



ĐẠI HỌC BÁCH KHOA HÀ NỘI

**BÁO CÁO GIỮA KỲ
MÔN CƠ SỞ DỮ LIỆU
ĐỀ TÀI: BẢO HIỂM**

**GIÁO VIÊN HƯỚNG DẪN:
NGUYỄN DANH TÚ**



NHÓM 15





THÀNH VIÊN CỦA NHÓM 15



HỌ VÀ TÊN

Nguyễn Long Dương

Trương Khắc Nam

Trần Thị Hồng Ngọc

Nguyễn Trung Nguyên

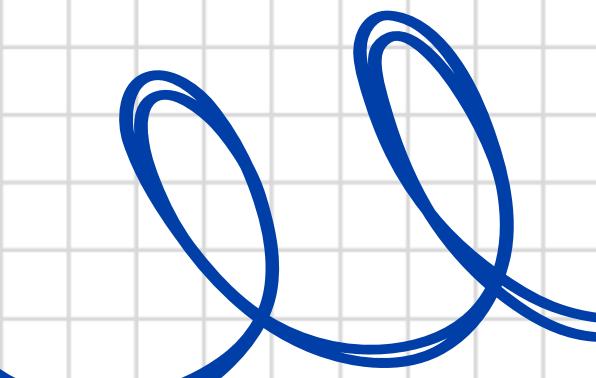
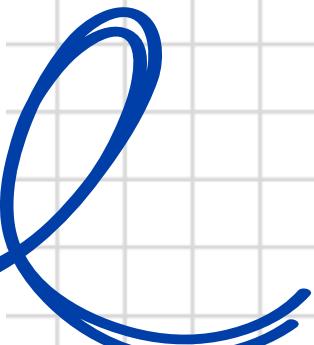
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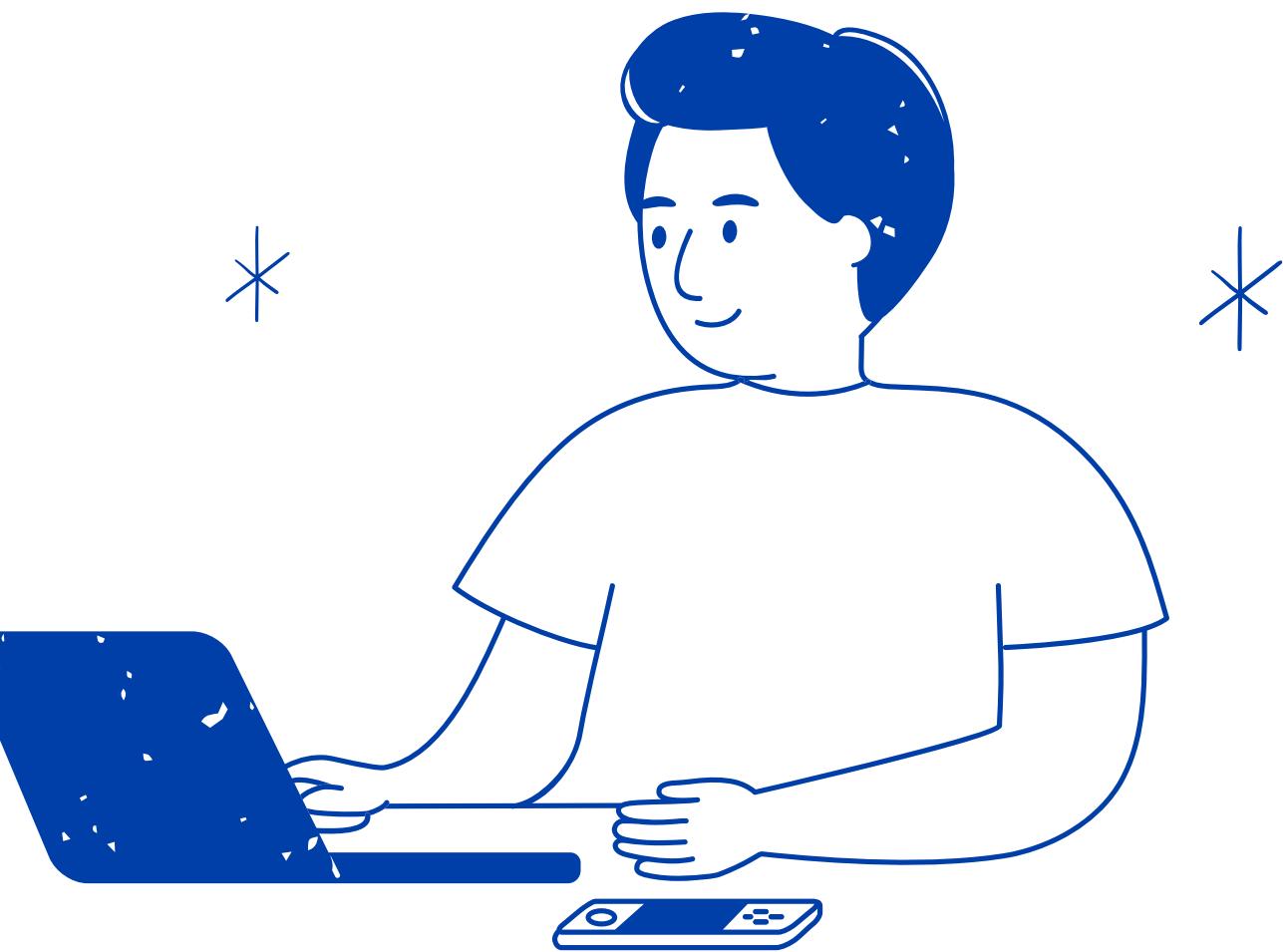
MỤC LỤC

- 1. GIỚI THIỆU CHỦ ĐỀ**
- 2. THÔNG TIN VỀ CƠ SỞ DỮ LIỆU**
- 3. TRUY VẤN DỮ LIỆU**
- 4. CẬP NHẬT DỮ LIỆU**
- 5. CẢI TIẾN CSDL**
- 6. TỔNG KẾT**



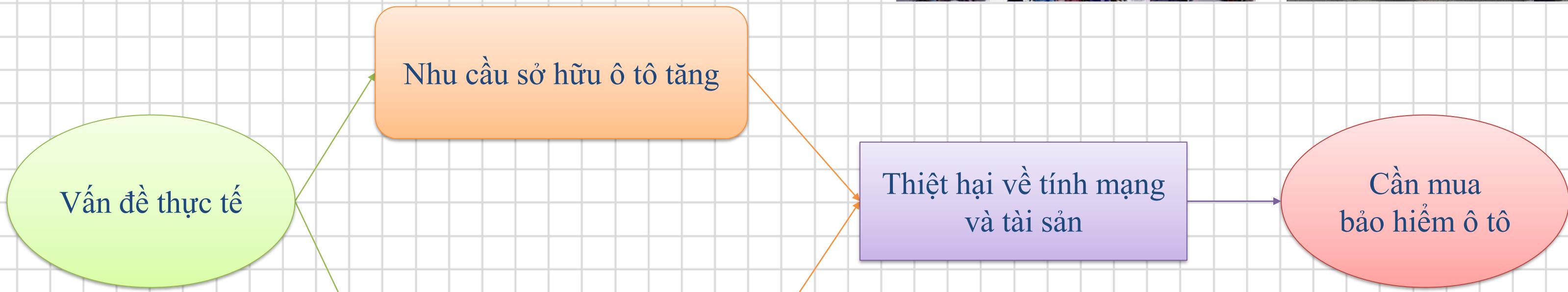
1. GIỚI THIỆU CHỦ ĐỀ

- Bài toán thực tế về bảo hiểm ô tô
- Mô tả bài toán
- Các chức năng trong chương trình ứng dụng



1. GIỚI THIỆU CHỦ ĐỀ

➤ Bài toán thực tế về bảo hiểm ô tô:



Sample Certificate of Insurance (COI)

The COI must meet ALL mandatory requirements shown in red to exhibit at an Esri event.

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERES NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(es) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsements.

CONTACT	PHONE	FAX
PRODUCER	NAME	(Ex. No.)
INSURER A	NAME	
INSURER B	NAME	
INSURER C	NAME	
INSURER D	NAME	
INSURER E	NAME	

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

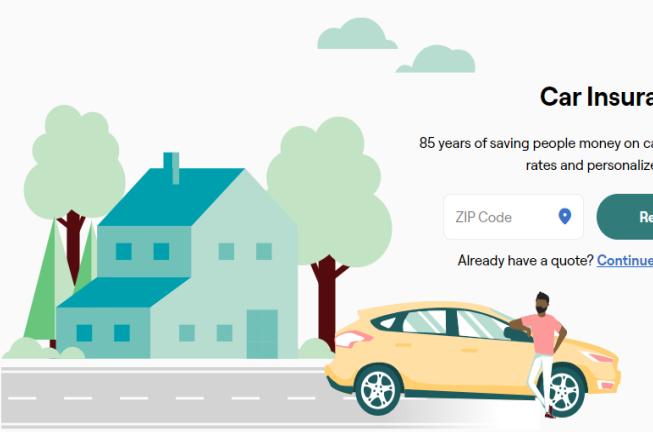
THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE OF INSURANCE IS ISSUED, THE POLICIES LISTED HEREIN ARE SUBJECT TO THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAY CLAIMS.

INSURER	TYPE OF INSURANCE	EXPIRATION DATE	POLICY NUMBER	POLICY EXP. DATE	LIMITS
GENERAL LIABILITY	GENERAL LIABILITY	Policy start date after event end date		Policy end date	EACH OCCURRENCE \$ DAMAGES TO PERSON \$ DAMAGES TO PROPERTY \$ MEDEXP (Per person) PERSONAL INJURY INSUR. \$ GENERAL AGGREGATE \$ PROJECTS - COMPASS \$ \$ COMBINED SINGLE LIMIT \$ BODY INJURY (Per person) \$ BODY INJURY (Per accident) \$ PROPERTY DAMAGE \$ The above \$
	CLAIMS-MADE <input type="checkbox"/> OCCUR				
	Broad Form Property Damage				
	Blanket Contractual				
	GENL AGGRGATE LIMIT APPLIES PER: POLICY LOC <input type="checkbox"/> LOC				
	AUTOMOBILE LIABILITY				
	ALL OWNED AUTOS <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> AUTO-OWNED AUTOS				
	EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE				
	UMBRELLA LIAB <input type="checkbox"/> OCCUR				
	EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE				
WORKERS COMPENSATION AND EMPLOYER LIABILITY	Y/N	N/A			EXHAUSENCE \$ AGGREGATE \$ \$ INC STATE / CTN EX. STAND. \$ EL. HAZACCIDENT \$ EL. DISEASE - EA EMPLOYEE \$ EL. DISEASE - POLICY LIMIT \$
ANNUAL POLICY PERIOD	DESCRIPTION OF OPERATIONS below				

GEICO

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Progressive	★★★★★	\$\$/mo
Nationwide	★★★★★	\$\$/mo
Liberty Mutual	★★★★★	\$\$/mo
Allstate	★★★★★	\$\$/mo
Travelers	★★★★★	\$\$/mo

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By Kristine Lee ①
Updated June 26, 2023

Reviewed By Mark Friedlander ①
Edited By Susan Meyer ①

How to get cheap auto insurance online

Most auto insurance policies could be described as "same day," "instant" or "free." You can shop around for car insurance online and buy it when you're at the dealership — all in one day and free of charge.

What can take time is finding auto insurance within your budget right when you need it. That's where The Zebra comes in. Our online app only requires one quick form to see your options from big and little companies across the US. You can sort by price or by coverage level to find the right car.

1.GIỚI THIỆU CHỦ ĐỀ

Mô tả bài toán:

❖ Xét các yêu cầu cho 1 cơ sở dữ liệu của một công ty Bảo hiểm ô tô dùng để lưu giữ thông tin chính sách như sau :

- Mỗi chính sách bảo hiểm (Policy) sẽ được đánh 1 số riêng, có ngày kích hoạt, ngày hết hạn chính sách, chi phí, phương thức thanh toán và 1 mã ID riêng. Mỗi chính sách có thể có nhiều phương tiện và tài xế nhưng mỗi tài xế và phương tiện chỉ thuộc về một chính sách.
- Mỗi phương tiện có ID phương tiện, hãng sản xuất, mẫu xe, màu sắc, kiểu dáng, năm sản xuất, mức độ sử dụng, ...
- Mỗi tài xế sẽ có mã tài xế, bao gồm các thông tin cá nhân như: Họ tên, ngày sinh, giới tính, SĐT, email, số bảo hiểm xã hội (SSN), số giấy phép lái xe, ngày cấp giấy phép, khu vực cấp giấy phép, mối quan hệ với chủ sở hữu xe...
- Mỗi địa chỉ chứa địa chỉ nhà và địa chỉ gửi thư của người lái xe. Một người lái xe có thể có nhiều địa chỉ nhưng một địa chỉ chỉ thuộc về một người lái xe.
- Các vi phạm giao thông đều chứa mã vi phạm giao thông, bao gồm thông tin về vi phạm, mức phạt, mô tả về vi phạm ...
- Mỗi loại phạm vi bảo hiểm có mã ID riêng, dùng để xác định xem bảo hiểm áp dụng cho chính sách hay cho phương tiện.
- Mỗi hóa đơn có mã ID riêng, chứa thông tin về hóa đơn bảo hiểm, bao gồm: số hóa đơn, ngày tạo hóa đơn, số tiền, ... Mỗi chính sách có thể có nhiều hóa đơn, nhưng một hóa đơn chỉ thuộc về duy nhất một chính sách.
- Mỗi thanh toán có ID thanh toán riêng, thông tin người thanh toán chứa các thông tin chi tiết thanh toán như: phương thức thanh toán, số thẻ, ngân hàng thanh toán, mã bưu chính, số tiền thanh toán, ...

