Practice Set-6

Total no of questions: 15.

Q1. Write a python program to implement Queue Class having Enqueue and Dequeue operation

(Implement methods for Enqueue(insert element from one end) and Dequeue (delete element from other end)).

Note: Define a fixed size queue to check condition for overflow before element is inserted, and underflow before element is deleted.

Reference:https://codezup.com/write-program-implement-queue-class-python/

Q2. Given a string s containing just the characters '(', ')', '{', '}', '[' and ']', determine if the input string is valid or not using Stack.

An input string is valid if:

1. Open brackets must be closed by the same type of brackets.
2. Open brackets must be closed in the correct order.

Example 1: Input: s = "()[]{}"

Output: true

Example 2: Input: s = "(]"

Output: false

Reference:
https://www.geeksforgeeks.org/check-for-balanced-parentheses-in-python/#:~:text=One%20approach%20to%20check%20balanced,%2C%20return%20Balanced%20otherwise%2C%20Unbalanced.

Q3. Define a Movie class that takes Movie Title, Director Name, Genre and IMDB rating to initialize.

1) You may define appropriate getters and setters.

2) Create multiple objects of this class(atleast 5)

3) Run the following queries on these objects:

- Sort Movies by their IMDB rating, in ascending order (You may use the inbuilt functions)
- List Title of Movies with IMDB rating above 7.0
- List Title of Movies directed by a particular director
- List Directors directing a particular genre

Q4.

Kristen is a contender for valedictorian of her high school. She wants to know how many students (if any) have scored higher than her in the 5 exams given during this semester.

Create a class named Student with the following specifications:

- An instance variable named score to hold a student's exam scores.
- An input() function that reads 5 integers and saves them to scores.

- A calculateTotalScore() function that returns the sum of the student's scores.

Reference: https://www.hackerrank.com/challenges/classes-objects/problem

Q5.

For this challenge, you are given two complex numbers, and you have to print the result of their addition, subtraction, multiplication, division and modulus operations.

The real and imaginary precision part should be correct up to two decimal places.

Input Format

One line of input: The real and imaginary part of a number separated by a space.

Output Format

For two complex numbers C and D, the output should be in the following sequence on separate lines:

- C + D
- C - D
- C * D
- C / D
- mod(C)
- mod(D)

For complex numbers with non-zero real(A) and complex(B) part, the output should be in the following format:

A + Bi

Replace the plus symbol (+) with a minus symbol (-) when B < 0.

For complex numbers with a zero complex part i.e. real numbers, the output should be:

For complex numbers where the real part is zero and the complex part (B) is non-zero, the output should be:

A + 0.00i

Sample Input

2 1

5 6

Sample Output

7.00+7.00i

-3.00-5.00i

4.00+17.00i

0.26-0.11i

2.24+0.00i

7.81+0.00i

Reference:https://www.hackerrank.com/challenges/class-1-dealing-with-complex-numbers/problem?isFullScreen=true

Q6. Reverse first K elements of the given Stack

Given a stack S and an integer K, the task is to reverse the first K elements of the given stack.

Input1: S = [1, 2, 3, 4, 5, 8, 3, 0, 9], K = 4

Output1: [4, 3, 2, 1, 5, 8, 3, 0, 9]

Input2: S = [1, 2, 3, 4, 5, 8, 3, 0, 9], K = 7

Output2: [3, 8, 5, 4, 3, 2, 1, 0, 9]

Explanation: First 4 elements of the given stack are reversed

Reference -
https://www.geeksforgeeks.org/reverse-first-k-elements-of-the-given-stack/

Q7. Reversing a Queue

Give an algorithm for reversing a queue Q. Only following standard operations are allowed on queue.

enqueue(x) : Add an item x to rear of queue.
dequeue() : Remove an item from front of queue.
empty() : Checks if a queue is empty or not.

Use a stack to reverse the queue. Do not use reverse() operation on list to solve the problem.

Reference - https://www.geeksforgeeks.org/reversing-a-queue/

Q8.

Write a Python class to get all possible unique subsets from a set of distinct integers.

