



Auto Insurance Decisions

Auto Insurance

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Problem Statement

Empire Auto Insurance needs to streamline its underwriting process while at the same time achieving more consistency in risk assessment and policy pricing. Currently, new applications can be submitted through several channels.

- Customers can fill out and submit applications online via the company's website.
- Applying in person with an insurance agent. The insurance agent gathers the necessary information from the applicant and submits the application using the company's legacy underwriting system.
- Applying through a car dealer when purchasing a car. The company provides a special dealer portal for this purpose, which is also a separate system. This system is antiquated and needs to be retired.

There are a number of weaknesses with the current application processes and systems:

- These systems are separate and distinct. Each has its own logic for determining eligibility, evaluating risk, and pricing. The most complete system is the legacy system, but it is very difficult to maintain, so some of its eligibility and pricing logic is out of date relative to the company's current policies. Most policies submitted via this system require some manual adjustment to pricing before a contract can be issued.
- The web application is easier to maintain, but it does not yet have all of the eligibility and pricing logic incorporated yet. Only the most straight-forward applications can be processed without manual review by underwriters for risk and pricing.
- The dealer portal is completely antiquated and so poorly designed that no one dares touch it. All applications received via this system are processed manually.

This situation has caused a number of business problems:

- No one trusts any of the systems. Underwriters review almost all applications manually. They all have their own risk tolerances and pricing preferences, which they maintain in their head, on paper, or in spreadsheets.
- Underwriting is very expensive because it is so labor intensive
- Even though the company issues risk and pricing policies quarterly, the company has discovered that its risk profile across policies issued is highly variable. Policy pricing is also highly-variable, and most disturbingly, does not properly reflect risk a significant percentage of the time.

- The turn-around time for new policies is painfully slow, far below the current industry average. This has serious implications for competitiveness.

Positioning Statement

The problems of pricing variability, risk variability, and slow policy turn-around times are caused by the inconsistent application of risk and pricing policies across the existing underwriting systems and the highly-manual underwriting process. This exposes the company to greater risk in its portfolio than it desires and for which it is under-compensated. It also exposes the company to competitive threat due to poor customer service relative to current industry standards. A better system and process will:

- Apply eligibility and pricing policies uniformly across all new applications
- Enable the company to update its underwriting policies quickly in response to competitive pressures, trends in risk factors, unforeseen events, etc.
- Enable a much higher percentage of new applications to be underwritten without the intervention of an underwriter.

The benefits to the company will include:

- Much faster application turn-around time and vastly improved customer service
- Lower underwriting costs due to reduced manual processing
- Reduced variability in pricing and risk across the portfolio, ultimately resulting in higher returns for the company

The diagram below shows how we have chosen to organize the use cases associated with the application and underwriting process. The decisions included in the process are our primary area of concern. The broader application and underwriting use cases are included for context.

Policy Proposal Decisions

These are the decisions that have been identified in the underwriting process.

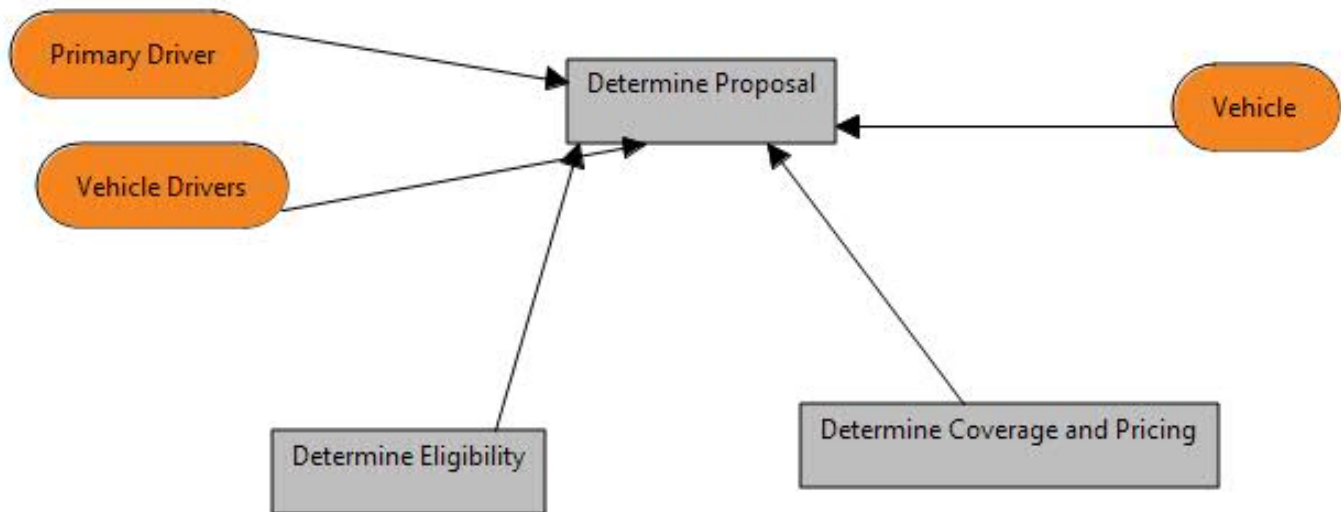


Diagram: Decision Requirements Diagram

Determine Proposal

Description:

Determine if the drivers and the vehicle to be insured are eligible for coverage. For an eligible application, determine the coverage limits for the insurance coverage requested and calculate the premiums. Eligibility and pricing are separate decisions, but for the current needs of the system, these decisions can be made together.