1.GIỚI THIỆU CHỦ ĐỀ



➤ Các chức năng trong chương trình ứng dụng:

Người quản lý

- Quản lý thông tin chính sách
- Quản lý hồ sơ khách hàng
- Báo cáo và thống kê

Khách hàng

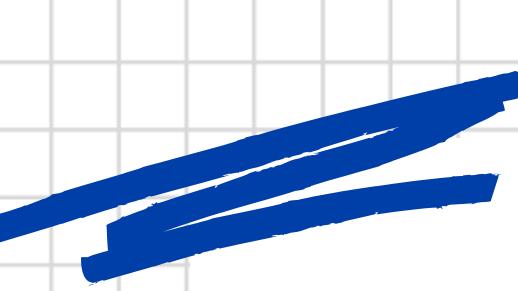
- Tính toán và báo giá chính sách
- Mua chính sách bảo hiểm
- Quản lý chính sách
- Yêu cầu đèn bù
- Hỗ trợ khách hàng



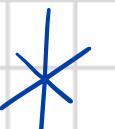
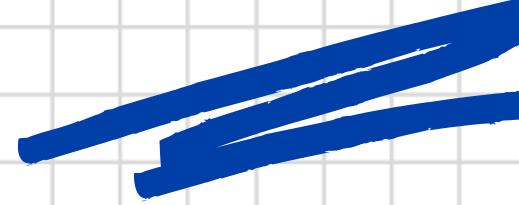
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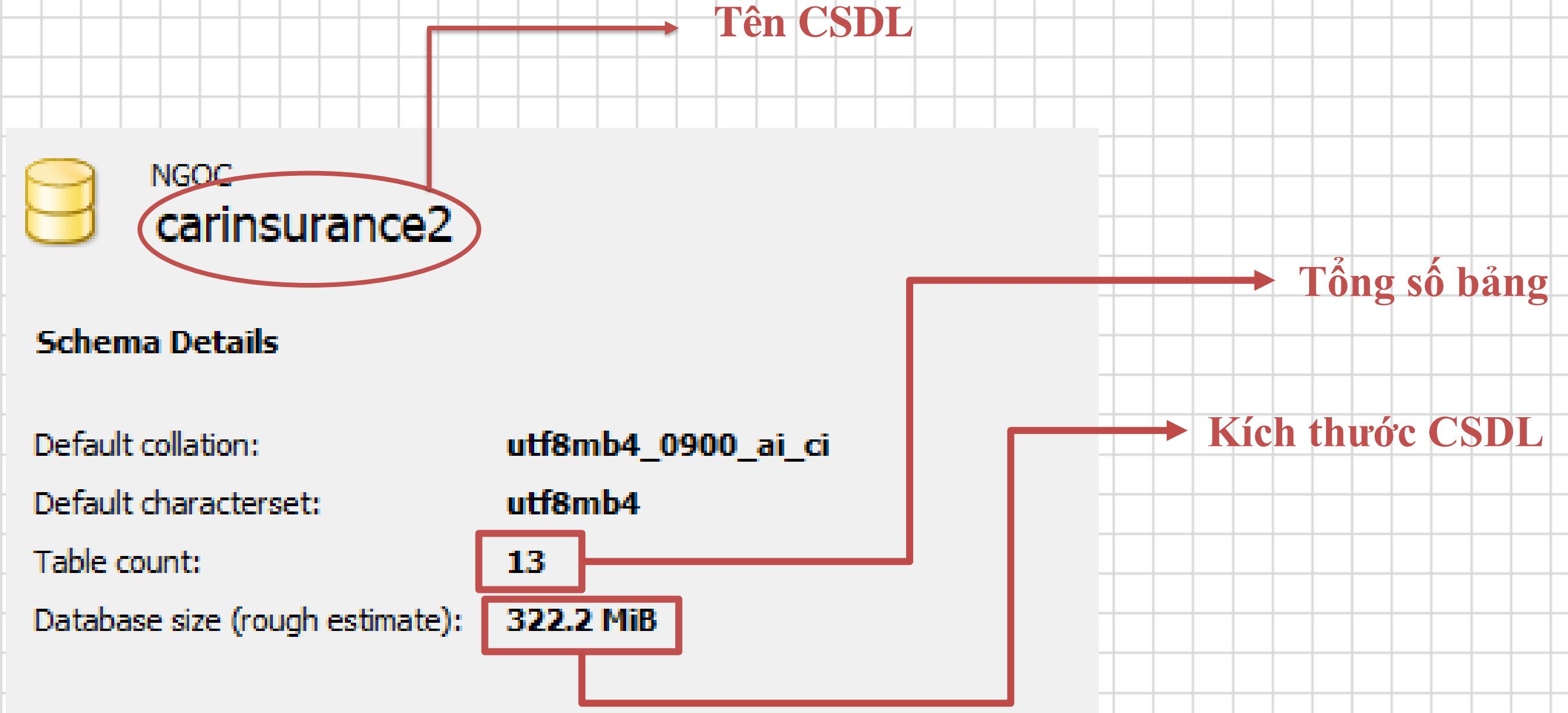


2. THÔNG TIN VỀ CSDL

- Thông tin chung về CSDL
 - Thông tin bản ghi
 - Thông tin chi tiết từng bảng
 - Lược đồ ER
 - Lược đồ RE
 - Diagram
 - Đánh giá mức độ chuẩn hóa
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2. THÔNG TIN VỀ CSDL

➤ Thông tin chung về CSDL:

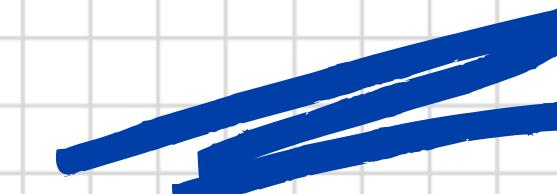


2. THÔNG TIN VỀ CSDL

➤ Thông tin bản ghi:

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coverage	InnoDB	10	Dynamic	135423	182	24690688	0	0	7340032	249501	2023-06-04 14:32:46	2023-06-04 23:28:13	NULL	utf8mb4_0900_ai_ci	NULL
driver	InnoDB	10	Dynamic	138142	193	26787840	0	3686400	5242880	NULL	2023-06-04 16:25:30	2023-06-04 21:09:36	NULL	utf8mb4_0900_ai_ci	NULL
driver_trafficViolation_record	InnoDB	10	Dynamic	150388	38	5783552	0	8421376	4194304	196745	2023-06-04 14:32:46	2023-06-04 22:49:52	NULL	utf8mb4_0900_ai_ci	NULL
driveraddress	InnoDB	10	Dynamic	279311	107	29949952	0	8929280	23068672	600098	2023-06-04 14:32:46	2023-06-04 21:24:28	NULL	utf8mb4_0900_ai_ci	NULL
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Tên các bảng

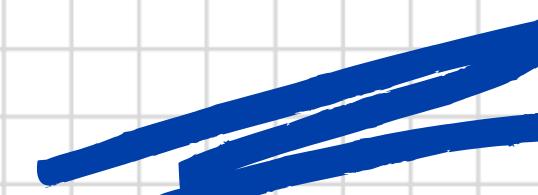


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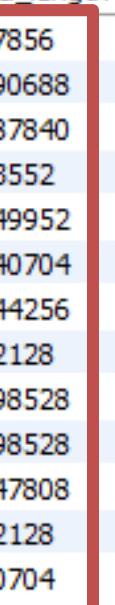
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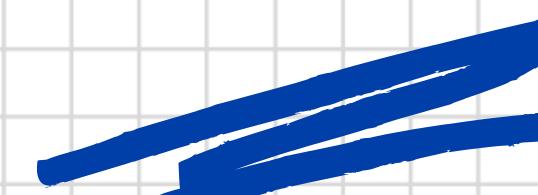
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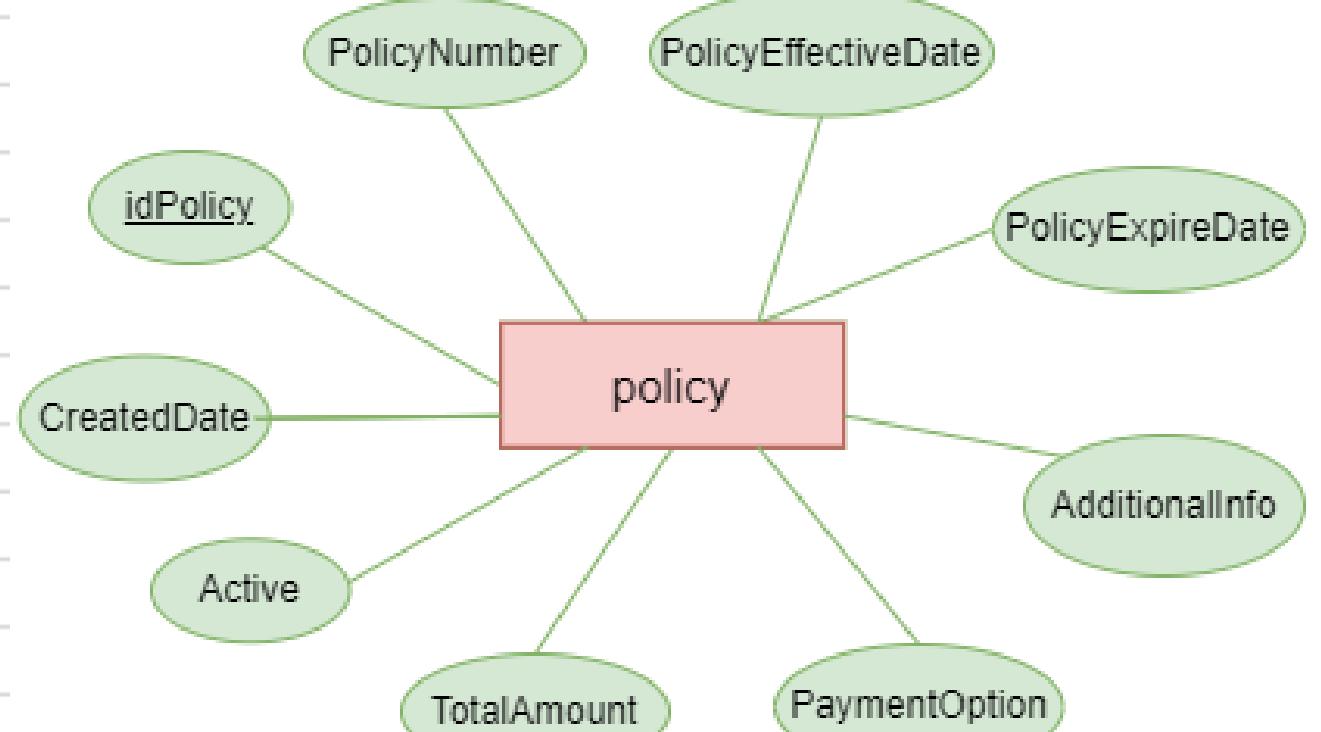
Kích thước dữ liệu từng bảng
(đơn vị byte)



2. THÔNG TIN VỀ CSDL

➤ Thông tin chi tiết từng bảng:

1. Bảng policy



Result Grid | Filter Rows: Export: Wrap Cell Content:

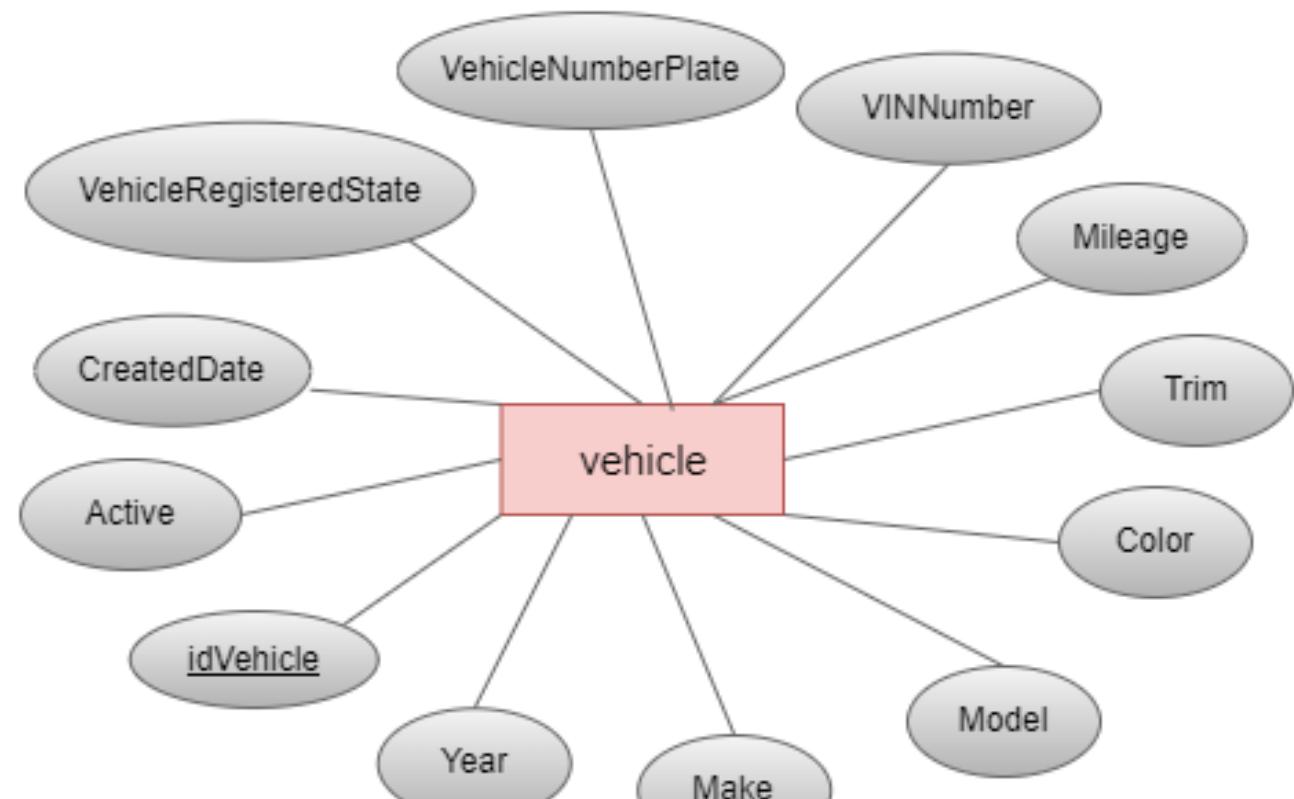
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PolicyExpireDate	datetime	NO		HULL	
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TotalAmount	double	NO		HULL	
Active	tinyint(1)	NO		HULL	
CreatedDate	datetime	NO		HULL	
AdditionalInfo	text	YES		HULL	

