1. (30*pts*) Describe the Redis data structures that you are going to use to implement the functionalities you described in the previous point. (example To implement the most viewed products I will use a Redis sorted set with key "mostViewed:userId", product ids as the values and a score of the number of views of the product.). You can use/describe more than one data structure, you will need to implement at least one.

**Current Logged-in Users**

* **Data Structure**: Redis Hash
* **Implementation**: A hash with the key **"logged\_in\_users"**, where each field is the **session\_token** and the value is the **user\_id**. This facilitates O(1) complexity for checking if a user is logged in and for retrieving user details.
* **Example**: **HSET logged\_in\_users session\_token123 user\_id42**

**Active Goals**

* **Data Structure**: Redis Sorted Set
* **Implementation**: A sorted set for each user with the key **"active\_goals:user\_id"**, where the members are **goal\_ids** and scores are **end\_dates** in UNIX timestamp format to keep goals sorted by their end date for timely progress checks.
* **Example**: **ZADD active\_goals:user\_id 1640995200 goal\_id15**

**Recent Activities**

* **Data Structure**: Redis Lists
* **Implementation**: A list for each user with the key **"recent\_activities:user\_id"**. New activities are added to the head of the list with **LPUSH**, and the list can be trimmed to a fixed size for the most recent entries.
* **Example**: **LPUSH recent\_activities:user\_id activity\_id88**

**Dietary Intakes**

* **Data Structure**: Redis Sets
* **Implementation**: A set for each user and each date with the key **"diet:user\_id:date"**. Each member of the set is a composite string containing **meal\_type**, **food\_item**, and **calories**.
* **Example**: **SADD diet:user\_id:2024-04-15 "Breakfast:Oatmeal:300"**

**Medication Schedules**

* **Data Structure**: Redis Sorted Set
* **Implementation**: A sorted set with the key **"medication\_schedule:user\_id"**, where members are **reminder\_ids** and the score is the next scheduled time to take the medication in UNIX timestamp format. This ensures medications are reminded in the correct order.
* **Example**: **ZADD medication\_schedule:user\_id 1641000000 reminder\_id27**