Question:

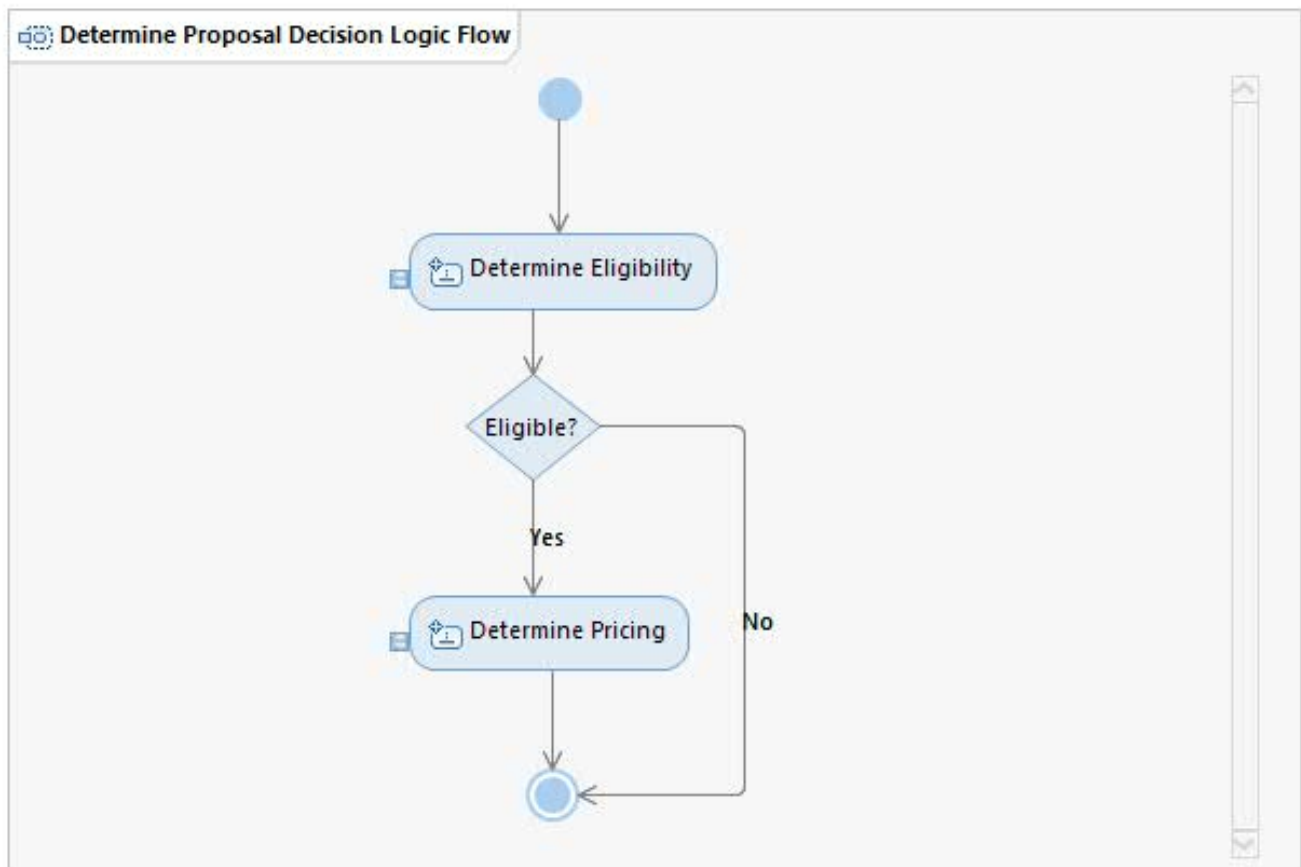
What automobile insurance coverage should be offered to the drivers of the given vehicle?

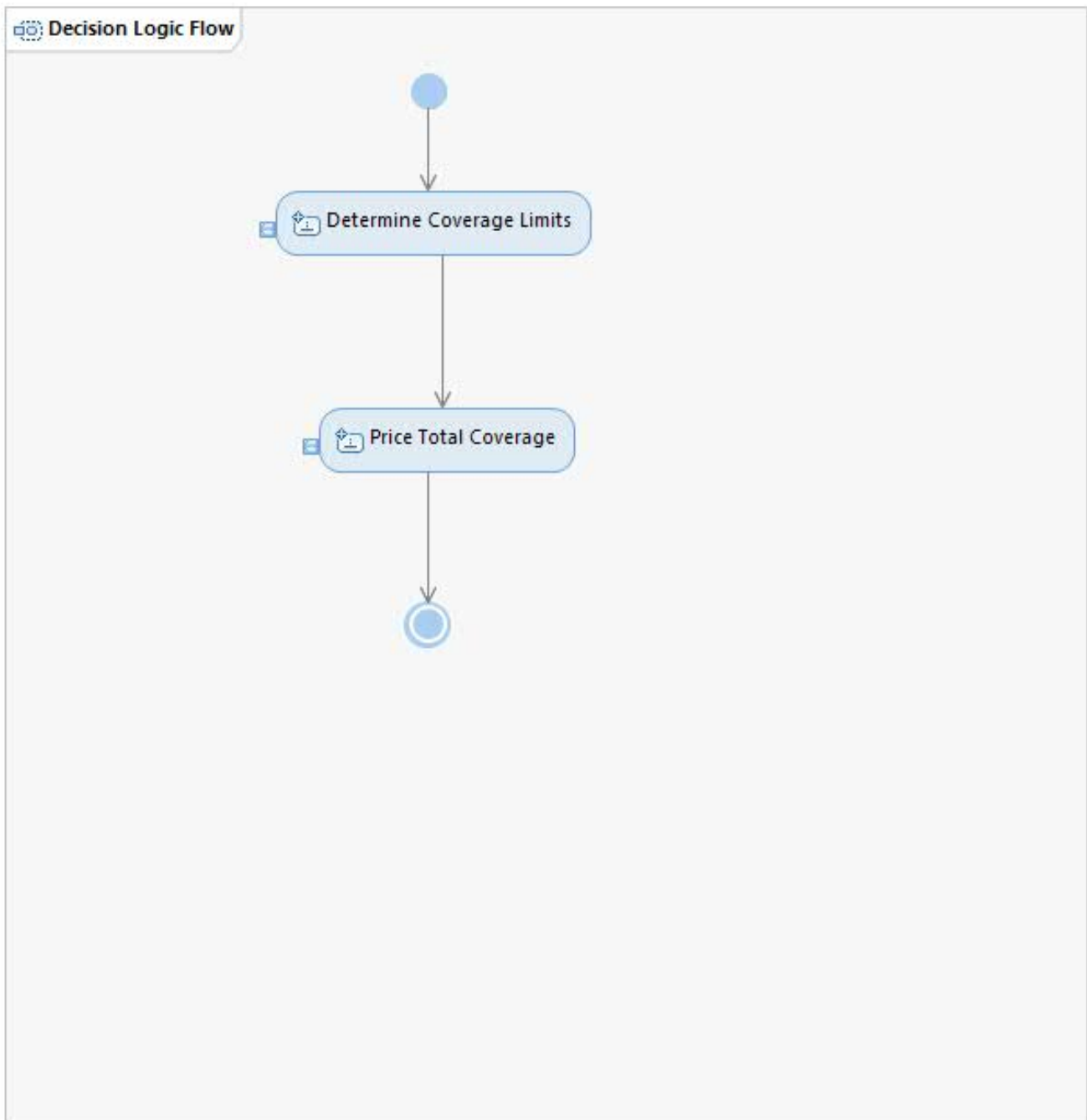
Allowed Answers:

If the applicants are ineligible for coverage, then no coverage should be offered. Otherwise, an insurance proposal which includes coverage limits and premiums is be offered.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	
Information Requirements From:	Determine Coverage and Pricing Determine Eligibility Primary Driver Vehicle Vehicle Drivers
Knowledge Requirements To:	
Knowledge Requirements From:	

Decision Activities





Insurance

Description:

The applicant specifies the coverage that is being request.

