System Design Overview

**Firestore**: A NoSQL document database used to store booking information.

**Cloud Functions**: Serverless functions triggered by events in Firestore, responsible for GST calculations and (mock) API interaction.

**Data Flow:**

1. A booking is created in the bookings collection in Firestore.
2. When the status field of a booking document is updated to "finished," a Cloud Function (generateGSTInvoice) is triggered.
3. The Cloud Function reads the booking details (amount, customer state, business state).
4. The function calculates GST components (IGST, SGST, CGST).
5. (Mock) API integration is simulated.
6. The function updates the booking document with GST details, invoice number, API response, filing status, and filing date.

**Firestore Collection Design (bookings)**

1. name (String): Customer's name.
2. totalBookingAmount (Number): Total booking amount.
3. status (String): Booking status ("pending," "processing," "finished," etc.).
4. customerState (String): Customer's state.
5. businessState (String): Your business's state.
6. bookingDate (Timestamp): The date and time of the booking.
7. gstDetails (Map): Stores calculated GST components:
8. sgst (Number): State GST.
9. cgst (Number): Central GST.
10. igst (Number): Integrated GST.
11. invoiceNumber (String): A unique invoice number.
12. apiResponse (Map): Stores the (mock) API response.
13. filingStatus (String): Status of GST filing ("success" or "failed").
14. filingError (String, optional): Stores error messages if filing fails.
15. filingDate (Timestamp): The date and time of the filing.

**IGST and SGST/CGST Calculation Logic**

1. GST Rate: A predefined GST rate is used (e.g., 18% or 0.18).
2. Total GST: The total GST amount is calculated by multiplying the totalBookingAmount by the gstRate.
3. State Comparison: The customerState and businessState are compared to determine if the transaction is intra-state (within the same state) or inter-state (between different states).
4. Intra-State (Same State):
5. SGST and CGST are calculated by dividing the totalGst by 2. This is because in intra-state transactions, GST is split equally between the state and central governments.
6. Inter-State (Different States):
7. The entire totalGst becomes IGST. This is because in inter-state transactions, the GST is collected by the central government.