

Senior Software Engineer Code Test

Please solve the following code problems in the language and style of your choice. During your interview, we will conduct a code review of your submission with you, and you will have a chance to explain the design choices and trade-offs you made.

You may submit your code via a github/gitlab link, or as a zip file. If you have any questions, feel free to direct them at mlukaszevicz@jornaya.com.

Recency Calculation

Write a program that, when given a set of events, a set of age ranges, and a point in time, returns how many events fall into each of the age ranges relative to the given point in time.

Considerations

- Age ranges should be considered inclusive.
- The point in time should be considered inclusive.
- It is safe to assume that all events have a Category and a valid numeric Timestamp.
- It is safe to assume that the given age ranges and the given point in time are valid numbers.

Example

Example Event Set:

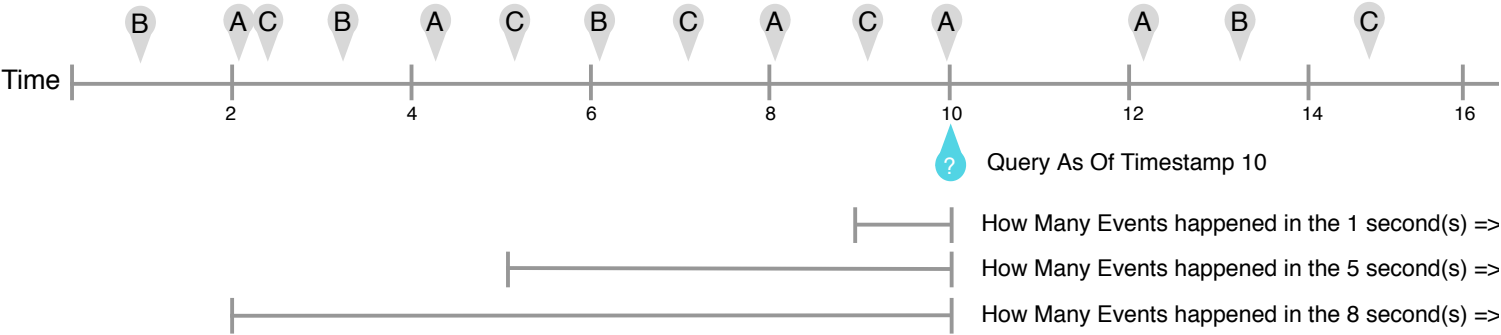
Category	Timestamp
A	2
A	4
A	8
A	10
A	12
B	1
B	3
B	6
B	13
C	2
C	5
C	7
C	9
C	15

Example Problem:

With the example data set on the left, given age ranges of [1, 5, 8] and a point in time of 10 , How many events:

- Are at most 1 second old?
- Are at most 5 seconds old?
- Are at most 8 seconds old?

Timeline:



Example Execution:

```
calculate_frequency(data=sampleData, ageGroups=[1, 5, 8], asOfTime=10) => [2, 6, 10]
```

Shortest Path

Write a program that, when given a set of Data Transactions between Buyers and Sellers, a target account, and a point in time, returns the length of the shortest path of accounts from the source account to the given target account at the given time.

Considerations:

- The Data Transaction that does not have a `bought_from` field is the source account.
- Shortest path should be considered by accounts, not transactions.
- The point in time should be considered inclusive
- Return an error when no path or account can be found

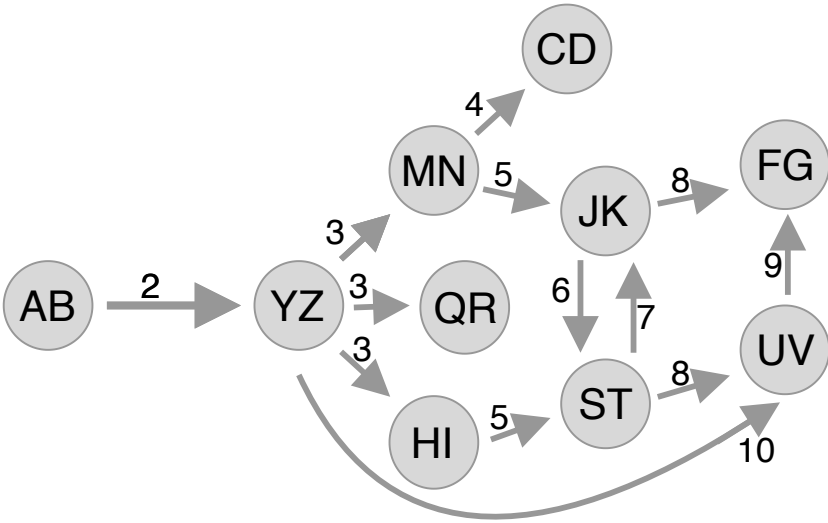
Example

Example Data Transactions:

timestamp	account	bought_from
1	AB	
2	YZ	AB
3	MN	YZ
3	QR	YZ

Example Data Graph Visualization:

timestamp	account	bought_from
3	HI	YZ
4	CD	MN
5	JK	MN
5	ST	HI
6	ST	JK
7	JK	ST
8	FG	JK
8	UV	ST
9	FG	UV
10	UV	YZ



Example Executions:

shortest_path(data=data, toAccount=FG, asOfTime=9) => 4

toAccount	asOfTime	Result	Explanation
JK	4	3	AB→YZ, YZ→MN, MN→JK

ST	5	3	AB→YZ, YZ→HI, HI→ST
UV	9	4	AB→YZ, YZ→HI, HI→ST, ST→UV
FG	9	4	AB→YZ, YZ→MN, MN→JK, JK→FG
FG	10	3	AB→YZ, YZ→UV, UV→FG
FG	3	Error	No Path Found at Point in Time
AZ	9	Error	Target Account Not Found