- The applicant can specify the types and amounts of coverage desired.
- The minimum coverage that must be provided is basic third-party coverage. The customer must specify the amount of coverage requested.
- The customer can request additional collision coverage. The customer must specify the amount of collision coverage requested.
- The customer can request coverage options. The customer most specify the amount of coverage requested for each of the desired options:
 - Theft
 - Fire and Vandalism
 - Bodily Injury
- The customer specifies the deductible the he or she is willing to pay.

Type:

AutoInsurance

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Determine Coverage and Pricing
Information Requirements From:	
Knowledge Requirements To:	
Knowledge Requirements From:	

Vehicle

Description:

The following information is available for the vehicle to be insured:

Make	
Model	
Year	
Classification	Compact, Full Size, Etc
Miles Driven Per Year	
Base Value	
Value of Accessories	
Horsepower	Class A through Class E
What do you use your vehicle for?	Personal, Business, Etc.
Ownership type	Lease, financed, owned
Number of airbags	
Vehicle capacity	
Maximum insured value requested	The maximum insurance coverage that the applicant is requesting.

Type:

Vehicle

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Determine Coverage Amounts Determine Proposal Third-Party Price Adjustments Vehicle Eligibility Young Primary Driver
Information Requirements From:	
Knowledge Requirements To:	
Knowledge Requirements From:	

Primary Driver**Description:**

One of the the vehicle drivers must be designated as the Primary Driver. In addition to the information available for every vehicle driver, the following information is available for the Primary Driver:

Marital Status	Single, Married, Divorced, Widow, Civil Partnership
Employment Status	Employed, Government, Homemaker, Retired, Student , Unemployed, Military
Where do you typically park your vehicle?	One the street, in a home garage, in a locked home ga rage.
Where is your parking located	Central City, Suburb, Rural

Type:

PrimaryDriver

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Determine Coverage and Pricing Determine Proposal Primary Driver Eligibility
Information Requirements From:	
Knowledge Requirements To:	
Knowledge Requirements From:	

Vehicle Drivers

Description:

Each of the authorized drivers for the car must include the following information

First Name	
Last Name	
Gender	Male, Female
Birth Date	
How long have you been driving?	total number of months

Type:

Driver

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Additional Premium for each Risky Driver Determine Proposal Driver Eligibility
Information Requirements From:	
Knowledge Requirements To:	
Knowledge Requirements From:	

02. Determine Eligibility

These are the decisions relating specifically to determining the eligibility of an applicant for underwriting.

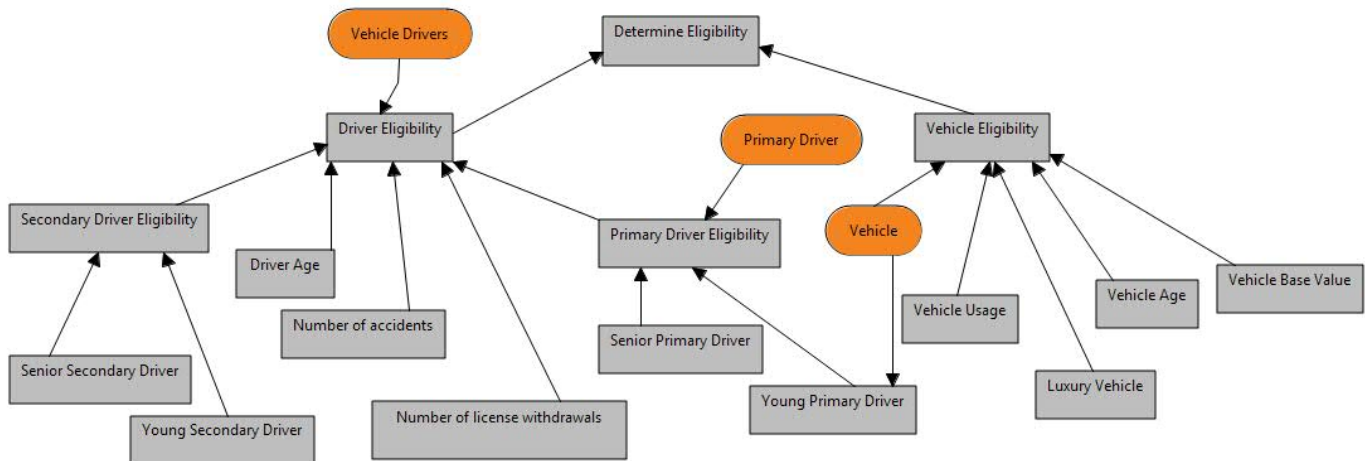


Diagram: Decision Requirements Diagram

Determine Eligibility

Description:

Evaluate the drivers and the vehicle to be insured to determine if an application is eligible for underwriting.

Question:

Is the application eligible for coverage?

Allowed Answers:

Eligible or Ineligible. If ineligible, include reason(s) for denial of coverage

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Determine Proposal
Information Requirements From:	Driver Eligibility Vehicle Eligibility
Knowledge Requirements To:	
Knowledge Requirements From:	

Driver Eligibility

Description:
Question:

Is each driver eligible for coverage?

Allowed Answers:

Eligible or Ineligible. If ineligible, report the reason.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Determine Eligibility
Information Requirements From:	Driver Age Number of accidents Number of license withdrawals Primary Driver Eligibility Secondary Driver Eligibility Vehicle Drivers
Knowledge Requirements To:	
Knowledge Requirements From:	

Driver Age

Description:

Drivers who are too young or too old are not eligible for coverage.

Question:

Is the driver eligible based on age?