- Name of the class should be subsets
- It should contain helper functions that will help in making these subsets.
- The constructor of the class should take the list an input.

Example:
Input : [4, 5, 6]
Output : [[], [6], [5], [5, 6], [4], [4, 6], [4, 5], [4, 5, 6]]

Reference : https://www.w3resource.com/python-exercises/class-exercises/

Q9.
Devise an algorithm to implement a stack with the help of two queues.

Reference: https://www.geeksforgeeks.org/implement-stack-using-queue/

Q10: build a flashcard using a class in python. A flashcard is a card having information on both sides, which can be used as an aid in memorization. Flashcards usually have a question on one side and an answer on the other. Particularly in this article, you are going to create flashcards that will have a word and its meaning.

- Create a class named flashcard.
- Initialize dictionary fruits using __init__() method.

- Now randomly choose a pair from fruits using choice() method and store the key in variable fruit and value in variable color.
- Now prompt the user to answer the color of the randomly chosen fruit.
- If correct print correct else print wrong.

Sample Output :

```
welcome to fruit quiz
What is the color of apple
Red
Correct answer
enter 0 , if you want to play again : 0
What is the color of watermelon
Red
Wrong answer
enter 0 , if you want to play again : 1
```

Reference :
https://www.geeksforgeeks.org/python-program-to-build-flashcard-using-class-in-python/

Q11: Implement queue using stack.

Reference : https://www.geeksforgeeks.org/queue-using-stacks/

Q12: Stock span problem

The stock span problem is a financial problem where we have a series of n daily price quotes for a stock and we need to calculate the span of stocks price for all n days.

The span Si of the stocks price on a given day i is defined as the maximum number of consecutive days just before the given day, for which the price of the stock on the current day is less than or equal to its price on the given day.

For example, if an array of 7 days prices is given as {100, 80, 60, 70, 60, 75, 85}, then the span values for corresponding 7 days are {1, 1, 1, 2, 1, 4, 6}.

Example 1:

Input:

N = 7, price[] = [100 80 60 70 60 75 85]

Output:

1 1 1 2 1 4 6

Explanation:

Traversing the given input span for 100
will be 1, 80 is smaller than 100 so the
span is 1, 60 is smaller than 80 so the
span is 1, 70 is greater than 60 so the
span is 2 and so on. Hence the output will
be 1 1 1 2 1 4 6.

Example 2:

Input:

N = 6, price[] = [10 4 5 90 120 80]

Output:

1 1 2 4 5 1

Explanation:

Traversing the given input span for 10 will be 1, 4 is smaller than 10 so the span will be 1, 5 is greater than 4 so the span will be 2 and so on. Hence, the output will be 1 1 2 4 5 1.

Reference:https://www.interviewbit.com/blog/stock-span-problem/

Q13. Generate Binary Numbers

Given a number N. The task is to generate and print all binary numbers with decimal values from 1 to N.

Example 1:

Input:

N = 2

Output:

1 10

Explanation:

Binary numbers from

1 to 2 are 1 and 10.

Example 2:

Input:

N = 5

Output:

1 10 11 100 101

Explanation:

Binary numbers from

1 to 5 are 1 , 10 , 11 , 100 and 101.

Reference:

https://www.geeksforgeeks.org/interesting-method-generate-binary-numbers-1-n/

Q14.

Create a class called Numbers, which has a single class attribute called MULTIPLIER, and a constructor which takes the parameters x and y (these should all be numbers). (a) Write a method called add which returns the sum of the attributes x and y. (b) Write a class method called multiply, which takes a single number parameter a and returns the product of a and MULTIPLIER. (c) Write a static method called subtract, which takes two number parameters, b and c, and returns b - c. (d) Write a method called value which returns a tuple containing the values of x and y. Make this method into a property, and write a setter and a deleter for manipulating the values of x and y.

Q15.

Create a class called 'Matrix' containing constructor that initializes the number of rows

and number of columns of a new Matrix object. The Matrix class has the following

information:

1.number of rows of matrix

2 number of columns of matrix

3 - elements of matrix in the form of 2D array