Q3

**ESG Issuer Graph**

**Programming challenge description:**

ESG Issuer Data is of the form

Issuer | Parent | ESG Rating

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A54365 | B34454 | AA

B34454 | C34563 | A

D45747 | B34454 | B

E36547 | D45747 | AAA

G34657 | D45747 | CCC

H84464 | C34563 | BB

I76474 | H84464 | AA

C34563 | | BBB

F34654 | | BB

J74576 | K46565 | C

K46565 | | CC

L54334 | I76474 | AA

H84464 | L54334 | BB

Assumptions that can be made:

1. If asked to find a min or max rating, given an issuer, consider all the issuers in the path from the given issuer to the ultimate parent
2. Rating order AAA > AA > A > BBB > BB > B > CCC > CC > C

Your assignment:

* Come up with a Data Structure to hold this type of data.
* Write an algorithm to check if the relations above are cyclic in nature.
* (Convert the Data Structure to a directed one assuming the direction is from the Issuer to its parent) Find the issuer with max rating

**Input:**

The issuer table, with respective columns:

Issuer Parent ESGRating, separated by |

**Output:**

* If relations from the input table are cyclic in nature (cyclic or noncyclic)
* issuer with max rating, return None if invalid/not applicable
* max rating, return None if invalid/not applicable

**Test 1**

**Test InputDownload Test 1 Input**

A54365|B34454|CCC B34454|C34563|A D45747|B34454|B E36547|D45747|AAA G34657|D45747|CCC H84464|C34563|BB I76474|H84464|AA C34563| |BBB F34654| |BB J74576|K46565|C K46565| |CC L54334|I76474|AA H84464| |BB

**Expected OutputDownload Test 1 Input**

noncyclic C34563 BBB

**Test 2**

**Test InputDownload Test 2 Input**

A54365|B34454|AA B34454|C34563|A D45747|B34454|B E36547|D45747|AAA G34657|D45747|CCC H84464|C34563|BB I76474|H84464|AA C34563||BBB F34654||BB J74576|K46565|C K46565||CC L54334|I76474|AA H84464|L54334|BB

**Expected OutputDownload Test 2 Input**

cyclic A54365 AA