Allowed Answers:

Eligible or Ineligible. If ineligible, report that the reason is based on age.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Driver Eligibility
Information Requirements From:	
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	Driver Age
Type:	LiteralExpression
Description:	<p>if the age of a driver (in years) at the start date of the proposed policy is not between 18 and 80 then refuse the application add a refusal reason to the application "At least one driver was did not meet the age requirements for insurance."</p>

Number of accidents

Description:

Drivers who have been involved in too many accidents are not eligible for coverage.

Question:

Should we reject the application based on the number of accidents that each driver has been involved in?

Allowed Answers:

Eligible or Ineligible. If ineligible, report that the reason is based on number of accidents

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Driver Eligibility
Information Requirements From:	
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	<i>Number of at-fault accidents</i>
Type:	LiteralExpression
Description:	<p>If there is at least one driver on the application that has had more than 2 at-fault accidents in the last five years then refuse the application add a refusal reason to the application "At least one driver has had too many at-fault accidents (2)."</p>
Expression:	<i>Total number of accidents</i>
Type:	LiteralExpression
Description:	<p>if a driver has been involved in more than 4 accidents then refuse the application add a refusal reason to the application "Driver " + the first name of 'the bad driver' + the last name of 'the bad driver' + "has had too many accidents"</p>

Number of license withdrawals

Description:
Question:

Is the application ineligible based on the number of times any driver has had a license withdrawn?

Allowed Answers:

Eligible or Ineligible. If ineligible, report that the reason is based on license withdrawals.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Driver Eligibility
Information Requirements From:	
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	<i>Too many license withdrawals</i>
Type:	LiteralExpression
Description:	<p>if a driver has more than one license withdrawal in the last five years</p> <p>then refuse the application add a refusal reason to the application "Driver " + the first name of 'the bad driver' + the last name of 'the bad driver' + "has had too many license withdrawals"</p>

Secondary Driver Eligibility

Description:
Question:

Is each secondary driver eligible for coverage?

Allowed Answers:

Eligible or Ineligible. If ineligible, report the reason.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Driver Eligibility
Information Requirements From:	Senior Secondary Driver Young Secondary Driver
Knowledge Requirements To:	
Knowledge Requirements From:	

Senior Secondary Driver

Description:

A senior driver is defined as a driver who is at least 65 years old.

Question:

Has any senior secondary driver been involved in too many accidents?

Allowed Answers:

Eligible or Ineligible. If ineligible, include the reason.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Secondary Driver Eligibility
Information Requirements From:	
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	Senior Secondary Driver - too many accidents
Type:	LiteralExpression
Description:	<p>if there is at least one secondary driver on the application where the age (in years) of this driver at the start date of 'the proposed policy' is at least 65 and this driver has been involved in more than three accidents then refuse the application add a refusal reason to the application "Risk too high - Number of accidents"</p>

Young Secondary Driver

Description:

A young driver is defined as a driver who is younger than 25 years old.

Question:

Has any young secondary driver been involved in too many accidents?

Allowed Answers:

Eligible or Ineligible. If ineligible, include the reason.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Secondary Driver Eligibility
Information Requirements From:	
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	<i>Young Secondary Driver - too many at-fault accidents</i>
Type:	LiteralExpression
Description:	<p>if there is at least one secondary driver on the application where the age (in years) of this driver at the start date of 'the proposed policy' 21 or younger and this driver was at-fault in more than 1 accident in the last five years then refuse the application add a refusal reason to the application "Risk too high - Number of at fault accidents"</p>

Primary Driver Eligibility

Description:
Question:

Is the primary driver eligible for coverage?

Allowed Answers:

Eligible or Ineligible. If ineligible, report the reason.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Driver Eligibility
Information Requirements From:	Primary Driver Senior Primary Driver Young Primary Driver
Knowledge Requirements To:	
Knowledge Requirements From:	

Senior Primary Driver

Description:
Question:

Is the senior primary driver eligible?

Allowed Answers:

Eligible, Ineligible, or Manual. If not eligible, include the reason.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Primary Driver Eligibility
Information Requirements From:	
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	Senior Primary Driver					
Type:	DecisionTable					
Description:	Driver Age Min	Driver Age Max	Number of Accidents	Number of at- fault Accidents	Status	Message
	65	70	> 3	-	Refused	Risk too High
	71	80	<= 3	<= 1	Manual	Borderline
	71	80	<= 3	> 1	Refused	Risk too high
	71	80	> 3	-	Refused	Risk too high

Young Primary Driver

Description:

Young drivers are drivers under 25 years old.

Question:

Is the primary driver eligible?

Allowed Answers:

Eligible, Ineligible, Manual. If not Eligible, provide a reason.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Primary Driver Eligibility
Information Requirements From:	Vehicle
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	Young Primary Driver							
Type:	DecisionTable							
Description:	Driver Age Min (inclusive)	Driver Age Max (exclusive)	Vehicle Horsepower class	Number of at-fault Accidents (last 5 years)	License Age (in months)	Number of license withdrawals	Status	Message
	-	21	Class D	<= 1	-	0	Manual	Borderline
	-	21	Class D	-	-	>= 1	Refused	Risk too high
	-	21	Class E	<= 1	-	-	Refused	Risk too high
	-	21	-	> 1	-	-	Refused	Risk too high
	21	25	Class D or Class E	-	<= 36	0	Manual	Borderline
	21	25	Class D or Class E	-	-	>= 1	Refused	Risk too high

Vehicle Eligibility**Description:****Question:**

Is the vehicle eligible for coverage?

Allowed Answers:

Eligible or Ineligible. If ineligible, report the reason.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Determine Eligibility
Information Requirements From:	Luxury Vehicle Vehicle Vehicle Age Vehicle Base Value Vehicle Usage
Knowledge Requirements To:	
Knowledge Requirements From:	

Vehicle Usage

Description:
Question:

Is the applicant eligible based on vehicle usage?

Allowed Answers:

Eligible or Ineligible. If ineligible, include reason

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Vehicle Eligibility
Information Requirements From:	
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	Vehicle Usage
Type:	LiteralExpression
Description:	if the usage of the vehicle is Commercial then refuse the application add a refusal reason to the application "This insurance policy does not cover commercial use"

Luxury Vehicle

Description:
Question:

Is the vehicle ineligible because it is a luxury vehicle?