✓ Chứa thông tin chung về chính sách

2. THÔNG TIN VỀ CSDL

➤ Thông tin chi tiết từng bảng:

2. Bảng vehicle

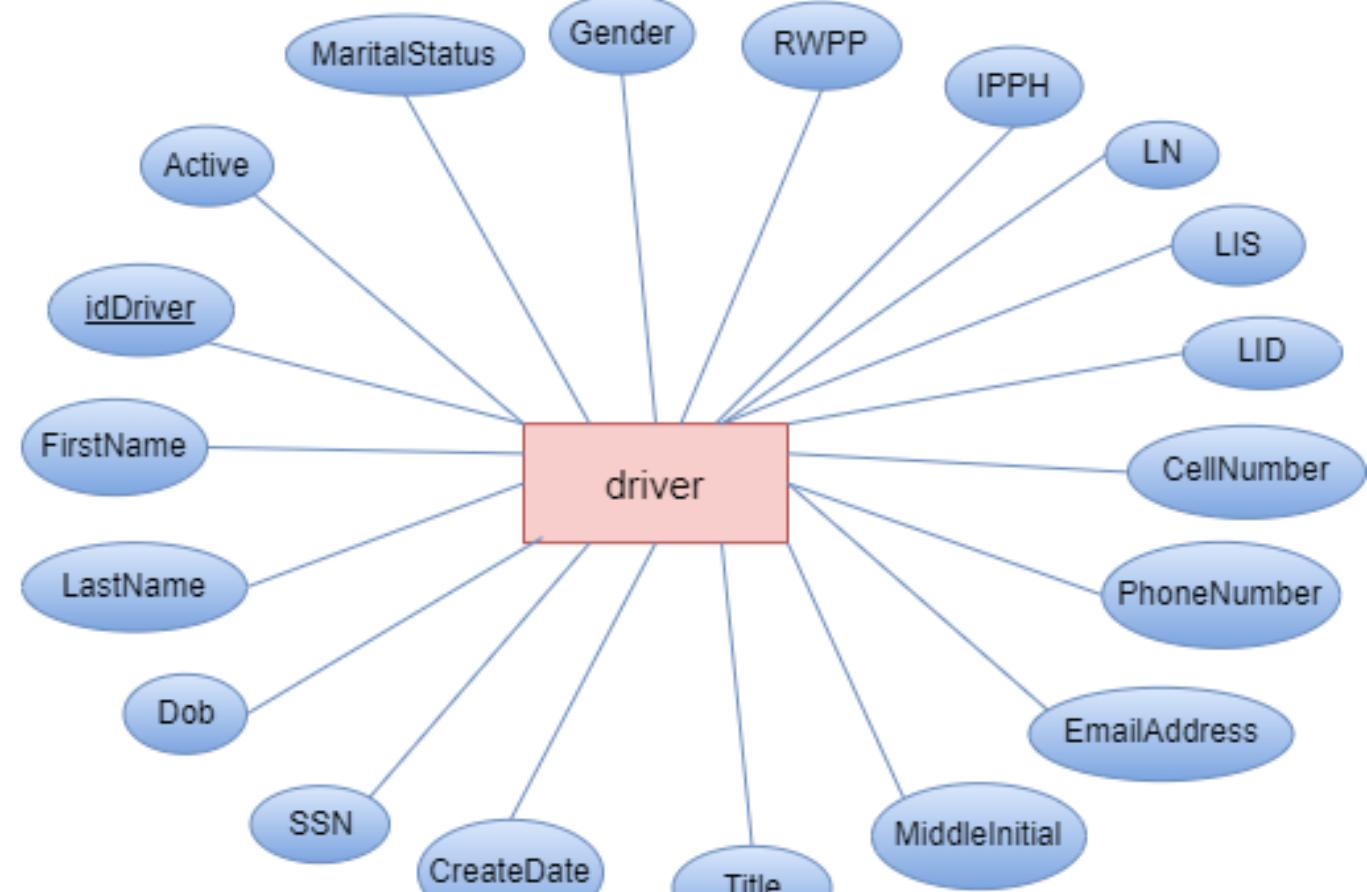


	Field	Type	Null	Key	Default	Extra
▶	idVehicle	int	NO	PRI	NULL	auto_increment
	Policy_ID	Policy_ID	NO	MUL	NULL	
	Year	char(4)	NO		NULL	
	Make	varchar(50)	NO		NULL	
	Model	varchar(50)	NO		NULL	
	Color	varchar(50)	YES		NULL	
	Trim	varchar(50)	YES		NULL	
	Mileage	int	NO		NULL	
	VINNumber	varchar(20)	NO		NULL	
	VehicleNumberPlate	varchar(20)	NO		NULL	
	VehicleRegisteredS...	varchar(50)	NO		NULL	
	CreatedDate	datetime	NO		NULL	
	Active	tinyint(1)	NO		NULL	

- ✓ Lưu thông tin về xe được bảo hiểm
- ✓ Có thể có nhiều hơn một phương tiện theo một chính sách

2. THÔNG TIN VỀ CSDL

➤ Thông tin chi tiết từng bảng:



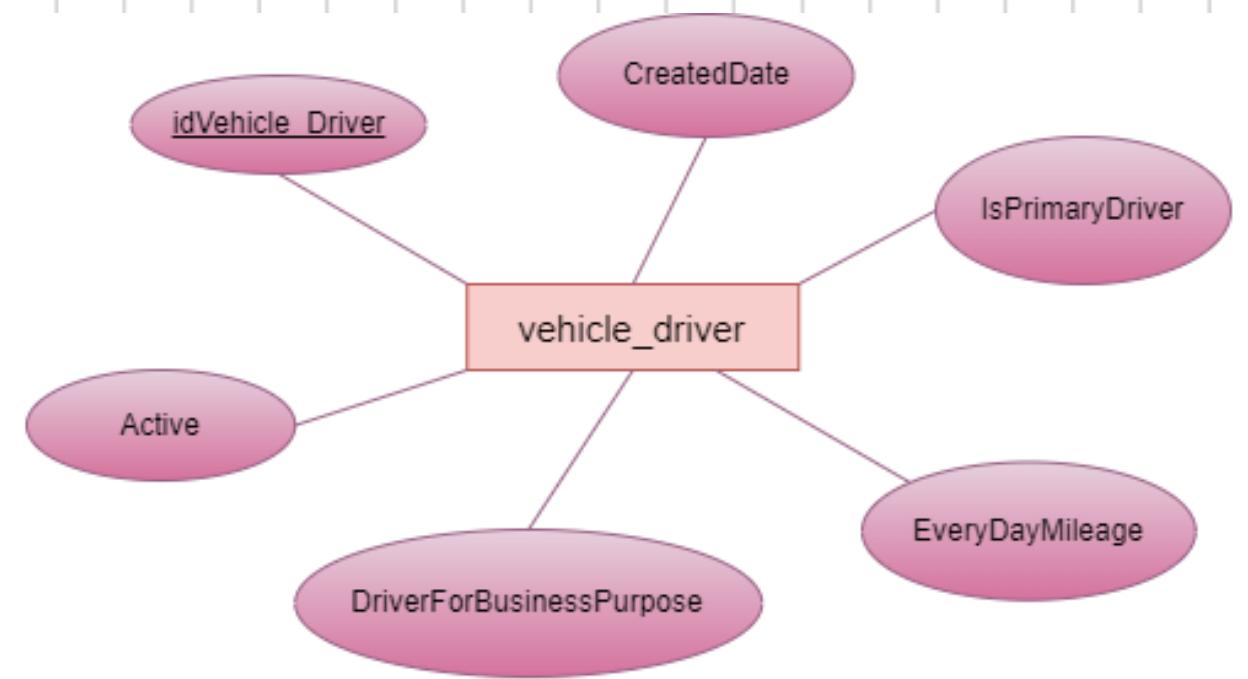
Field	Type	Null	Key	Default	Extra
idDriver	int	NO	PRI	NULL	
Policy_ID	int	NO	MUL	NULL	
Title	varchar(50)	YES		NULL	
FirstName	varchar(50)	NO		NULL	
LastName	varchar(50)	NO		NULL	
MiddleInitial	char(1)	YES		NULL	
Dob	varchar(50)	YES		NULL	
EmailAddress	varchar(100)	YES		NULL	
PhoneNumber	varchar(20)	YES		NULL	
CellNumber	varchar(20)	YES		NULL	
SSN	varchar(12)	NO		NULL	
LicenseIssue...	date	NO		NULL	
LicenseIssue...	varchar(50)	NO		NULL	
LicenseNumber	varchar(20)	NO		NULL	
IsPrimaryPoli...	tinyint(1)	NO		NULL	
RelationWith...	varchar(50)	NO		NULL	
Gender	varchar(10)	YES		NULL	
MaritalStatus	varchar(20)	YES		NULL	
CreateDate	datetime	NO		NULL	
Active	tinyint(1)	NO		NULL	

- ✓ Lưu thông tin về người lái xe
- ✓ Có thể có nhiều trình điều khiển theo một chính sách

2. THÔNG TIN VỀ CSDL

➤ Thông tin chi tiết từng bảng:

4. Bảng vehicle_driver



Result Grid | Filter Rows: Export: Wrap Cell Content: □

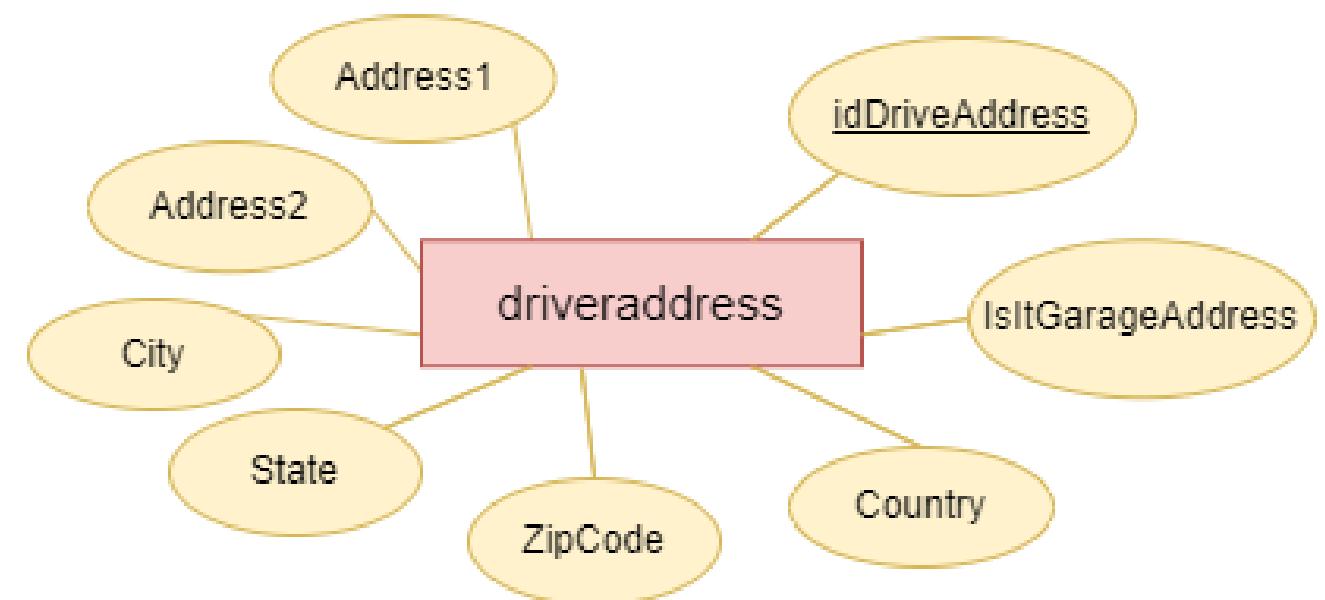
Field	Type	Null	Key	Default	Extra
<code>idVehicle_Driver</code>	int	NO	PRI	NULL	auto_increment
<code>Vehide_ID</code>	int	NO	MUL	NULL	
<code>Driver_ID</code>	int	NO	MUL	NULL	
<code>DriverForBusinessPurpose</code>	bit(1)	NO		NULL	
<code>IsPrimaryDriver</code>	bit(1)	NO		NULL	
<code>EveryDayMileage</code>	int	NO		NULL	
<code>CreatedDate</code>	datetime	NO		NULL	
<code>Active</code>	tinyint(1)	NO		NULL	

✓ Bảng cầu nối giữa 2 bảng
vehicle và driver

2. THÔNG TIN VỀ CSDL

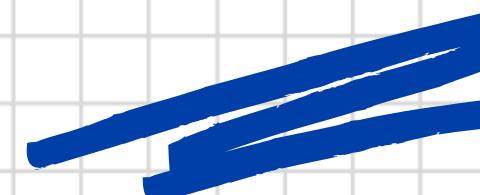
➤ Thông tin chi tiết từng bảng:

