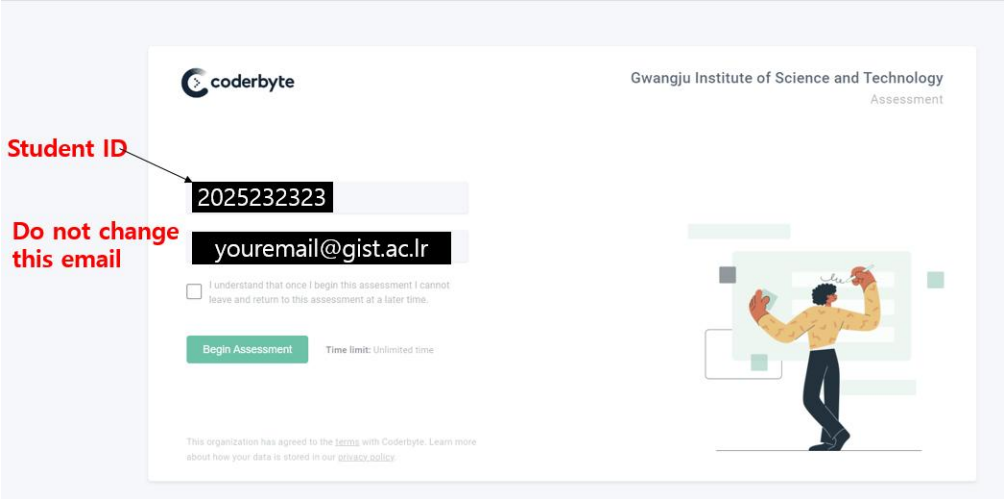
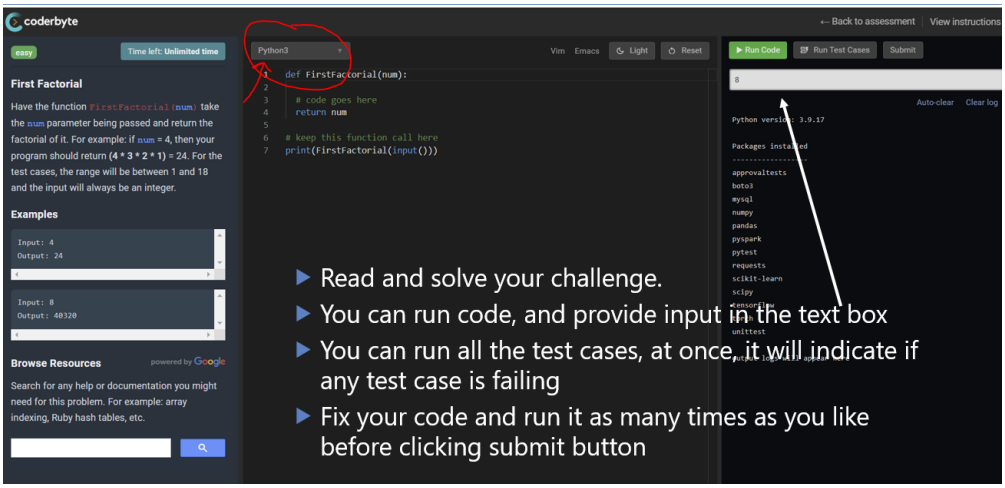
Algo Assignment 8: Graph

General Instruction to submit the assignment

1. Open the link sent in email and enter your **Student ID** and **ZEUS email address**



2. You must change the programming language to Python3 before starting to code. There is a drop down button above the coding window.



3. If you submit and try to resubmit etc., the system will not let you do that. (**once submitted you cannot update your code**)
4. Hence **solve this question beforehand and then enter your code in Coderbyte system**. This way you will save a lot of hassle. The questions will also be released in the pdf format. Make sure your code gives the right results for all the given test cases before you submit your code.
   You may ignore warning messages about cheating when you paste your code to Coderbyte.
5. You should not use **system libraries** while solving questions for at least first 3 assignments. Starting from DP assignments you can use **min max** and **sort** functions of python3.
6. Remember total points from the assignments are only **10%** of your grades. Hence these are mainly for practicing for mid-term and final-term coding tests.
7. The time complexity of your submissions will be tested only after 4th Assignment.

Q1. **Funland and Lolland Sea**

There is an m x n rectangular island that borders both the **Funland Sea** and **Lolland Sea**. The **Funland Sea** touches the island's left and top edges, and the **Lolland Sea** touches the island's right and bottom edges.

The island is partitioned into a grid of square cells. You are given an m x n integer matrix heights where heights[r][c] represents the **height above sea level** of the cell at coordinate (r, c).

The island receives a lot of rain, and the rain water can flow to neighboring cells directly north, south, east, and west if the neighboring cell's height is **less than or equal to** the current cell's height. Water can flow from any cell adjacent to an ocean into the ocean.

Return *a **2D list** of grid coordinates* result *where* result[i] = [r_i, c_i] *denotes that rain water can flow from cell* (r_i, c_i) *to **both** the Funland sea and Lolland Sea*.

- m == heights.length
- n == heights[r].length
- 1 <= m, n <= 200
- 0 <= heights[r][c] <= 10^5

Be careful of input output shape.

Input shape is array of strings

For example,

["1,2,2,3,5","3,2,3,4,4","2,4,5,3,1","6,7,1,4,5","5,1,1,2,4"]

You should convert string with commas 1,2,2,3,5 to array [1,2,2,3,5] to get final 2D array.