Allowed Answers:

Eligible, or Ineligible. If ineligible, include the reason.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Vehicle Eligibility
Information Requirements From:	
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	<i>Luxury Vehicle</i>
Type:	LiteralExpression
Description:	<p>if the classification of 'the vehicle' is either High-end Luxury or Ultra-luxury then refuse the application add a refusal reason to the application "This insurance policy does not cover luxury vehicles"</p>

Vehicle Age

Description:
Question:

Is the vehicle ineligible because of its age?

Allowed Answers:

Eligible, or Ineligible. If ineligible, include the reason.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Vehicle Eligibility
Information Requirements From:	
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	Vehicle Age
Type:	LiteralExpression
Description:	if the vehicle is 40 years old or older at the start date of the proposed policy then refuse the application add a refusal reason to the application "This insurance policy does not cover vehicles over 40 years old"

Vehicle Base Value

Description:
Question:

Is the vehicle ineligible because its base value too high?

Allowed Answers:

Eligible, or Ineligible. If ineligible, include the reason.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Vehicle Eligibility
Information Requirements From:	
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	Vehicle Base Value
Type:	LiteralExpression
Description:	<p>if the base value of 'the vehicle' is more than 120000 then refuse the application add a refusal reason to the application "The base value of the vehicle is too high"</p>

03. Determine Coverage and Pricing

These are the decisions relating specifically to the coverage and pricing that should be proposed to the applicant.

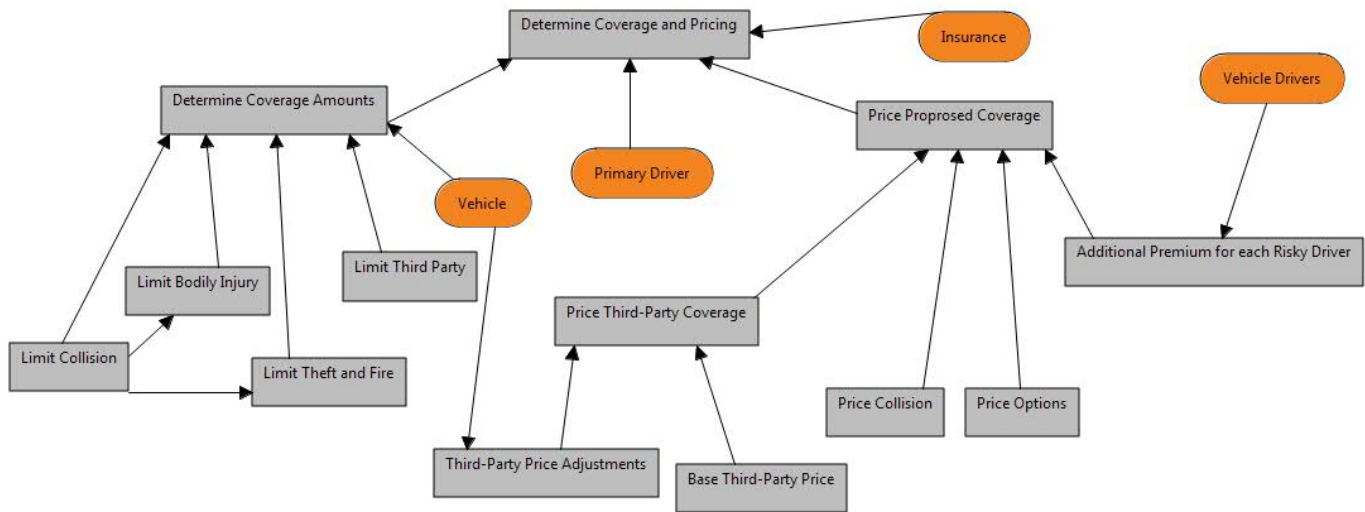


Diagram: Decision Requirements Diagram

Determine Coverage and Pricing

Description:

If an application is accepted, determine the amount of coverage to propose and the premiums for that coverage based on:

- The coverage requested by the applicant
- The minimum and maximum allowed coverage amounts for the coverage requested
- The premiums for the coverage proposed

Question:

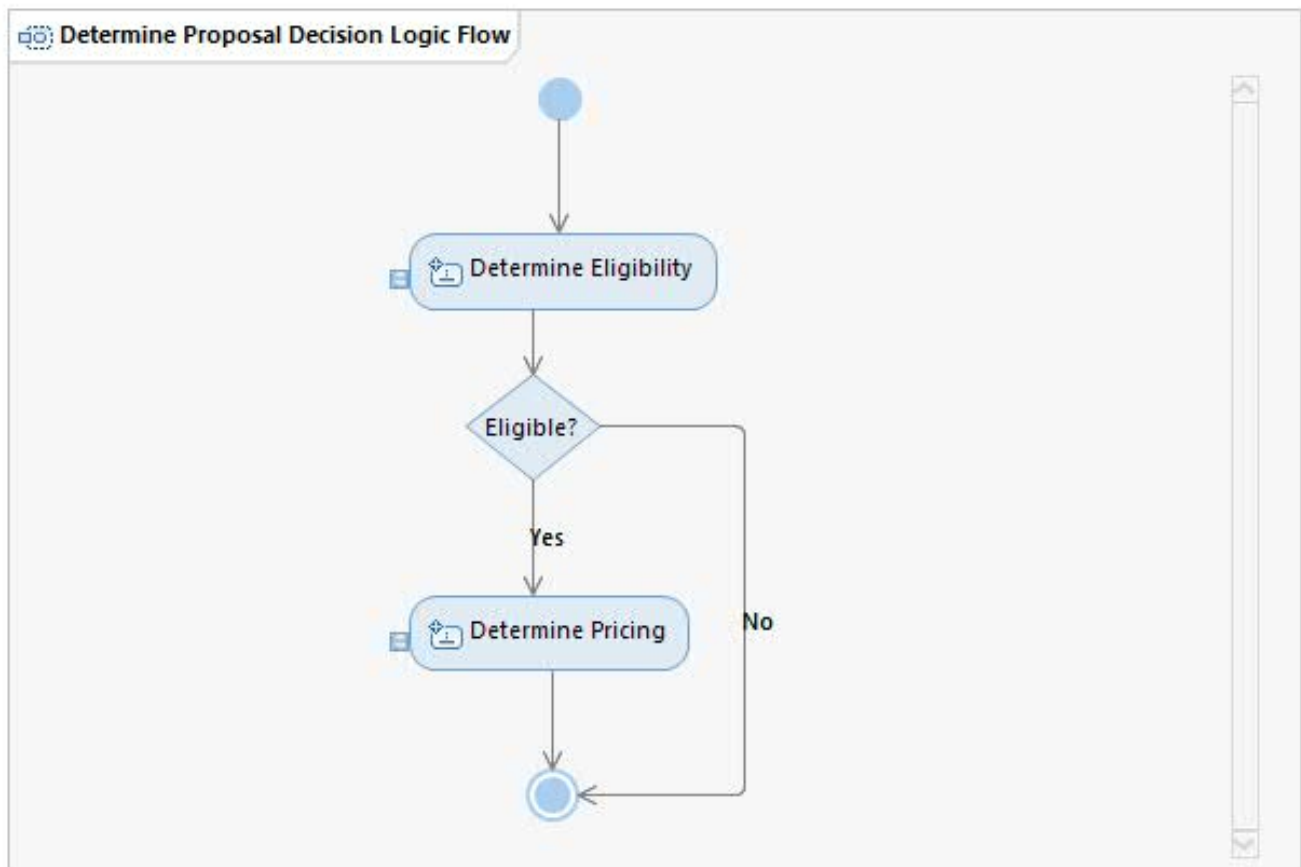
What insurance quote should be offered to the applicant?