5. Bảng driveraddress



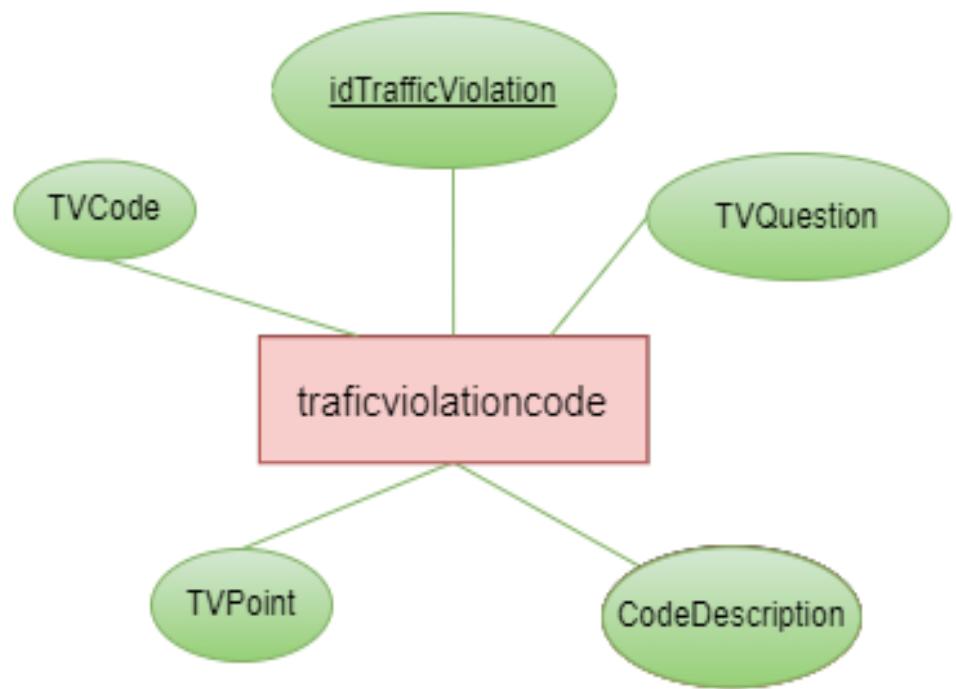
	Field	Type	Null	Key	Default	Extra
▶	idDriveAddress	int	NO	PRI	NULL	auto_increment
	Driver_ID	int	YES	MUL	NULL	
	Address1	varchar(100)	NO		NULL	
	Address2	varchar(100)	YES		NULL	
	City	varchar(100)	NO		NULL	
	State	varchar(50)	NO		NULL	
	ZipCode	varchar(20)	NO		NULL	
	Country	varchar(100)	NO		NULL	
	IsItGarageAddress	tinyint(1)	NO		NULL	

✓ Chứa địa chỉ nhà để xe và
gửi thư của người lái xe



2. THÔNG TIN VỀ CSDL

➤ Thông tin chi tiết từng bảng:



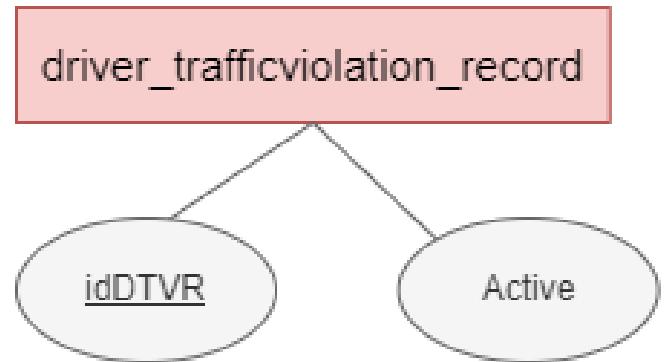
6. Bảng trafficViolationcode

	Field	Type	Null	Key	Default	Extra
▶	<code>idTrafficViolation</code>	int	NO	PRI	NULL	<code>auto_increment</code>
	<code>TrafficViolationQuestion</code>	<code>varchar(1000)</code>	NO		NULL	
	<code>TrafficViolationCode</code>	<code>varchar(10)</code>	NO		NULL	
	<code>TrafficViolationPoint</code>	<code>double</code>	NO		NULL	
	<code>CodeDescription</code>	<code>varchar(1000)</code>	YES		NULL	

✓ Chứa mã vi phạm giao thông

2. THÔNG TIN VỀ CSDL

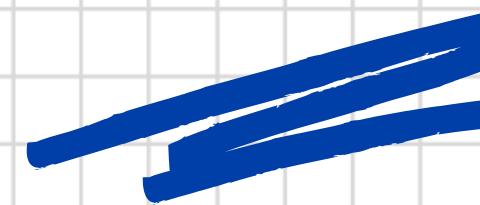
➤ Thông tin chi tiết từng bảng:



7. Bảng driver_trafficViolation_record

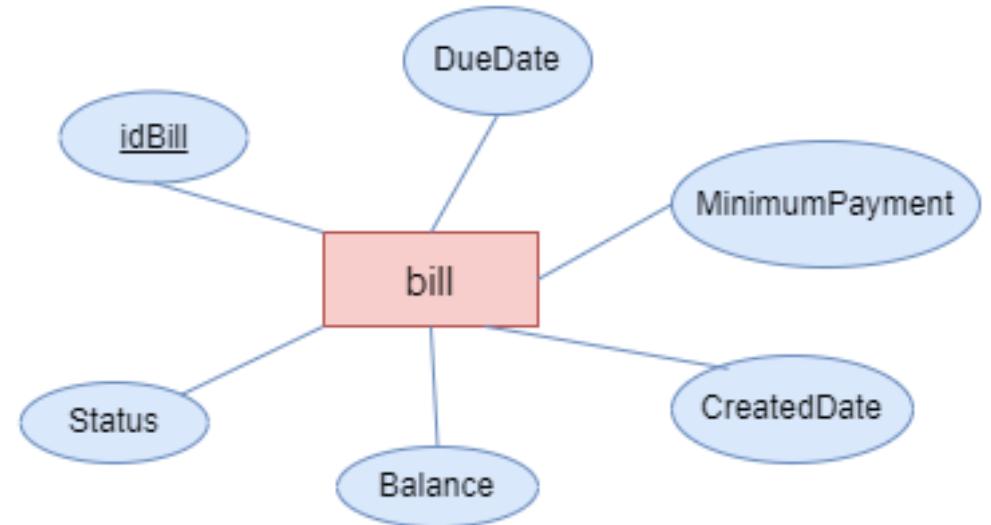
Field	Type	Null	Key	Default	Extra
idDTVR	int	NO	PRI	NULL	auto_increment
Driver_ID	int	NO	MUL	NULL	
TrafficViolationCode_ID	int	NO	MUL	NULL	
Active	tinyint(1)	NO		NULL	

✓ Bảng cầu nối giữa 2 bảng driver và trafficViolationcode



2. THÔNG TIN VỀ CSDL

➤ Thông tin chi tiết từng bảng:



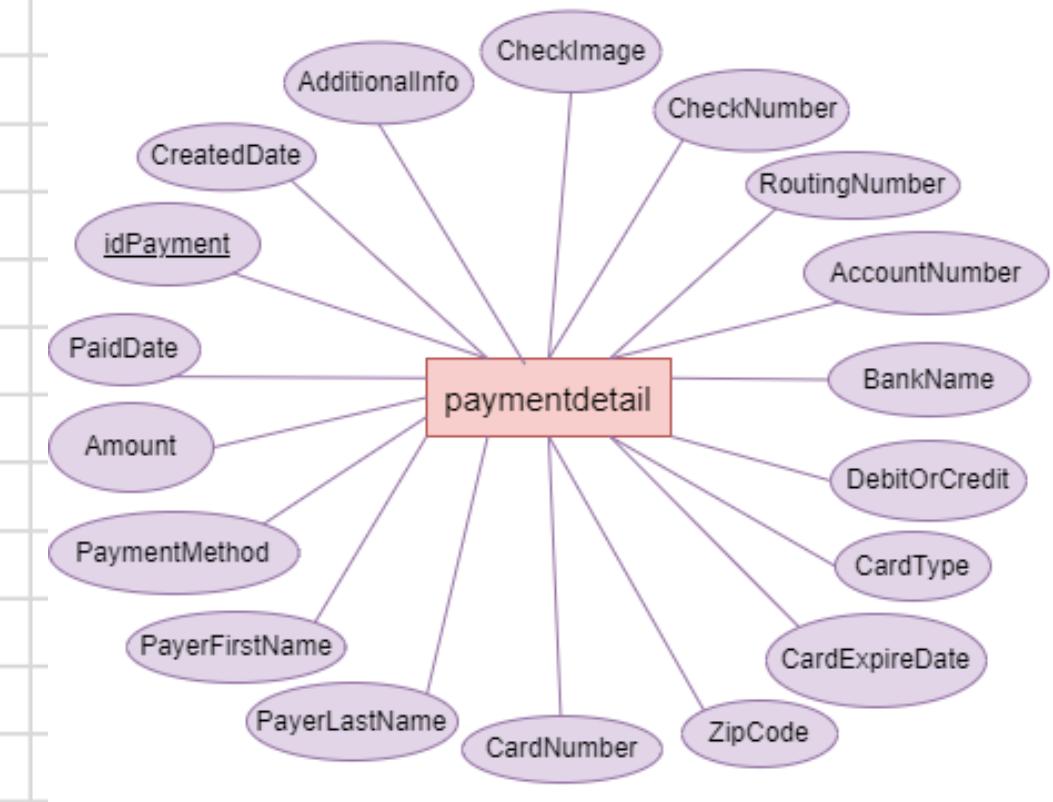
8. Bảng bill

Field	Type	Null	Key	Default	Extra
idBill	int	NO	PRI	HULL	auto_increment
Policy_ID	int	NO	MUL	HULL	
DueDate	datetime	NO		HULL	
MinimumPayment	double	NO		HULL	
CreatedDate	datetime	NO		HULL	
Balance	double	NO		HULL	
Status	varchar(50)	NO		HULL	

✓ Lưu thông tin về hóa đơn
cho chính sách

2. THÔNG TIN VỀ CSDL

➤ Thông tin chi tiết từng bảng:



9. Bảng paymentdetail

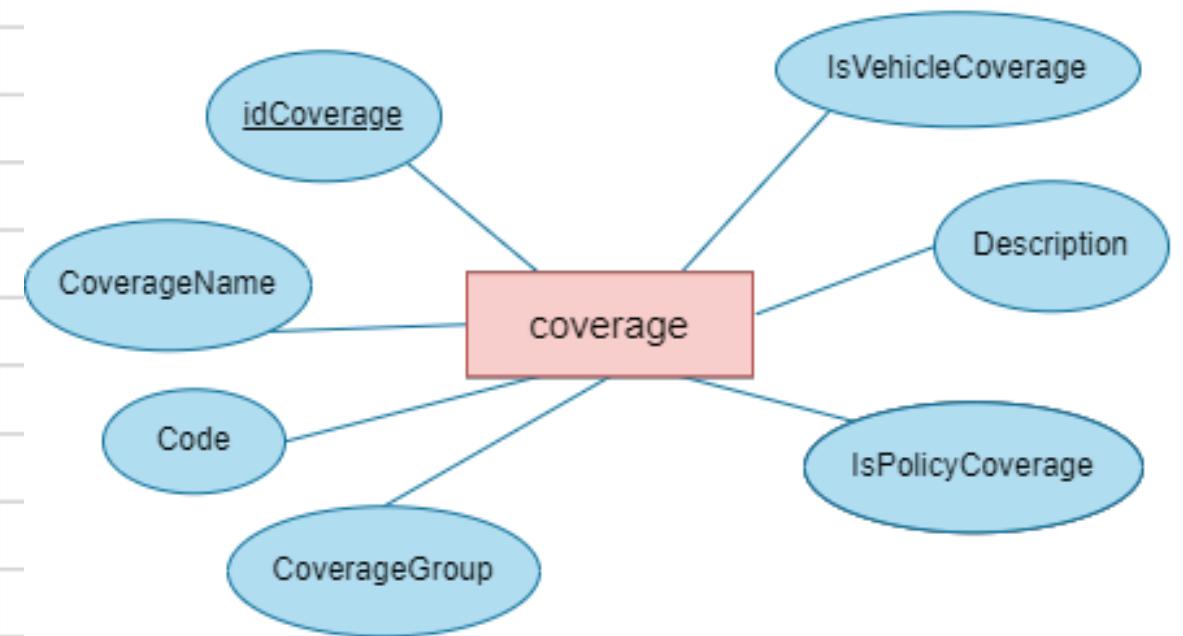
Field	Type	Null	Key	Default	Extra
idPayment	int	NO	PRI	NULL	auto_increment
Bill_ID	int	NO	MUL	NULL	
PaidDate	datetime	NO		NULL	
Amount	double	NO		NULL	
PaymentMethod	varchar(100)	NO		NULL	
PayerFirstName	varchar(50)	YES		NULL	
PayerLastName	varchar(50)	YES		NULL	
CardNumber	varchar(50)	YES		NULL	
ZipCode	varchar(10)	YES		NULL	
CardExpireDate	varchar(10)	YES		NULL	
CardType	varchar(20)	YES		NULL	
DebitOrCredit	varchar(50)	YES		NULL	
BankName	varchar(100)	YES		NULL	
AccountNumber	varchar(20)	YES		NULL	
RoutingNumber	varchar(20)	YES		NULL	
CheckNumber	varchar(20)	YES		NULL	
CheckImage	varchar(20)	YES		NULL	
AdditionalInfo	text	YES		NULL	
CreatedDate	datetime	NO		NULL	