After conversion,

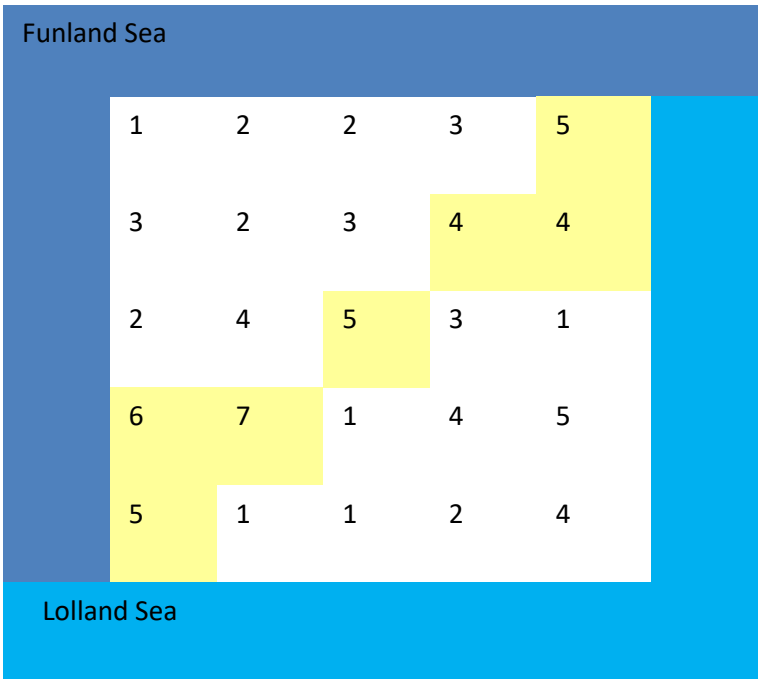
You should get 2D array [[1,2,2,3,5],[3,2,3,4,4],[2,4,5,3,1],[6,7,1,4,5],[5,1,1,2,4]]

For output,

You should convert array coordinate to string as well [0,4] to "0,4"

For example, As a result return

["0,4","1,3","1,4","2,2","3,0","3,1","4,0"]




```
def FunlandandLollandSea(strArr):


  # code goes here
  return strArr

# keep this function call here
print(FunlandandLollandSea(input()))
```

Test cases

1. For input `["1,2,2,3,5","3,2,3,4,4","2,4,5,3,1","6,7,1,4,5","5,1,1,2,4"]` ,The correct output is `["0,4","1,3","1,4","2,2","3,0","3,1","4,0"]`

2. For input `["2,1","1,2"]`, The correct output is `["0,0","0,1","1,0","1,1"]`

3. For input `["5,2,3,3","1,2,3,4","2,7,6,5,","2,3,1,2"]`, The correct output is `["0,2","0,3","1,2","1,3","2,0","2,1","2,2","2,3","3,0","3,1"]`

4. For input `["1,2,1","0,1,2"]`, The correct output is `["0,0","0,1","0,2","1,0","1,1","1,2"]`

5. For input `["1,2,3","3,4,4","5,3,3","6,7,5","5,2,4"]`, The correct output is `["0,2","1,1","1,2","2,0","3,0","3,1","4,0"]`

6. For input `["2,1,0,3,4","1,2,3,4,5"]`, The correct output is `["0,0","0,4","1,0","1,1","1,2","1,3","1,4"]`

7. For input `["2,3,5","3,4,4"]`, The correct output is `["0,2","1,0","1,1,"1,2"]`

8. For input `["2,1","1,2","2,2","2,3","4,2"]`, The correct output is `["0,0","0,1","1,1","2,0","2,1","3,0","3,1","4,0"]`

9. For input `["10,11,12","10,14,14","15,13,11","11,10,9","9,10,11"]`, The correct output is `["0,2","1,1","1,2","2,0","2,1","3,0","3,1","4,0","4,1","4,2"]`

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10. For input `["24,13,22","13,32,33"]`, The correct output is `["0,0","0,2","1,0","1,1","1,2"]`

Q2. **CoCo Language**

You went to a new country which uses a new language called CoCo. CoCo language uses the English alphabet. However, the order among the alphabet is unknown to you.

You are given a list of words from the CoCo language's dictionary, where the words are sorted in order by the rules of this new language.

Return a string of the unique alphabets in CoCo language sorted in increasing order by the new language's rules. If there is no solution, return "". If there are multiple solutions, return any of them.

- 1 <= words length <= 100
- 1 <= words[i] length <= 100
- words[i] consists of only lowercase English letters.

Code frame

```
def CoCoLanguage(strArr):

  # code goes here
  return strArr

# keep this function call here
print(CoCoLanguage(input()))
```

Test cases

1. For input `["xwt","xwf","aw","att","wftt"]`, The correct output is `"xawtf"`

2. For input `["a","l"]`, The correct output is `"al"`

3. For input `["a","l","a"]`, The correct output is `""`

4. For input `["abc","ab"]`, The correct output is `""`

5. For input `["a","b","c"]`, The correct output is `"abc"`

6. For input `["ab","ba"]`, The correct output is `"ab"`

7. For input `["a","a","b"]`, The correct output is `"ab"`

8. For input `["aa","ab","ac"]`, The correct output is `"abc"`

9. For input `["aba","bba","aaa"]`, The correct output is `""`

10. For input `["gg","gta","gtb","ga"]`, The correct output is `"gtab"`