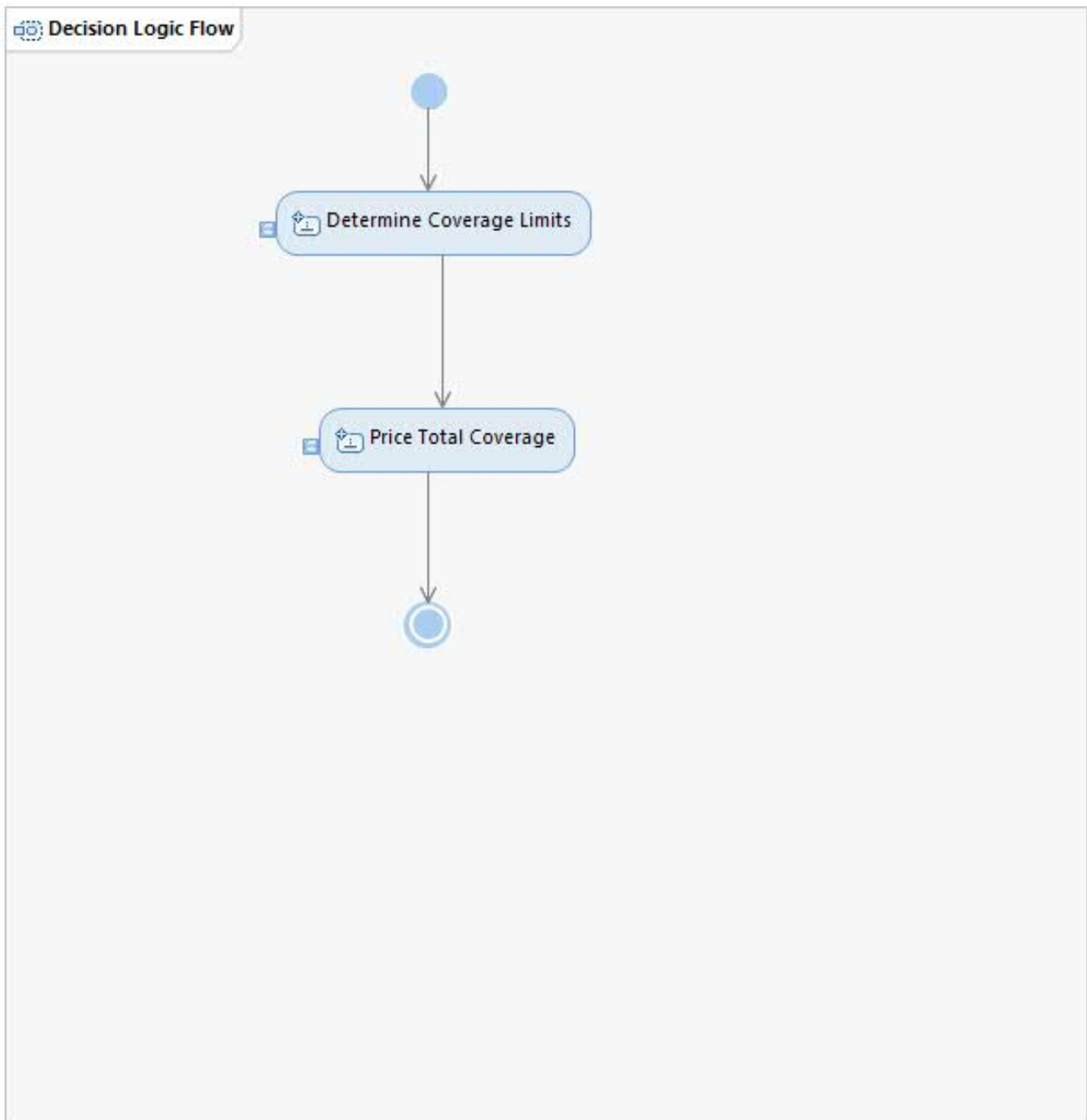
Allowed Answers:

An appropriate insurance quote, with coverage limits and premium cost.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Determine Proposal
Information Requirements From:	Determine Coverage Amounts Insurance Price Proposed Coverage Primary Driver
Knowledge Requirements To:	
Knowledge Requirements From:	

Decision Activities





Determine Coverage Amounts

Description:

Question:

What are the limits of Coverage for the applicant?

Allowed Answers:

If necessary requested coverage amounts are adjusted to fall within limits.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Determine Coverage and Pricing
Information Requirements From:	Limit Bodily Injury Limit Collision Limit Theft and Fire Limit Third Party Vehicle
Knowledge Requirements To:	
Knowledge Requirements From:	

Limit Collision

Description:
Question:

How much Collision coverage should be offered?