✓ Lưu thông tin về việc thực hiện giao dịch thanh toán của khách hàng

2. THÔNG TIN VỀ CSDL

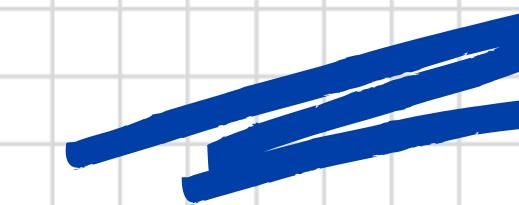
➤ Thông tin chi tiết từng bảng:

10. Bảng coverage



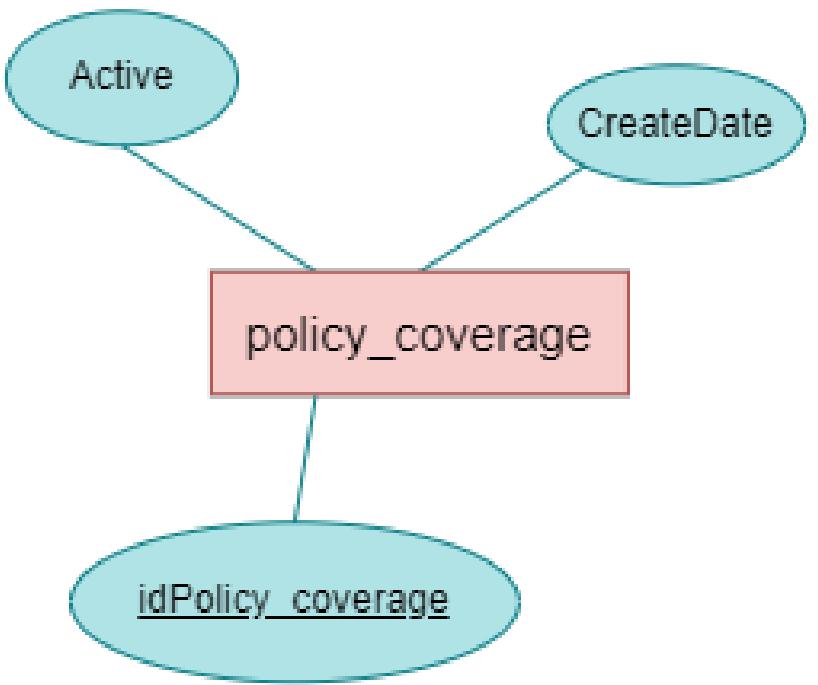
Field	Type	Null	Key	Default	Extra
idCoverage	int	NO	PRI	NULL	auto_increment
CoverageName	varchar(1000)	NO		NULL	
CoverageGroup	varchar(50)	NO		NULL	
Code	varchar(20)	NO		NULL	
IsPolicyCoverage	bit(1)	NO		NULL	
IsVehicleCoverage	bit(1)	NO		NULL	
Description	varchar(1000)	YES		NULL	

✓ Lưu thông tin về các loại phạm vi
bảo hiểm khác nhau



2. THÔNG TIN VỀ CSDL

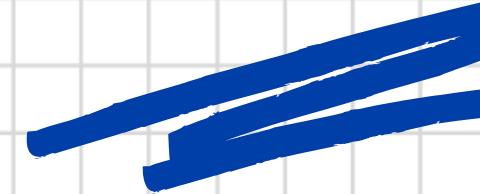
➤ Thông tin chi tiết từng bảng:



11. Bảng policy_coverage

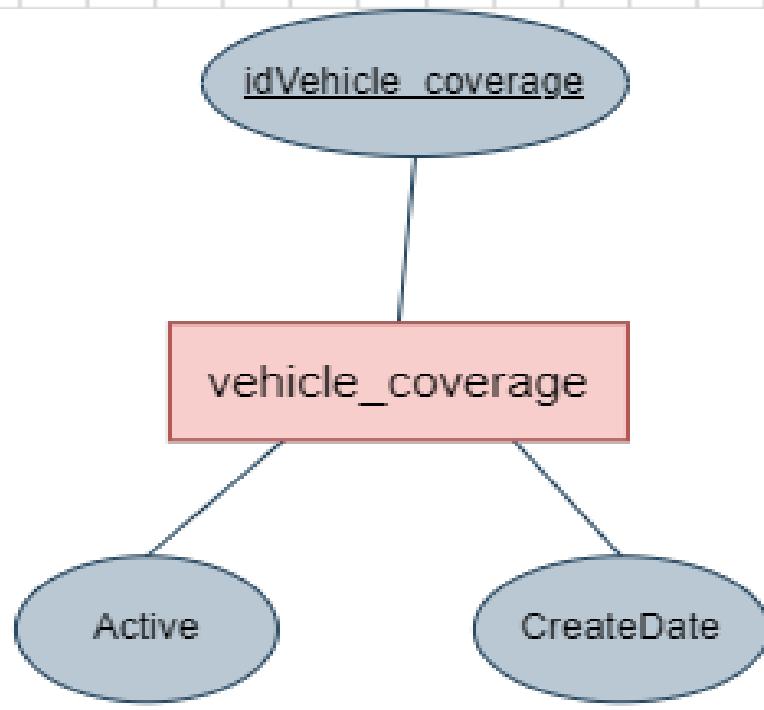
	Field	Type	Null	Key	Default	Extra
▶	idPolicy_coverage	int	NO	PRI	HULL	auto_increment
	Policy_ID	int	NO	MUL	HULL	
	Coverage_ID	int	NO	MUL	HULL	
	Active	tinyint(1)	NO		HULL	
	CreateDate	datetime	NO		HULL	

✓ Bảng cầu nối giữa 2 bảng
policy và coverage



2. THÔNG TIN VỀ CSDL

➤ Thông tin chi tiết từng bảng:



12. Bảng vehicle_coverage

	Field	Type	Null	Key	Default	Extra
▶	<code>idVehicle_coverage</code>	int	NO	PRI	<code>NULL</code>	<code>auto_increment</code>
	<code>Vehide_ID</code>	int	NO	MUL	<code>NULL</code>	
	<code>Coverage_ID</code>	int	NO	MUL	<code>NULL</code>	
	<code>Active</code>	<code>tinyint(1)</code>	NO		<code>NULL</code>	
	<code>CreateDate</code>	<code>datetime</code>	NO		<code>NULL</code>	

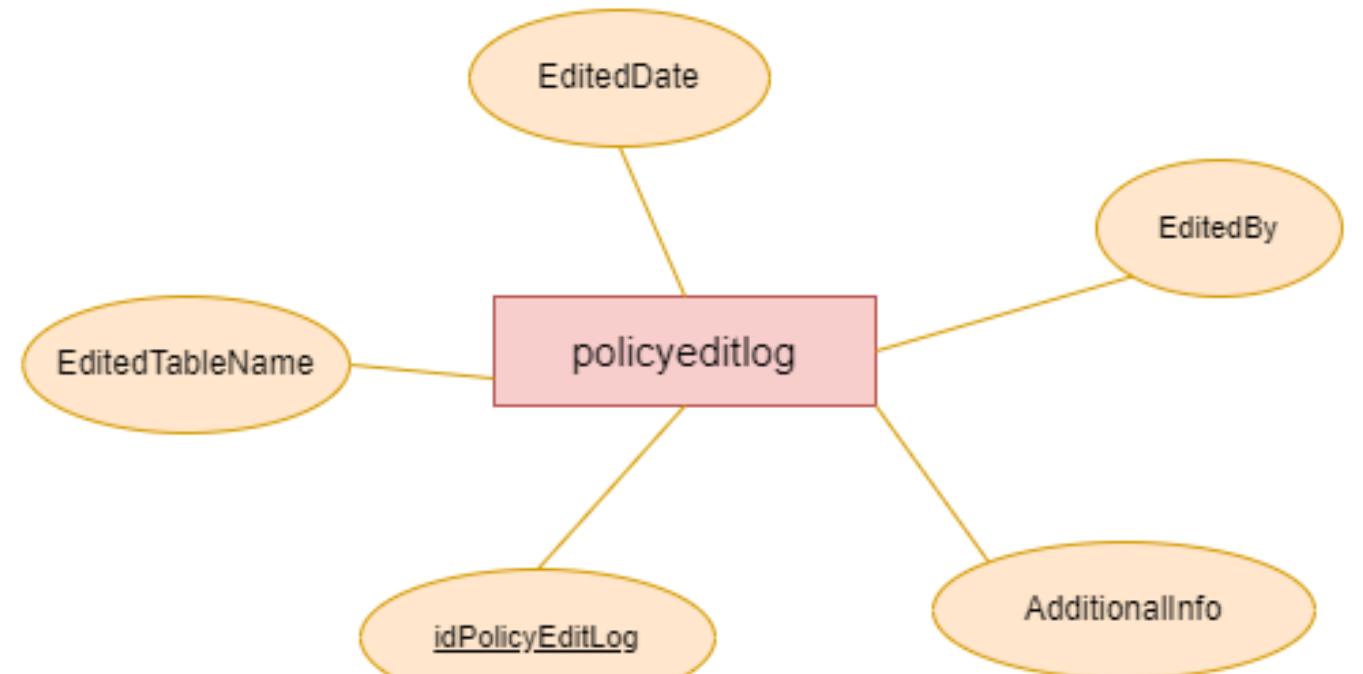
Bảng cầu nối giữa 2 bảng
vehicle và coverage



2. THÔNG TIN VỀ CSDL

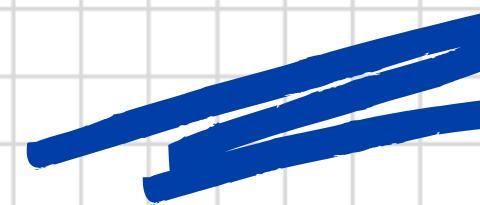
➤ Thông tin chi tiết từng bảng:

13. Bảng policyeditlog



Field	Type	Null	Key	Default	Extra
<code>idPolicyEditLog</code>	int	NO	PRI	<code>NULL</code>	<code>auto_increment</code>
<code>Policy_ID</code>	int	NO	MUL	<code>NULL</code>	
<code>EditedTableName</code>	varchar(50)	NO		<code>NULL</code>	
<code>EditedDate</code>	datetime	NO		<code>NULL</code>	
<code>EditedBy</code>	varchar(50)	NO		<code>NULL</code>	
<code>AdditionalInfo</code>	text	YES		<code>NULL</code>	

✓ Lưu thông tin nhật ký khi khách hàng cập nhật thông tin như xóa xe hoặc thêm tài xế ...



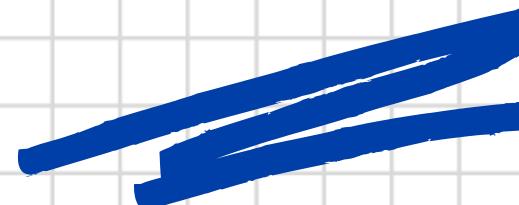


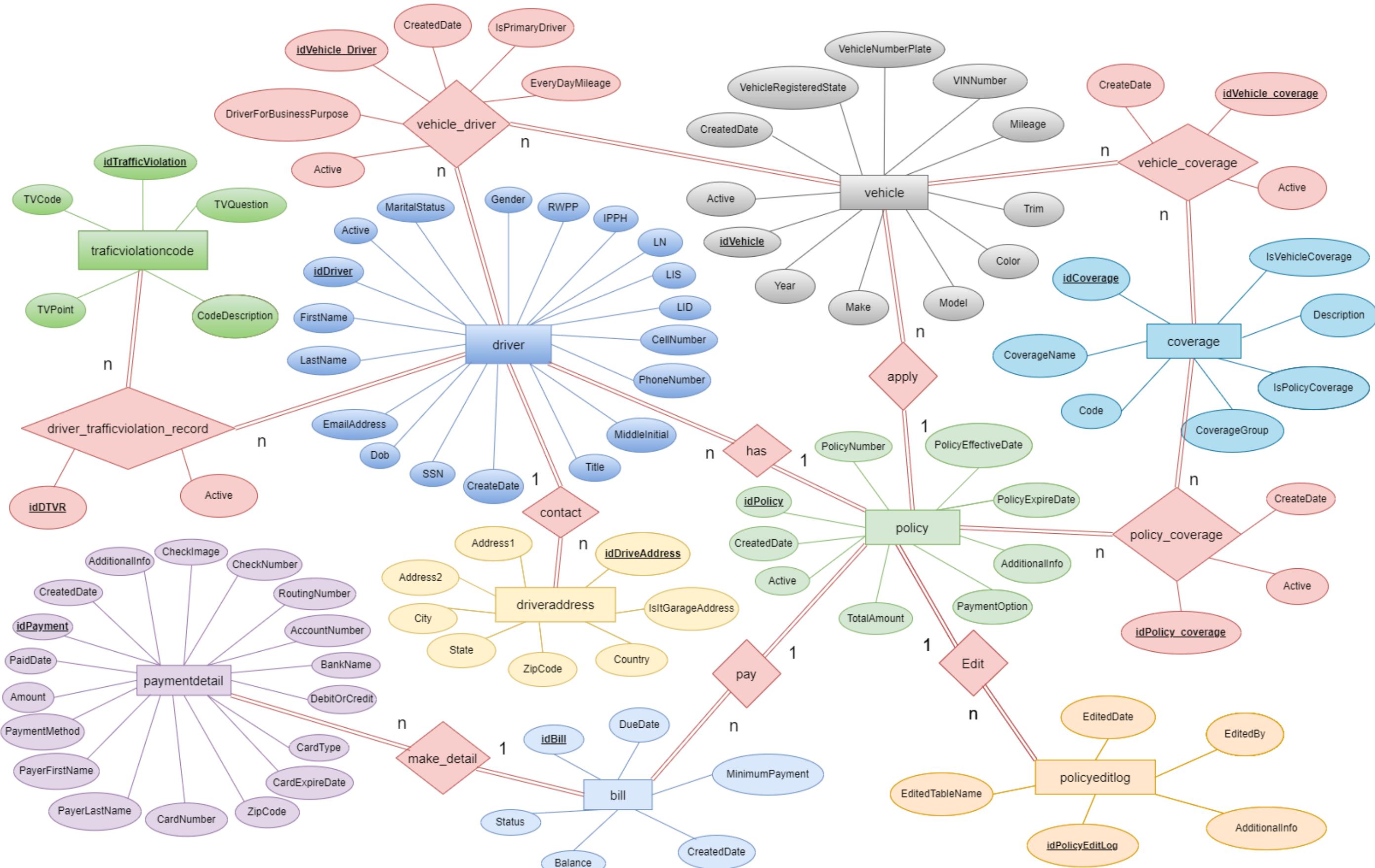
2. THÔNG TIN VỀ CSDL

- Lược đồ ER:

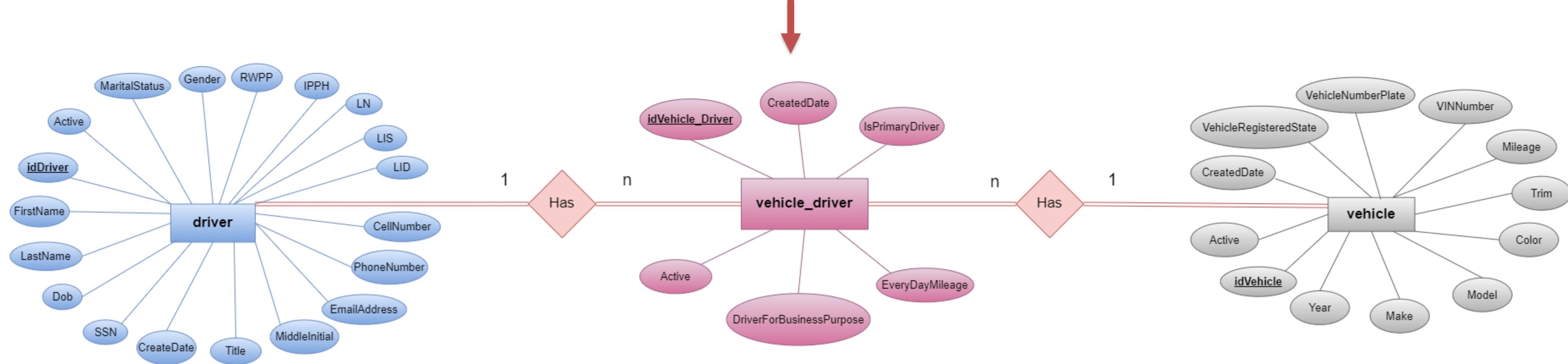
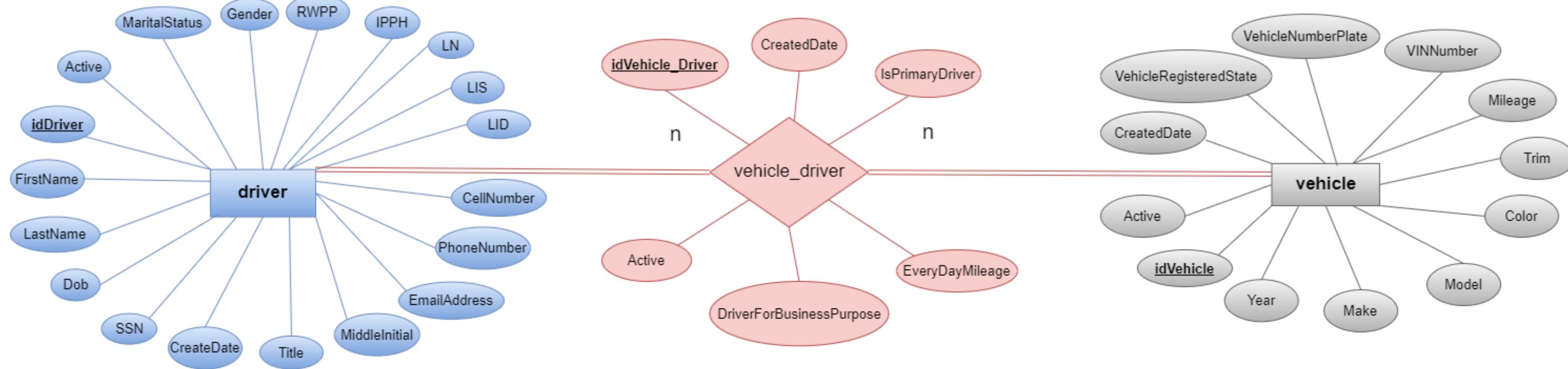
CHI TIẾT

TÓM TẮT

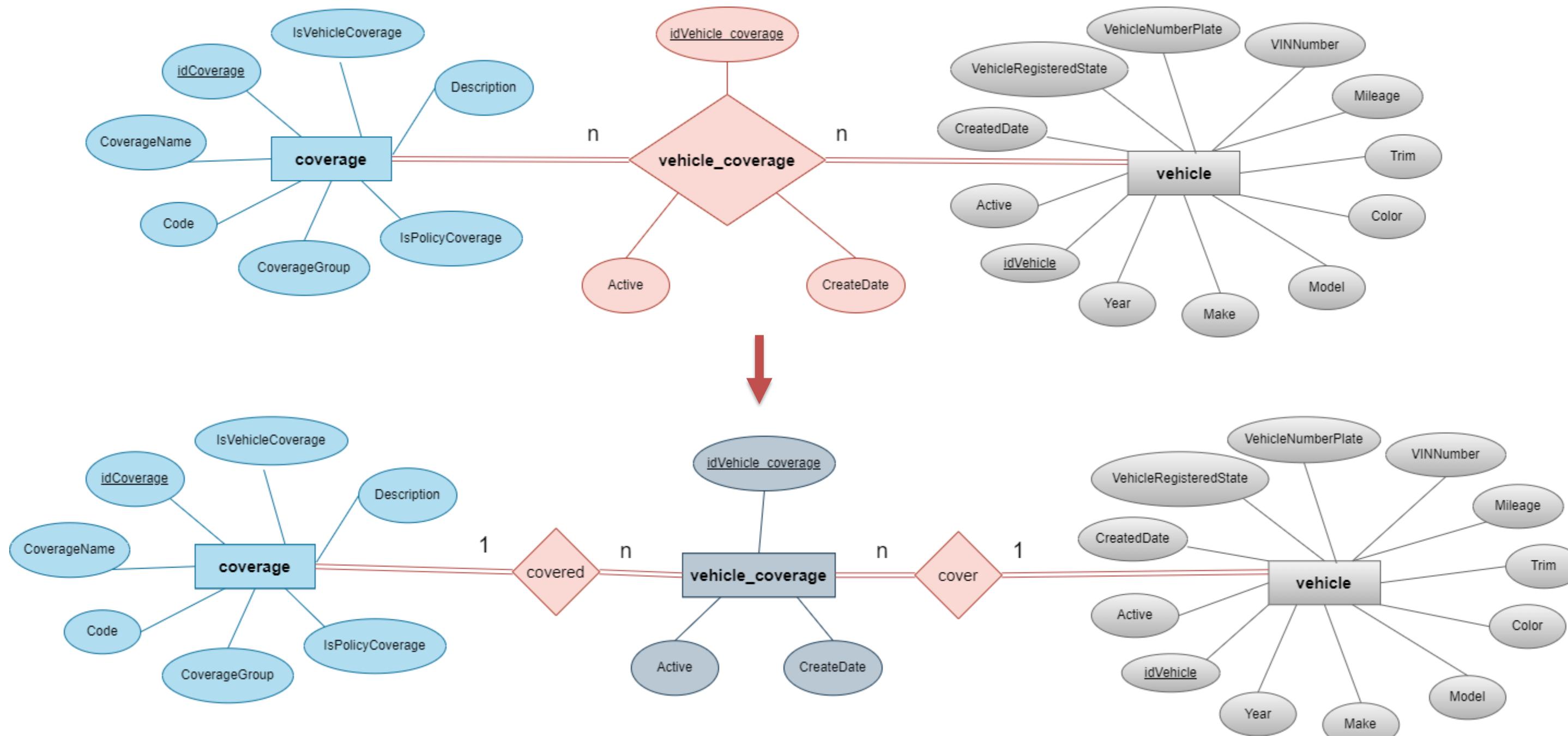




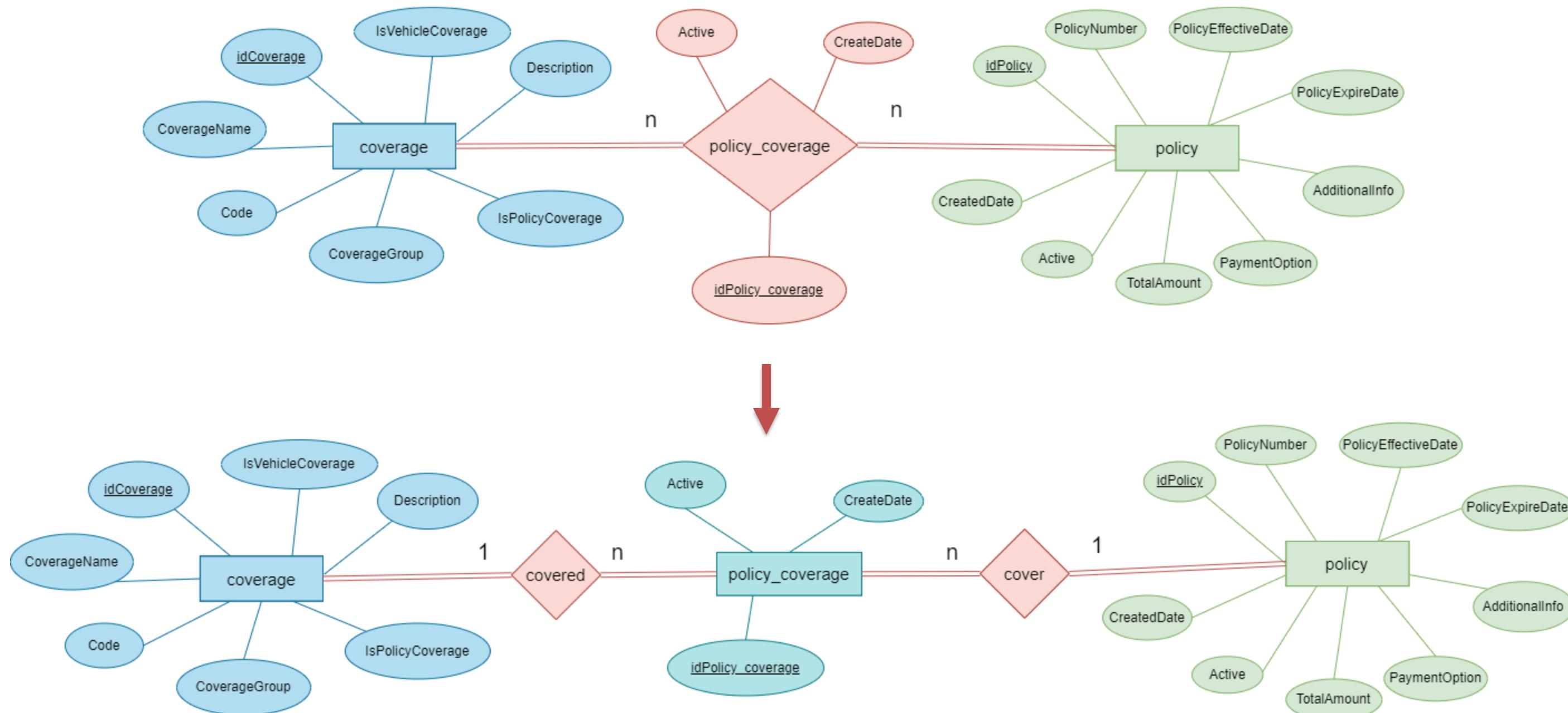
Biến quan hệ vehicle_driver thành thực thể



