3. Business Logic & Calculation Rules

The insurance calculator should determine the final premium based on multiple explicit parameters, which vary by insurance type. The formula considers:

1. **Base premium percentage** based on the **insurance category**.
2. **Sum insured brackets** that determine the applicable percentage.
3. **Risk factors** (e.g., driver age, location, medical history).
4. **Discounts & surcharges** (e.g., no-claim bonus, high-risk penalties).
5. **Optional add-ons & deductibles** (which modify the premium).
6. **Payment frequency** (monthly, quarterly, yearly).

3.1. Common Formula for Premium Calculation

Premium = (Sum Insured × Base Percentage Rate) + Risk Surcharge – Discounts + Add-ons

3.2. Insurance Categories & Explicit Parameters

Each insurance category has different parameters that influence the premium.

3.2.1. Vehicle Insurance

Explicit Parameters Considered:

- **Sum insured** (vehicle value).

- **Vehicle type** (car, motorcycle, truck, electric).

- **Driver's age & driving experience** (risk factor).

- **Location** (city vs. rural; high-crime vs. low-crime area).

- **Previous claims/no-claim bonus**.

- **Additional add-ons** (roadside assistance, theft protection).

Percentage-Based Premium Calculation:

Sum Insured	Car Premium Rate	Motorcycle Premium Rate	Truck Premium Rate	Electric Vehicle Rate
≤ $10,000	2.0%	2.5%	3.0%	1.8%
$10,001 - $50,000	1.8%	2.3%	2.7%	1.5%
> $50,000	1.5%	2.0%	2.5%	1.2%

Surcharges & Discounts:

Factor	Surcharge/Discount
Young Driver (≤ 25 years)	+10% surcharge
Senior Driver (≥ 65 years)	+8% surcharge
Installed Anti-Theft System	-5% discount

Optional Add-Ons & Their Costs:

Add-On	Additional Cost
Roadside Assistance	+$50 per year
Theft Protection	+5% of base premium
Accident Protection	+3% of base premium

3.2.2. Health Insurance

Explicit Parameters Considered:

- **Age group**.
- **Coverage type** (Basic, Standard, Premium).
- **Pre-existing conditions** (e.g., diabetes, heart disease).
- **Lifestyle choices** (smoking, gym membership).

Percentage-Based Premium Calculation:

Age Group	Basic Coverage	Standard Coverage	Premium Coverage
18-30	3.0%	4.5%	6.0%
31-50	3.5%	5.0%	6.5%
51+	4.0%	5.5%	7.0%

Surcharges & Discounts:

Factor	Surcharge/Discount
Smoker	+10% surcharge
Obese (BMI ≥ 30)	+8% surcharge
Active Gym Membership (≥ 1 year)	-5% discount
Pre-existing Condition (Diabetes, Heart Disease, etc.)	+12% surcharge

Optional Add-Ons & Their Costs:

Add-On	Additional Cost
Dental & Vision Coverage	+5% of base premium
Mental Health & Therapy Coverage	+3% of base premium
Critical Illness Coverage	+7% of base premium

3.2.3. Home Insurance

Explicit Parameters Considered:

- **Property type** (apartment, house, villa).

- **Location risk level** (earthquake-prone, flood-prone, crime rate).

- **Security features** (fire alarm, gated community, CCTV).

- **Property value (sum insured).**

Percentage-Based Premium Calculation:

Property Value	Base Premium Rate	High-Risk Area Surcharge
≤ $50,000	0.5%	+20%
$50,001 - $200,000	0.4%	+15%
> $200,000	0.3%	+10%

Surcharges & Discounts:

Factor	Surcharge/Discount
High-Risk Area (Flood/Earthquake Zone)	+20% surcharge
Gated Community	-5% discount
Fire Alarm Installed	-3% discount
Smart Home Security System	-7% discount

Optional Add-Ons & Their Costs:

Add-On	Additional Cost
Natural Disaster Coverage	+10% of base premium
Home Appliance & Electronics Insurance	+4% of base premium

3.2.4. Life Insurance

Explicit Parameters Considered:

- **Age of policyholder**.

- **Term of policy** (10 years, 20 years, lifetime).

- **Health factors (smoker, BMI, pre-existing conditions).**

Percentage-Based Premium Calculation:

Age Group	10-Year Policy	20-Year Policy	Lifetime Policy
18-30	0.8%	1.2%	2.0%
31-50	1.0%	1.5%	2.5%
51+	1.5%	2.0%	3.5%

Surcharges & Discounts:

Factor	Surcharge/Discount
Non-Smoker	-10% discount
Obese (BMI ≥ 30)	+10% surcharge
Athlete (low BMI, active check-ups)	-5% discount

Optional Add-Ons & Their Costs:

Add-On	Additional Cost
Accidental Death Benefit	+10% of base premium
Terminal Illness Coverage	+5% of base premium

3.3. Summary

- **All calculations are percentage-based on the sum insured.**
- **Surcharges & discounts are dynamically applied.**
- **Optional add-ons allow customization.**

Examples for Common Formula for Premium Calculation

The general formula is:

Premium = (Sum Insured × Base Percentage Rate) + Risk Surcharge - Discounts + Add-ons

Example 1: Vehicle Insurance Calculation

Inputs:

- **Sum Insured:** $20,000
- **Base Percentage Rate:** 3%
- **Risk Surcharge:** 10% (applies due to young driver age)
- **Discounts:** 5% (No-Claim Bonus)
- **Add-ons:** $100 (Roadside assistance)

Calculation:

1. Base Premium: 20,000×0.03=60020,000 \times 0.03 = 60020,000×0.03=600
2. Risk Surcharge (10% of Base Premium): 600×0.10=60600 \times 0.10 = 60600×0.10=60