Allowed Answers:

An amount of coverage, in U.S. dollars. The amount should be the amount requested on the application, unless that amount falls outside of the range of allowed values.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Determine Coverage Amounts Limit Bodily Injury Limit Theft and Fire
Information Requirements From:	
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	<i>Requested Collision Coverage Exceeds Maximum</i>
Type:	LiteralExpression
Description:	if requested collision coverage amount of the application is more than 125000 then set the max collision coverage amount of the proposed collision policy to 125000;
Expression:	<i>Requested Collision Coverage Exceeds Total Insured Value</i>
Type:	LiteralExpression
Description:	if the requested collision coverage amount of the application is more than the max insurable value of the vehicle then set the max collision coverage amount of the proposed collision policy to the max insurable value of the vehicle
Expression:	<i>Requested Collision Coverage Less than Minimum</i>
Type:	LiteralExpression
Description:	if requested collision coverage amount of the application is less than 2500 then set the minimum collision coverage amount of the proposed collision policy to 2500;
Expression:	<i>Requested Collision Coverage Within Limits</i>
Type:	LiteralExpression
Description:	if the requested collision coverage amount of 'the application' is between 2500 and 125000 then set the max collision coverage amount of the proposed collision policy to the requested collision coverage amount of the application

Limit Bodily Injury**Description:**

Question:

How much Bodily Injury coverage should be offered?

Allowed Answers:

An amount of coverage, in U.S. dollars. The amount should be the amount requested on the application, unless that amount falls outside of the range of allowed values.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Determine Coverage Amounts
Information Requirements From:	Limit Collision
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	<i>Requested Bodily Injury Coverage Exceeds Maximum</i>
Type:	LiteralExpression
Description:	<p>if the requested max liability of the bodily injury option of the application is more than 5 * the max collision coverage amount of the proposal then set the max liability of the proposed bodily injury option to 5 * the max collision coverage amount of the proposal</p>
Expression:	<i>Requested Bodily Injury Coverage Less than Minimum</i>
Type:	LiteralExpression
Description:	<p>if the requested max liability of the bodily injury option of the application is less than 2 * the collision deductible amount of the application then set the max liability of the proposed bodily injury option to 2 * the collision deductible amount of the application</p>
Expression:	<i>Requested Bodily Injury Coverage Within Limits</i>
Type:	LiteralExpression
Description:	<p>if the requested max liability of the bodily injury option of the application is between 2 * the collision deductible amount of the application and 5 * the max collision coverage amount of the proposal then set the max liability of the proposed bodily injury option to the requested max liability of the bodily injury option of the application</p>

Limit Theft and Fire

Description:**Question:**

How much Theft and Fire coverage should be offered?

Allowed Answers:

An amount of coverage, in U.S. dollars. The amount should be the amount requested on the application, unless that amount falls outside of the range of allowed values.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Determine Coverage Amounts
Information Requirements From:	Limit Collision
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	<i>Requested Theft and Fire Coverage Exceeds Maximum</i>
Type:	LiteralExpression
Description:	if the requested max liability of the theft and fire option of the application is more than the max collision coverage amount of the proposal then set the max liability of the proposed fire and theft option to the max collision coverage amount of the proposal
Expression:	<i>Requested Theft and Fire Coverage Less than Minimum</i>
Type:	LiteralExpression
Description:	if the requested max liability of the theft and fire option of the application is less than 2 * the collision deductible amount of the application then set the max liability of the proposed fire and theft option to 2 * the collision deductible amount of the application
Expression:	<i>Requested Theft and Fire Coverage Within Limits</i>
Type:	LiteralExpression
Description:	if the requested max liability of the theft and fire option of the application is between 2 * the collision deductible amount of the application and the max collision coverage amount of the proposal then set the max liability of the proposed fire and theft option to the requested max liability of the fire and theft option of the application

Limit Third Party

Description:**Question:**

How much Third Party coverage should be offered?

Allowed Answers:

An amount of coverage, in U.S. dollars. The amount should be the amount requested on the application, unless that amount falls outside of the range of allowed values.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Determine Coverage Amounts
Information Requirements From:	
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	<i>Requested Third Party Coverage Exceeds Maximum</i>
Type:	LiteralExpression
Description:	if the requested third party liability amount of the application is more than 200000 then set the max third party liability amount of the proposed policy to 200000
Expression:	<i>Requested Third Party Coverage Less than Minimum</i>
Type:	LiteralExpression
Description:	if the requested third party liability amount of the application is less than 5000 then set the max third party liability amount of the proposed policy to 5000
Expression:	<i>Requested Third Party Coverage Within Limits</i>
Type:	LiteralExpression
Description:	if the requested third party liability amount of the application is between 5000 and 200000 then set the max third party liability amount of the proposed policy to the requested third party liability amount of the application

Price Proposed Coverage

Description:
Question:

What is the price of the proposed coverage?

Allowed Answers:

A premium amount, in U.S. dollars.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Determine Coverage and Pricing
Information Requirements From:	Additional Premium for each Risky Driver Price Collision Price Options Price Third-Party Coverage
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	<i>Include Collision in Coverage Premium</i>
Type:	LiteralExpression
Description:	if the type of the proposed policy is collision then add the collision price before tax to the price before tax of the policy.
Expression:	<i>Include Option prices in Coverage Premium</i>
Type:	LiteralExpression
Description:	for each priced option: then add the price before tax of the priced option to the price before tax of the policy.
Expression:	<i>Include Third Party Price in Premium</i>
Type:	LiteralExpression
Description:	then add the third party price before tax to the price before tax of the policy.

Price Third-Party Coverage

Description:**Question:**

What is the price of the third-party coverage?

Allowed Answers:

A premium amount, before tax, in U.S. dollars.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Price Proposed Coverage
Information Requirements From:	Base Third-Party Price Third-Party Price Adjustments
Knowledge Requirements To:	
Knowledge Requirements From:	

Base Third-Party Price

Description:

Question:

What is the base price of third-party coverage?

Allowed Answers:

The base premium price, before tax, in U.S. dollars.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Price Third-Party Coverage
Information Requirements From:	
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	Base Third-Party Price			
Type:	DecisionTable			
Description:	Min Third-Party Liability Amount (inclusive)	Max Third-Party Liability Amount (exclusive)	Base Price	Variable Rate
	\$5000	\$10000	\$50	0
	\$10000	\$20000	\$0	.005
	\$20000	-	\$80	.001
	<p>In this decision table, the total Collision price is given by: $\text{Base Price} + (\text{Third-Party Liability Amount} * \text{Variable Rate})$</p>			

Third-Party Price Adjustments

Description:

There are several types of adjustments here, and many are expected to apply to a given applicant. The final effect of all adjustments that apply is the product of the individual adjustments. For example, if 2 different adjustments are applied, 1 at +60% and another at -4%, the final adjustment would be $1.6 * 0.96 = 1.536$ (or +53.6%).