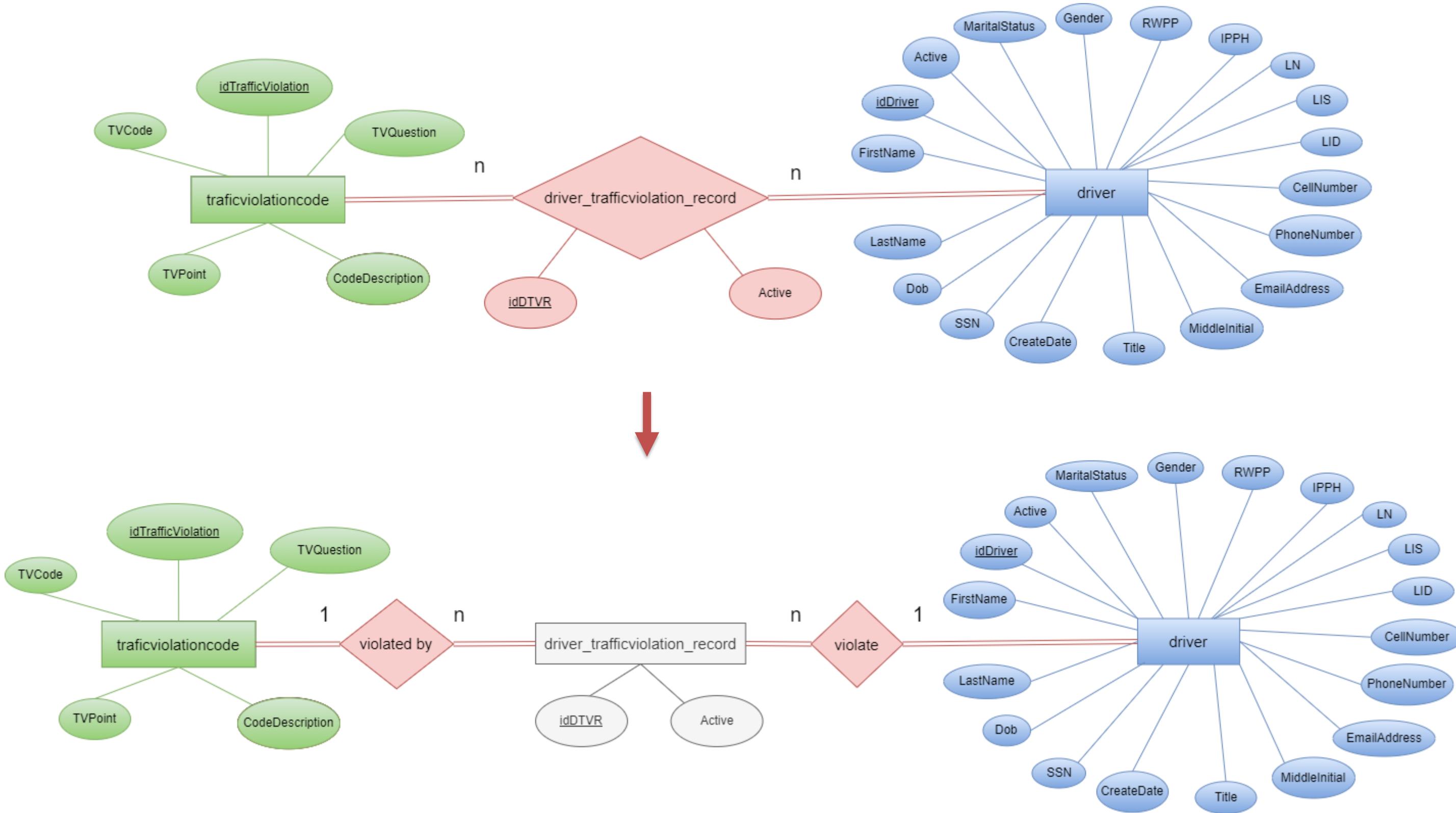
Biên quan hệ vehicle_coverage thành thực thể



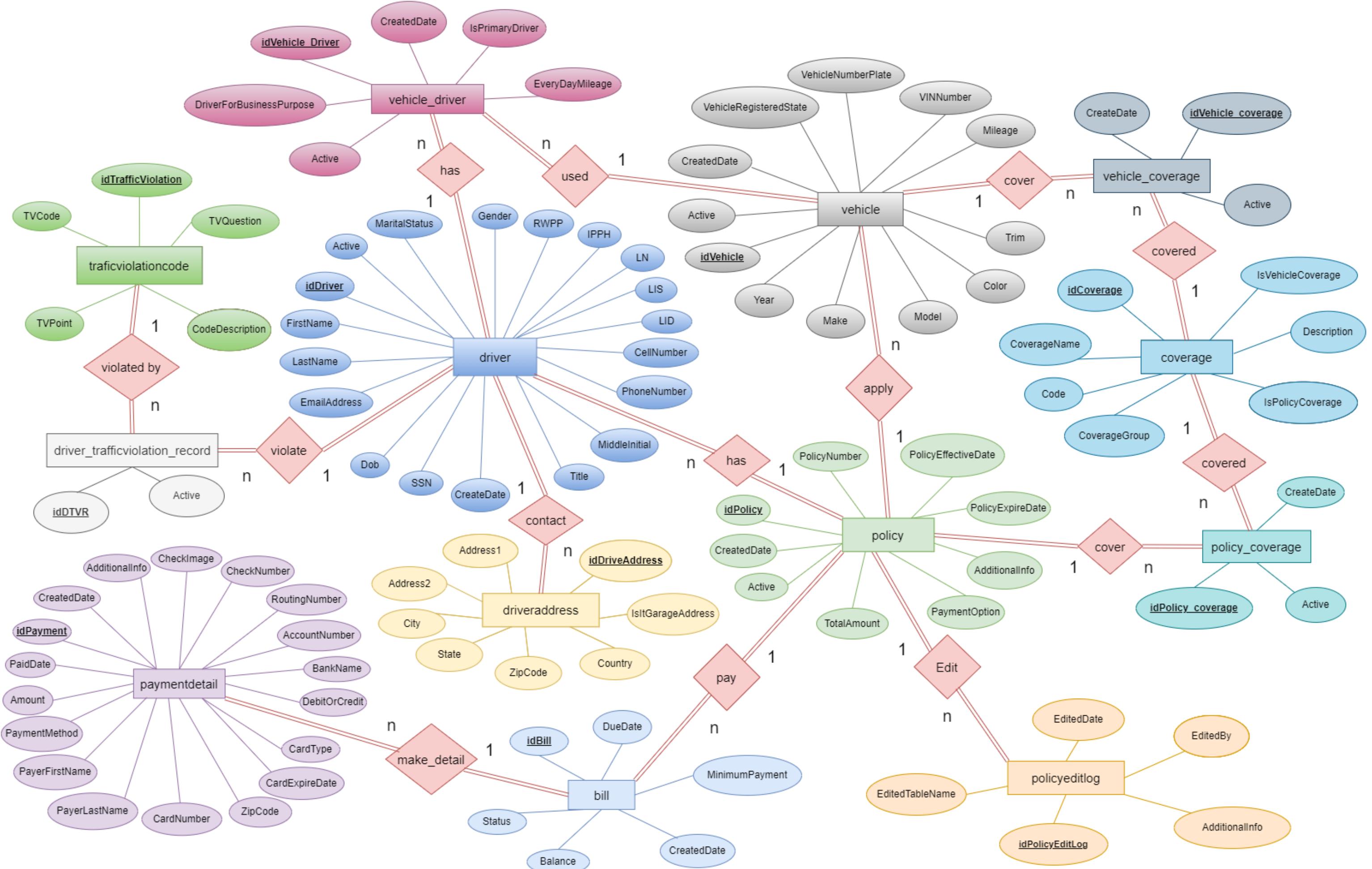
Biến quan hệ policy_coverage thành thực thể



Biến quan hệ driver_trafficViolation_record thành thực thể



Sau khi chuyển các quan hệ thành thực thể

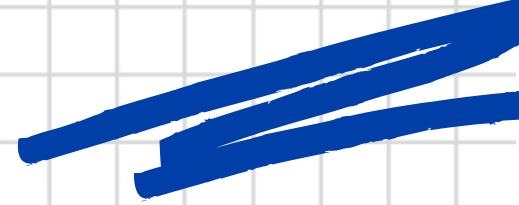


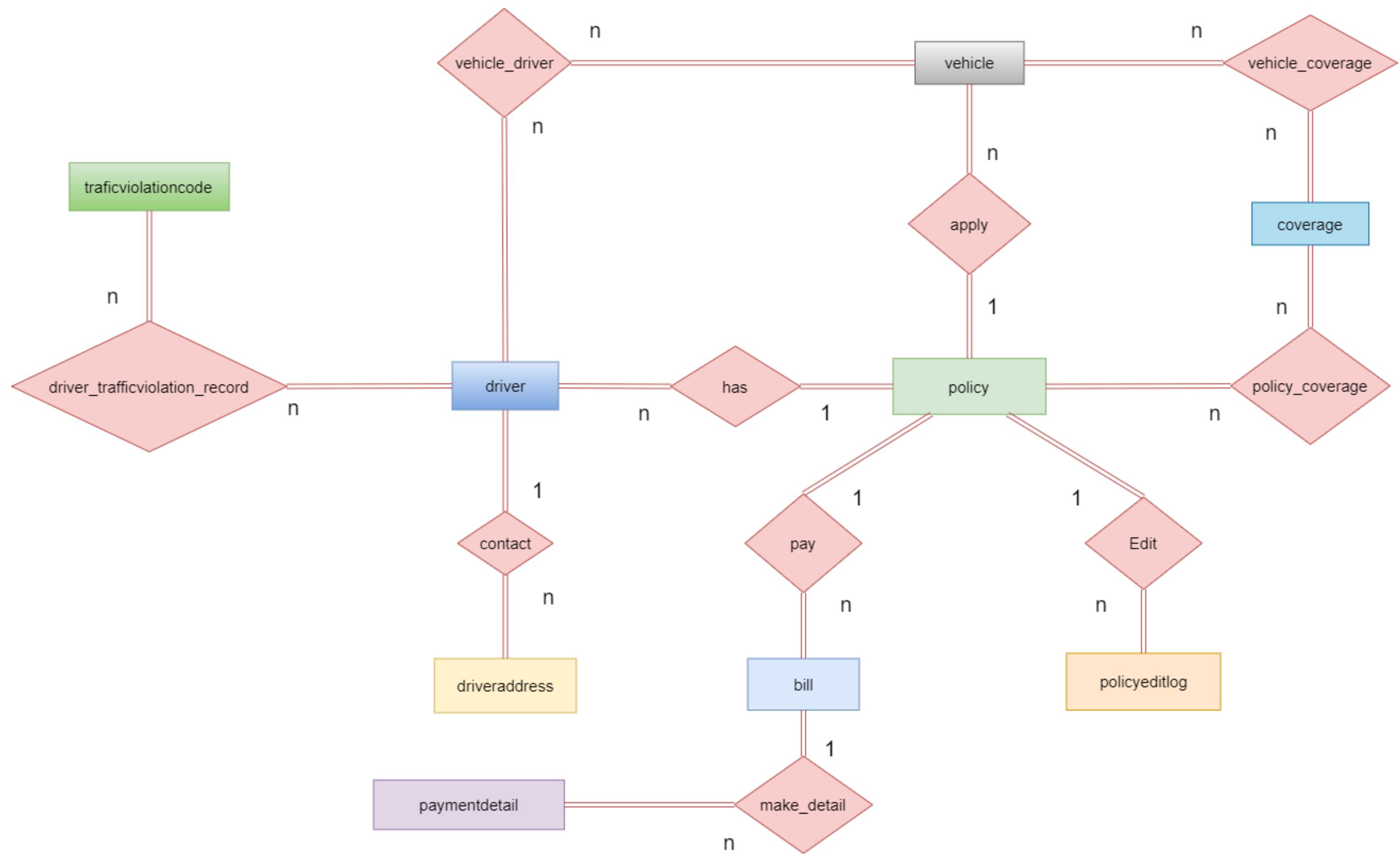
2. THÔNG TIN VỀ CSDL

➤ Lược đồ ER:

