list of lists and returns a single flattened list containing all the elements. **[5]**

    Examples:
    - Input: nestedList = [[1, 2, [3, 4]], [5, 6], [7, 8]]
    - Output: [1, 2, 3, 4, 5, 6, 7, 8]

    - Input: nestedList = [[], [1, [2, 3]], [[4, 5], 6]]
    - Output: [1, 2, 3, 4, 5, 6]