Question:

What adjustments should be applied to the base third-party price based on vehicle and driver attributes?

Allowed Answers:

the adjustment, as a percentage of the base price.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Price Third-Party Coverage
Information Requirements From:	Vehicle
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	<i>Apply Airbag Factor</i>
Type:	LiteralExpression
Description:	If the vehicle has at least 1 airbag then apply a 2% discount to the base third-party price

Expression:	<i>Apply Garage Location Factor - Female</i>			
Type:	DecisionTable			
Description:	Primary Driver Minimum Age	Primary Driver Maximum Age (exclusive)	Garage Location Type	Adjust the Third- Party Price By
	-	21	Suburb	+60%
	-	21	Central City	+70%
	-	21	Rural	+40%
	21	28	Suburb	+20%
	21	28	Central City	+20%
	21	28	Rural	+10%
	28	55	Rural	-5%
	55	65	Suburb	+10%
	55	65	Central City	+10%
	65	-	Suburb	+50%
	65	-	Central City	+60%
	65	-	Rural	+40%
	If the primary driver is Female			

Expressions:

Expression:	Apply Gargage Location Factor - Male			
Type:	DecisionTable			
Description:	Primary Driver Minimum Age	Primary Driver Maximum Age (exlusive)	Garage Location Type	Adjust the Third-Party Price by
	-	21	Suburb	+180%
	-	21	Central City	+185%
	-	21	Rural	+140%
	21	28	Suburb	+180%
	21	28	Central City	+170%
	21	28	Rural	+150%
	28	55	Suburb	+170%
	28	55	Central City	+170%
	28	55	Rural	+150%
	55	65	Suburb	+160%
	55	65	Central City	+150%
	55	65	Rural	+150%
	65	-	Suburb	+95%
	65	-	Central City	+100%
	65	-	Rural	+80%
	If the primary driver is Male			

Expression:	Apply Horsepower Factor	
Type:	DecisionTable	
Description:	Vehicle Horsepower Class	Adjust Third-Party Price by
	Class A	+2%
	Class C	+1%
	Class D	+4%
	Class E	+8%

Expressions:

Expression:	Apply Marital Status Factor	
Type:	DecisionTable	
Description:	Primary Driver Marital Status	Adjust Third-Party Price by
	Civil Partnership	-3%
	Married	-3%
	Single	+5%
	Widow	-5%
Expression:	Apply Nmbr Accidents Factor	
Type:	DecisionTable	
Description:	Primary Driver Number of Accidents	Adjust Third-Party Price by
	0	-
	1	+4%
	2	+9%
	3	+19%
	>= 4	+28%
Expression:	Apply Nmbr At-Fault Accidents Factor	
Type:	DecisionTable	
Description:	Primary Driver Number of at-fault Accidents	Adjust Third-Party Price by
	0	-
	1	+10%
	>= 2	+30%

Expressions:

Expression:	Apply Occupation Factor		
Type:	DecisionTable		
Description:	Primary Driver Occupation		Adjust Third-Party Price by
	Unemployed		+5%
	Government		-5%
	Homemaker		-
	Military		-5%
	Retired		-10%
	Student		+10%
Expression:	Apply Vehicle Miles Per Year Factor		
Type:	DecisionTable		
Description:	Min Miles Per Year	Max Miles Per Year (exclusive)	Adjust Third-Party Price by
	-	4000	-40%
	4000	8000	-20%
	15000	25000	+20%
	25000	-	+25%
Expression:	Apply Vehicle Usage Factor		
Type:	DecisionTable		
Description:	Vehicle Usage Type		Adjust Third-Party Price by
	Business		+8%
	Personal		-4%

Price Collision

Description:
Question:

What is the premium for collision coverage?

Allowed Answers:

The premium price, before tax, in U.S. dollars

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Price Proposed Coverage
Information Requirements From:	
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	Expression																			
Type:	DecisionTable																			
Description:	<table><tr><th>Collision Coverage Min Amount</th><th>Collision Coverage Max Amount (exclusive)</th><th>Base Price</th><th>Variable Rate</th></tr><tr><td>-</td><td>\$10000</td><td>\$100</td><td>0</td></tr><tr><td>\$10000</td><td>\$20000</td><td>\$100</td><td>.005</td></tr><tr><td>\$20000</td><td>-</td><td>\$80</td><td>.001</td></tr></table>				Collision Coverage Min Amount	Collision Coverage Max Amount (exclusive)	Base Price	Variable Rate	-	\$10000	\$100	0	\$10000	\$20000	\$100	.005	\$20000	-	\$80	.001
	Collision Coverage Min Amount	Collision Coverage Max Amount (exclusive)	Base Price	Variable Rate																
	-	\$10000	\$100	0																
	\$10000	\$20000	\$100	.005																
	\$20000	-	\$80	.001																
In this decision table, the total Collision price is given by:																				
Base Price + (Coverage Amount - Deductible Amount) * Variable Rate																				

Price Options

Description:

Question:

What is the premium price for each type of optional coverage that the applicant has requested?

Allowed Answers:

The price before tax, in U.S. dollars.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Price Proposed Coverage
Information Requirements From:	
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	Price Options	
Type:	DecisionTable	
Description:		
	Option Type	Option Price
	BodilyInjury	.002 * Option Max Liability Amount
	FireAndVandalism	.005 * Option Max Liability Amount
	Theft	.01 * Option Max Liability Amount
This decision table applies to each option in the application. For each option, the premium price is expressed as some multiplier times the max liability requested for that option.		

Additional Premium for each Risky Driver

Description:
Question:

Should the price be increased based on risky secondary drivers?

Allowed Answers:

For each risky secondary driver, increase the third party coverage price.

Additional Details:	
Authority Requirements To:	
Authority Requirements From:	
Information Requirements To:	Price Proposed Coverage
Information Requirements From:	Vehicle Drivers
Knowledge Requirements To:	
Knowledge Requirements From:	

Expressions:

Expression:	<i>Risky Co-Drivers</i>
Type:	LiteralExpression
Description:	for each secondary driver if the number of at-fault accidents in the last five years of the secondary driver is at least 1 or the number license withdrawals of each driver is at least 1 then add \$20 to the total price before tax of the proposed policy