3. Discount (5% of Base Premium): $600 \times 0.05 = 30$

4. Add-ons: $100

Final Premium Calculation:

$600 + 60 - 30 + 100 = 730$

Final Premium: $730

Example 2: Health Insurance Calculation

Inputs:

- **Sum Insured:** $100,000
- **Base Percentage Rate:** 2%
- **Risk Surcharge:** 15% (Smoker)
- **Discounts:** 10% (Gym Membership Discount)
- **Add-ons:** $200 (Critical Illness Cover)

Calculation:

1. Base Premium: $100,000 \times 0.02 = 2,000$

2. Risk Surcharge (15% of Base Premium): $2,000 \times 0.15 = 300$

3. Discount (10% of Base Premium): $2,000 \times 0.10 = 200$

4. Add-ons: $200

Final Premium Calculation:

$2,000 + 300 - 200 + 200 = 2,300$

Final Premium: $2,300

User Stories for Insurance Calculator Website

1. As a User, I want to calculate my insurance premium

- **Given** I have selected an insurance type (e.g., Vehicle, Health, Home, Life)
- **When** I enter the required details (sum insured, age, risk factors, etc.)
- **Then** I should see the calculated premium amount based on the provided inputs

2. As a User, I want to compare different insurance plans

- **Given** I am viewing a calculated insurance premium
- **When** I modify the sum insured or risk factors
- **Then** I should see the updated premium and be able to compare different options

3. As a User, I want to apply discounts and add-ons

- **Given** I have selected an insurance plan
- **When** I choose applicable discounts (e.g., No-Claim Bonus, Gym Membership) or add-ons (e.g., Roadside Assistance, Critical Illness Cover)
- **Then** I should see how they impact my final premium

4. As a User, I want to view detailed premium breakdown

- **Given** I have calculated my insurance premium
- **When** I click on "View Breakdown"
- **Then** I should see how the base premium, risk surcharges, discounts, and add-ons contribute to the final price

5. As a User, I want to save my quote for future reference

- **Given** I have calculated an insurance premium
- **When** I choose to save the quote
- **Then** I should be able to retrieve it later from my user dashboard

6. As a User, I want to share my insurance quote with others

- **Given** I have generated an insurance premium calculation
- **When** I click on the "Share" button
- **Then** I should be able to email the quote or generate a shareable link

7. As a User, I want to purchase an insurance plan

- **Given** I have reviewed my insurance premium details
- **When** I click on "Proceed to Purchase"
- **Then** I should be guided through the checkout and payment process

Test Cases for Insurance Calculator Website

Test Case 1: Calculate Insurance Premium

- **Test ID:** TC001

- **Description:** Verify that the insurance premium is calculated correctly based on user inputs.

- **Preconditions:** User is on the insurance calculator page.

- **Steps:**

    1. Select an insurance type (e.g., Vehicle, Health, Home, Life).

    2. Enter the sum insured and other required details (e.g., age, risk factors).

    3. Click "Calculate Premium".

- **Expected Result:** The calculated premium amount is displayed correctly based on input values.

Test Case 2: Compare Different Insurance Plans

- **Test ID:** TC002

- **Description:** Verify that users can compare different premium calculations.

- **Preconditions:** User has already calculated a premium.

- **Steps:**

    1. Modify the sum insured.

    2. Modify risk factor details (e.g., driver age, smoking status).

    3. Click "Recalculate".

- **Expected Result:** The updated premium is displayed, allowing the user to compare different plans.

Test Case 3: Apply Discounts and Add-ons

- **Test ID:** TC003

- **Description:** Verify that users can apply discounts and add-ons, and they reflect correctly in the premium calculation.

- **Preconditions:** User is calculating an insurance premium.

- **Steps:**

    1. Select an insurance type and enter the required details.

2. Choose applicable discounts (e.g., No-Claim Bonus, Gym Membership).

3. Select add-ons (e.g., Roadside Assistance, Critical Illness Cover).

4. Click "Calculate Premium".

- **Expected Result:** Discounts and add-ons are correctly applied, and the final premium is updated accordingly.

Test Case 4: View Detailed Premium Breakdown

- **Test ID:** TC004

- **Description:** Verify that users can see a breakdown of their premium calculation.

- **Preconditions:** User has calculated an insurance premium.

- **Steps:**

    1. Click on "View Breakdown".

- **Expected Result:** A breakdown is displayed, showing the base premium, risk surcharges, discounts, and add-ons.

Test Case 5: Save Quote for Future Reference

- **Test ID:** TC005

- **Description:** Verify that users can save their insurance quote.

- **Preconditions:** User has calculated an insurance premium.

- **Steps:**

    1. Click "Save Quote".

    2. Log in if required.

    3. Navigate to "My Quotes" section.

- **Expected Result:** The saved quote appears in the "My Quotes" section with correct details.

Test Case 6: Share Insurance Quote

- **Test ID:** TC006

- **Description:** Verify that users can share their quote via email or a link.

- **Preconditions:** User has calculated an insurance premium.

- **Steps:**

  1. Click "Share Quote".

  2. Enter an email or generate a shareable link.

  3. Click "Send" or copy the link.

- **Expected Result:** The quote is successfully shared, and the recipient can view it.

Test Case 7: Purchase Insurance Plan

- **Test ID:** TC007

- **Description:** Verify that users can proceed with purchasing a selected plan.

- **Preconditions:** User has reviewed a calculated insurance premium.

- **Steps:**

  1. Click "Proceed to Purchase".

  2. Enter personal details and payment information.

  3. Complete the transaction.

- **Expected Result:** The purchase is successfully completed, and a confirmation message is displayed.