

Homework Question 2, Gradescope Q2.5

Key-Value Data Store Design for Flightapp

Key Types and Value Types

1. Flights

- **Key:** FLIGHT#<flight_id>
- **Value:**

```
{
  "carrier_id": "<carrier_id>",
  "origin": "<origin>",
  "destination": "<destination>",
  "departure_time": "<departure_time>",
  "arrival_time": "<arrival_time>",
  "capacity": "<capacity>",
  "reservable_capacity": "<reservable_capacity>"
}
```

2. Carriers

- **Key:** CARRIER#<carrier_id>
- **Value:**

```
{
  "carrier_name": "<carrier_name>"
}
```

3. Months

- **Key:** MONTH#<month_id>
- **Value:**

```
{
  "month_name": "<month_name>"
}
```

4. Weekdays

- **Key:** WEEKDAY#<weekday_id>
- **Value:**

```
{
  "weekday_name": "<weekday_name>"
}
```

5. Users

- **Key:** USER#<user_id>
- **Value:**

```
{
  "username": "<username>",
  "password": "<password>",
  "balance": "<balance>"
}
```

6. Itineraries

- **Key:** ITINERARY#<itinerary_id>
- **Value:**

```
{
  "origin": "<origin>",
  "destination": "<destination>",
  "is_direct": "<is_direct>",
  "flights": [
    {
      "flight_id": "<flight_id>",
      "departure_time": "<departure_time>",
      "arrival_time": "<arrival_time>"
    }
  ]
}
```

7. Reservations

- **Key:** RESERVATION#<reservation_id>
- **Value:**

```
{
  "user_id": "<user_id>",
  "is_paid": "<is_paid>",
  "reservation_date": "<reservation_date>",
  "flights": [
    {
      "flight_id": "<flight_id>"
    }
  ]
}
```

```
]
}
```

Command Usage of Keys and Values

1. Create User

- **Command:** `create(username, balance, password)`
- **Operation:** PutItem
- **Key:** `USER#<user_id>`
- **Value:** Contains user details such as username, password, and balance.

2. Search Itineraries

- **Command:** `search(origin, dest, day_of_month, directonly)`
- **Operation:** Query
- **Key Pattern:** `ITINERARY#<origin>#<destination>#<date>`
- **Value:** List of itineraries matching the search criteria.

3. Reserve Flights

- **Command:** `reserve(fid1, ..., fidn)`
- **Operation:** Transaction (PutItem and UpdateItem)
- **Key:** `RESERVATION#<reservation_id>`
- **Value:** Reservation details including user ID and flight IDs.
- **Additional Operation:** Update `reservable_capacity` in the corresponding flight keys.

4. Pay for Reservation

- **Command:** `pay(reservation_id)`
- **Operation:** UpdateItem
- **Key:** `RESERVATION#<reservation_id>`
- **Value:** Updates `is_paid` to true and decrements user balance.

5. List Reservations

- **Command:** `list_reservations(user_id)`
- **Operation:** Query
- **Key Pattern:** `USER#<user_id>#RESERVATION#*`
- **Value:** Lists all reservations for the user.