Problem 1797: Design Authentication Manager

Problem Information

Difficulty: Medium
Acceptance Rate: 58.14%
Paid Only: No
Tags: Hash Table, Linked List, Design, Doubly-Linked List

Problem Description

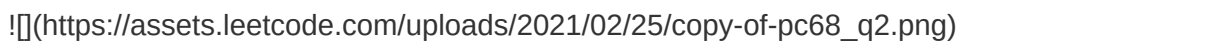
There is an authentication system that works with authentication tokens. For each session, the user will receive a new authentication token that will expire `timeToLive` seconds after the `currentTime`. If the token is renewed, the expiry time will be **extended** to expire `timeToLive` seconds after the (potentially different) `currentTime`.

Implement the `AuthenticationManager` class:

* `AuthenticationManager(int timeToLive)` constructs the `AuthenticationManager` and sets the `timeToLive`. * `generate(string tokenId, int currentTime)` generates a new token with the given `tokenId` at the given `currentTime` in seconds. * `renew(string tokenId, int currentTime)` renews the **unexpired** token with the given `tokenId` at the given `currentTime` in seconds. If there are no unexpired tokens with the given `tokenId`, the request is ignored, and nothing happens. * `countUnexpiredTokens(int currentTime)` returns the number of **unexpired** tokens at the given currentTime.

Note that if a token expires at time `t`, and another action happens on time `t` (`renew` or `countUnexpiredTokens`), the expiration takes place **before** the other actions.

Example 1:



Input ["AuthenticationManager", "renew", "generate", "countUnexpiredTokens", "generate", "renew", "renew", "countUnexpiredTokens"] [[5], ["aaa", 1], ["aaa", 2], [6], ["bbb", 7], ["aaa", 8], ["bbb", 10], [15]] **Output** [null, null, null, 1, null, null, null, 0] **Explanation** AuthenticationManager authenticationManager = new AuthenticationManager(5); //

Constructs the AuthenticationManager with timeToLive = 5 seconds. authenticationManager.renew("aaa", 1); // No token exists with tokenId "aaa" at time 1, so nothing happens. authenticationManager.generate("aaa", 2); // Generates a new token with tokenId "aaa" at time 2. authenticationManager.countUnexpiredTokens(6); // The token with tokenId "aaa" is the only unexpired one at time 6, so return 1. authenticationManager.generate("bbb", 7); // Generates a new token with tokenId "bbb" at time 7. authenticationManager.renew("aaa", 8); // The token with tokenId "aaa" expired at time 7, and 8 >= 7, so at time 8 the renew request is ignored, and nothing happens. authenticationManager.renew("bbb", 10); // The token with tokenId "bbb" is unexpired at time 10, so the renew request is fulfilled and now the token will expire at time 15. authenticationManager.countUnexpiredTokens(15); // The token with tokenId "bbb" expires at time 15, and the token with tokenId "aaa" expired at time 7, so currently no token is unexpired, so return 0.

Constraints:

* `1 <= timeToLive <= 108` * `1 <= currentTime <= 108` * `1 <= tokenId.length <= 5` * `tokenId` consists only of lowercase letters. * All calls to `generate` will contain unique values of `tokenId`. * The values of `currentTime` across all the function calls will be **strictly increasing**. * At most `2000` calls will be made to all functions combined.

Code Snippets

C++:

```
class AuthenticationManager {
public:
AuthenticationManager(int timeToLive) {

}

void generate(string tokenId, int currentTime) {

}

void renew(string tokenId, int currentTime) {

}

int countUnexpiredTokens(int currentTime) {
```

```
}
};

/**
* Your AuthenticationManager object will be instantiated and called as such:
* AuthenticationManager* obj = new AuthenticationManager(timeToLive);
* obj->generate(tokenId,currentTime);
* obj->renew(tokenId,currentTime);
* int param_3 = obj->countUnexpiredTokens(currentTime);
*/
```

Java:

```
class AuthenticationManager {

public AuthenticationManager(int timeToLive) {

}

public void generate(String tokenId, int currentTime) {

}

public void renew(String tokenId, int currentTime) {

}

public int countUnexpiredTokens(int currentTime) {

}
}

/**
* Your AuthenticationManager object will be instantiated and called as such:
* AuthenticationManager obj = new AuthenticationManager(timeToLive);
* obj.generate(tokenId,currentTime);
* obj.renew(tokenId,currentTime);
* int param_3 = obj.countUnexpiredTokens(currentTime);
*/
```

Python3:

```
class AuthenticationManager:

def __init__(self, timeToLive: int):


def generate(self, tokenId: str, currentTime: int) -> None:


def renew(self, tokenId: str, currentTime: int) -> None:


def countUnexpiredTokens(self, currentTime: int) -> int:



# Your AuthenticationManager object will be instantiated and called as such:
# obj = AuthenticationManager(timeToLive)
# obj.generate(tokenId,currentTime)
# obj.renew(tokenId,currentTime)
# param_3 = obj.countUnexpiredTokens(currentTime)
```