

Project: SaaS Subscription Billing System

Problem Statement

We want a system that allows a **user** to:

1. Create a user account
2. Purchase a subscription **after paying the bill**
3. See their bill and subscription status
4. Extend (renew) their subscription **after payment**
5. Cancel the subscription immediately
6. Upgrade from monthly → yearly (user pays extra)
7. Receive notifications for all subscription actions

Note: Every subscription action that changes billing (purchase, renew, upgrade) must generate a bill, and the subscription is activated/updated only after payment.

Entities / Objects

User

- **Properties:**
 - UserId → Unique identifier for the user
 - Name → User's name
 - Email → User's email
 - Subscription → The current subscription of the user (if any)
 - Invoices → All the payment receipts done by the user.
- **Behavior:**
 - Can create a new account
 - Can purchase, renew, cancel or upgrade a subscription

Subscription

- **Properties:**

- PlanName → Name of the plan (e.g., "Basic", "Pro")
 - Price → Price for the current plan & duration
 - StartDate → When the subscription starts
 - ExpiryDate → When the subscription ends
 - IsActive → True if subscription is currently active
 - BillPaid → True if the current subscription has been paid
 - NotificationChannel → e.g., Console, Email
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Functions / Actions

1. **CreateUser(name, email)**

- Registers a new user in the system

2. **PurchaseSubscription(plan, duration)**

- Generates a bill for the chosen plan and duration
- User must pay the bill before subscription is activated
- Send notification: "You purchased {PlanName} subscription! Your subscription is active until {ExpiryDate}."

3. **ShowBill()**

- Displays the current subscription bill
- Example: "Your subscription bill is \$50 for Monthly Pro plan."

4. **PayBill()**

- Marks the current bill as paid
- Activates subscription or applies changes (renew, upgrade, purchase)
- Send notification: "Payment successful! Your {PlanName} subscription is now active until {ExpiryDate}."

5. **CheckSubscriptionDetails()**

- Displays subscription status in a friendly format:
 - No subscription → "You don't have any subscription yet."
 - Expired → "Your subscription expired on {ExpiryDate}."
 - Active → "You are subscribed to {PlanName} until {ExpiryDate}."

6. **RenewSubscription(duration)**

- Generates a bill for renewal
- User pays → Expiry date is extended
- Monthly plan → extends by 1 month
- Yearly plan → extends by 1 year
- Send notification: "Your subscription has been extended until {ExpiryDate}."

7. **CancelSubscription()**

- Cancels subscription immediately
- Send notification: "Your {PlanName} subscription has been canceled. You won't be billed next month."

8. **UpgradeSubscription()**

- Upgrades from monthly → yearly
 - Generates bill for extra amount due
 - User pays → Expiry date adjusted
 - Send notification: "You upgraded to Yearly {PlanName} plan! Paid extra \$X. New expiry: {ExpiryDate}."
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Rules / Notes

- **Must apply SOLID + KISS + DRY + YAGNI if applicable**
- **We have just provided you abstraction, do fix the function parameters and other corner cases.**
- **No need to submit this.**