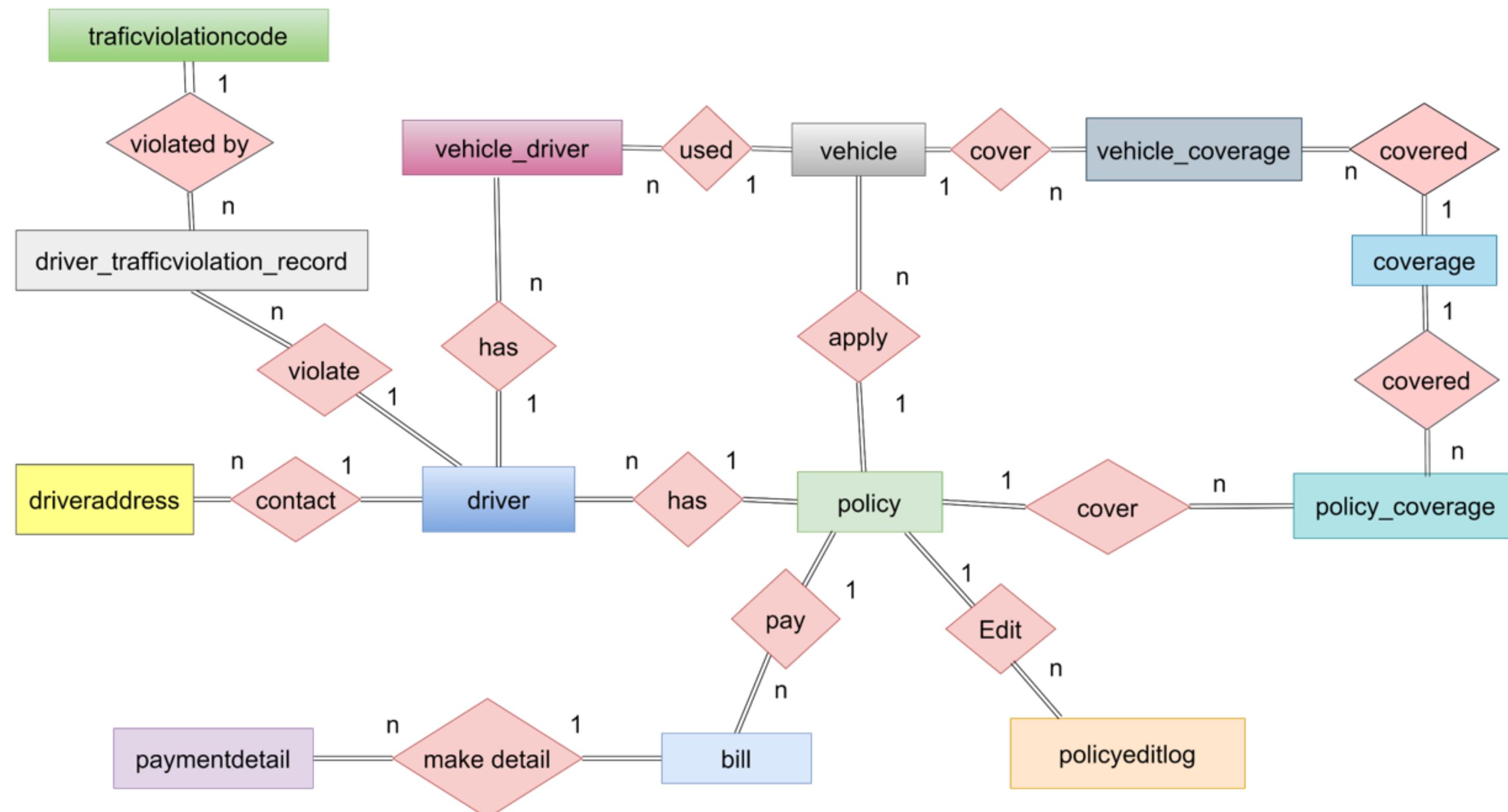
CHI TIẾT

TÓM TẮT





Sau khi chuyển các quan hệ thành thực thể



2. THÔNG TIN VỀ CSDL

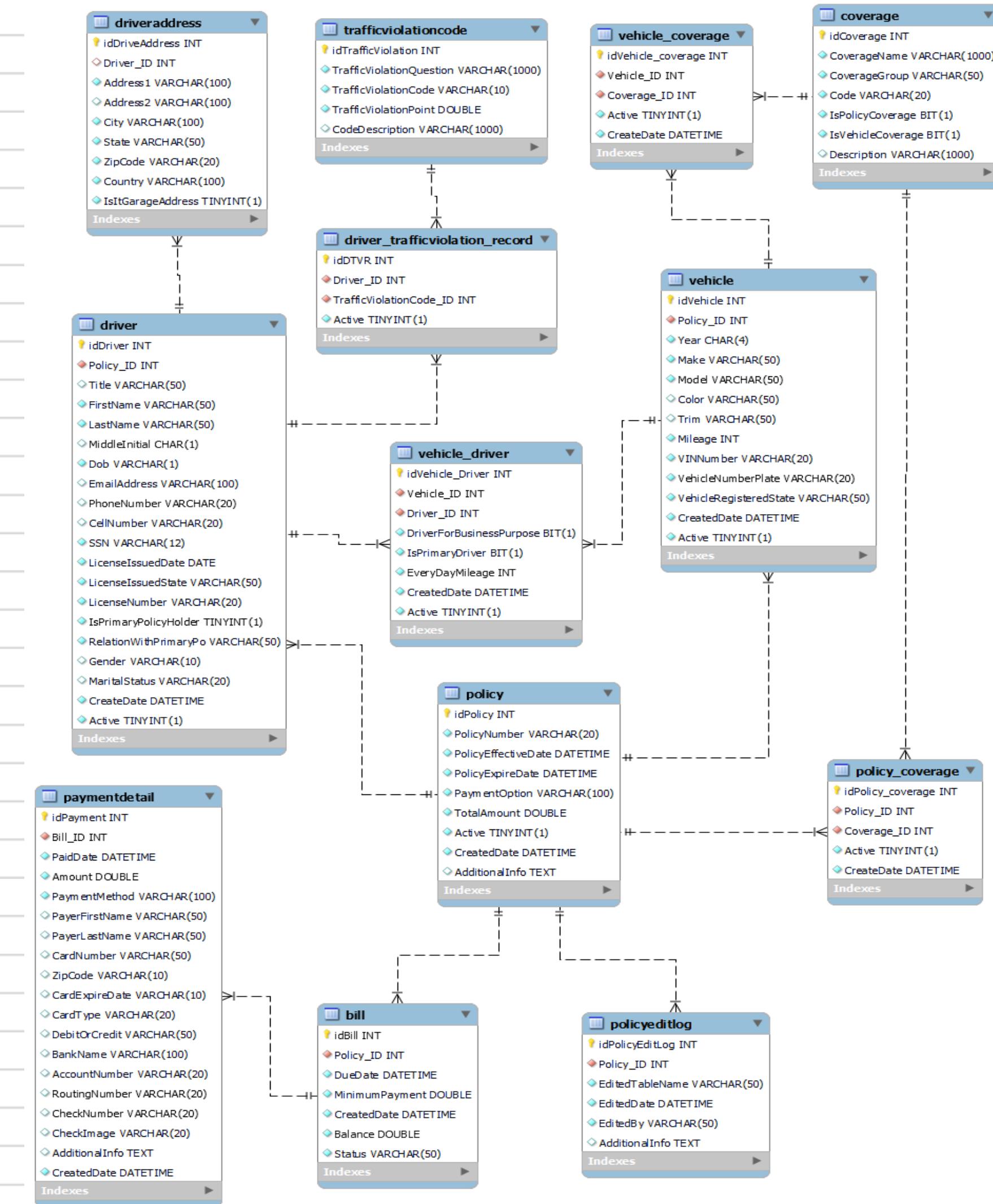
➤ Lược đồ RE:

- policy (**idPolicy**, PolicyNumber, PolicyEffectiveDate, PolicyExpireDate, PaymentOption, TotalAmount, Active, CreatedDate, AdditionalInfo).
- driver(**idDriver**, Policy_ID, Title, FirstName, LastName, MiddleInitial, Dob, EmailAddress, PhoneNumber, CellNumber, SSN, LicenseIssuedDate, LicenseIssuedState, LicenseNumber, IsPrimaryPolicyHolder, RelationWithPrimaryPo, Gender, MaritalState, CreatedDate, Active).
- vehicle(**idVehicle**, Policy_ID, Year, Make, Model, Color, Trim, Mileage, VINNumber, VehicleNumberPlate, VehicleRegisteredState, CreatedDate, Active).
- policy_coverage(**idPolicy coverage**, Policy, Coverage, Active, CreatedDate).
- policyeditlog(**idPolicyEditLog**, Policy_ID, EditedTableName, EditedDate, EditedBy, AdditionalInfo).
- bill(**idBill**, Policy_ID, DueDate, MinimumPayment, CreatedDate, Balance, Status).
- paymentdetail(**idPayment**, Bill_ID, PaidDate, Amount, PaymentMethod, PayerFirstName, PayerLastName, CardNumber, ZipCode, CardExpireDate, CardType, DebitOrCredit, BankName, AccountNumber, RoutingNumber, CheckNumber, CheckImage, AdditionalInfo, CreatedDate).
- vehicle_driver(**idVehicle Driver**, Vehicle_ID, Driver_ID, DriverForBusinessPurpose, IsPrimaryDriver, EveryDayMileage, CreatedDate, Active).
- driveraddress(**idDriverAddress**, Driver_ID, Address1, Address2, City, State, ZipCode, Country, IsItGarageAddress).
- driver_trafficViolation_record(**idDTVR**, Driver_ID, TrafficViolationCode_ID, Active).
- trafficViolationcode(**idTrafficViolation**, TrafficViolationQuestion, TrafficViolationCode, TrafficViolationPoint, CodeDescription).
- vehicle_coverage(**idVehicle**, Vehicle_ID, Coverage_ID, Active, CreatedDate).
- coverage(**idCoverage**, CoverageName, CoverageGroup, Code, IsPolicyCoverage, IsVehicleCoverage, Description).

2. THÔNG TIN VỀ CSDL

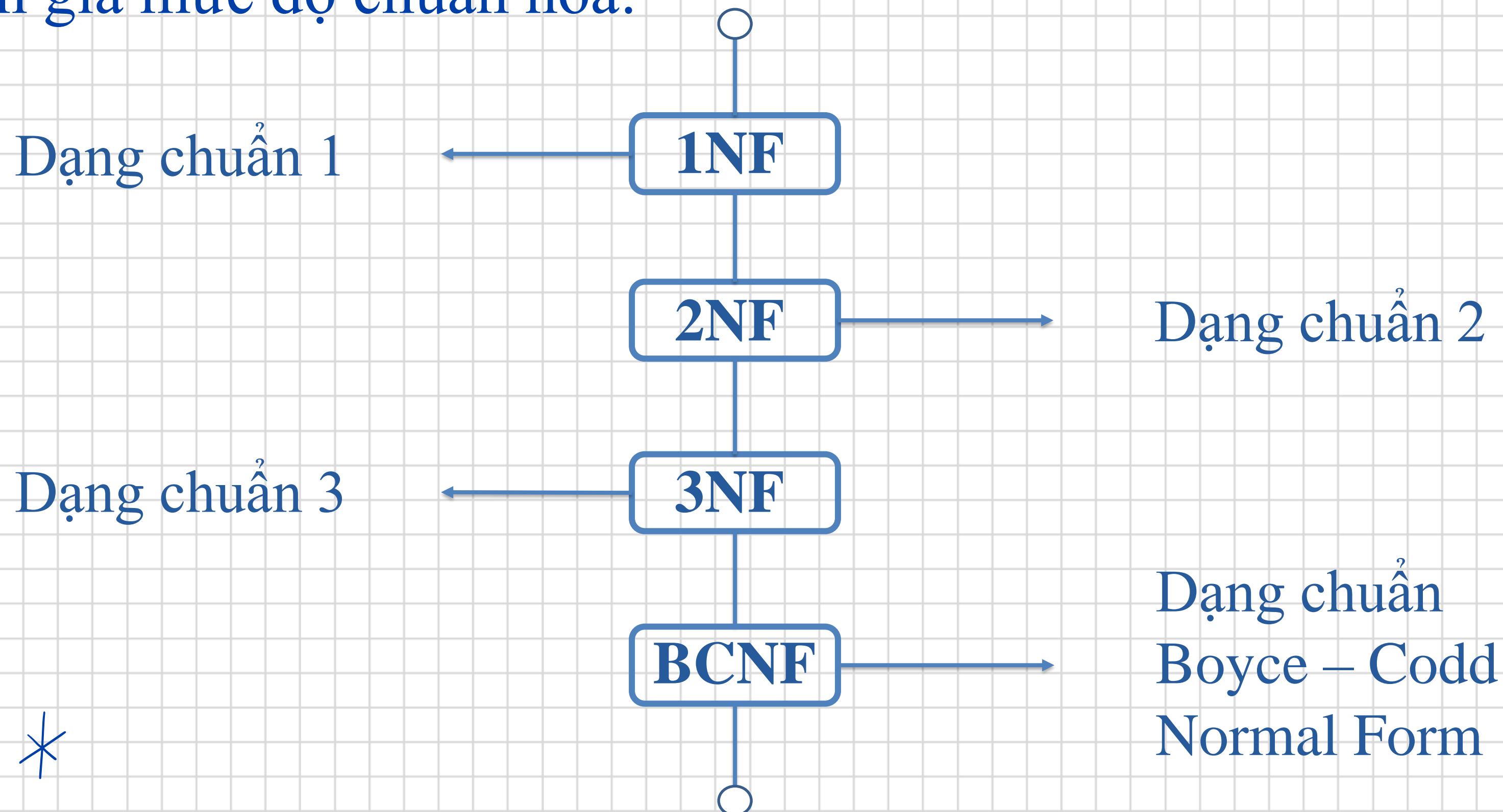
➤ Diagram:

Mỗi một chính sách chỉ
lưu thông tin của một
phương tiện phải không?



2. THÔNG TIN VỀ CSDL

- Đánh giá mức độ chuẩn hóa:

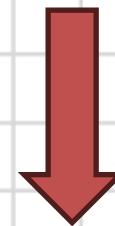


2. THÔNG TIN VỀ CSDL

➤ Đánh giá mức độ chuẩn hóa:

Dạng chuẩn 1

- ✓ Mỗi ô trong bảng chứa một giá trị đơn
- ✓ Mỗi dòng (bản ghi) cần phải là duy nhất



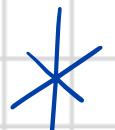
Tất cả các bảng ở Database
này đều thỏa mãn chuẩn 1

	idDTVR	Driver_ID	TrafficViolationCode_ID	Active
▶	1	59808	43308	1
	2	36290	73254	0
	3	110251	12886	1
	4	111764	56196	1
	5	97272	133597	1
	6	139043	23814	0
	7	15067	70876	1
	8	17072	7438	0
	9	116163	139861	0
	10	136372	25123	0
	11	62253	117387	0
	12	65715	65893	1
	13	70723	20531	1
	14	145879	126339	1
	15	65242	11025	1
	16	13191	52863	0
	17	119322	139614	0
	18	131714	145753	1
	19	5474	63126	1
	20	70313	74005	0

Bảng driver_trafficViolation_record

	idPolicy_coverage	Policy_ID	Coverage_ID	Active	CreateDate
▶	12862	8715	155583	0	2023-05-02 11:44:13
	12863	9833	153752	1	2023-01-03 21:01:48
	12864	481	107783	1	2023-02-08 02:30:48
	12865	5469	153649	0	2023-03-28 18:31:18
	12866	6239	133032	1	2023-03-15 00:31:26
	12867	3502	167909	0	2023-03-16 01:07:09
	12868	4948	103669	1	2023-03-27 01:00:51
	12869	1240	237260	0	2023-04-28 10:18:54
	12870	4661	159701	0	2023-03-15 09:25:24
	12871	5509	186353	1	2023-01-28 18:00:08
	12872	2372	223270	0	2023-02-08 13:35:31
	12873	7607	137117	1	2023-02-27 12:07:35
	12874	5843	242925	0	2023-01-25 11:00:26
	12875	2620	139625	0	2023-04-02 18:41:06
	12876	9214	186933	1	2023-05-13 02:29:05
	12877	317	184305	1	2023-05-07 12:48:50
	12878	9786	163167	1	2023-03-04 09:42:46
	12879	1272	160538	0	2023-04-03 23:08:46
	12880	673	223623	1	2023-05-31 23:41:13

Bảng policy_coverage

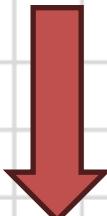


2. THÔNG TIN VỀ CSDL

➤ Đánh giá mức độ chuẩn hóa:

Dạng chuẩn 2

- ✓ Thỏa mãn chuẩn loại 1
- ✓ Mọi thuộc tính không khóa phải phụ thuộc đầy đủ vào khóa
- ✓ Ngoài ra, với các quan hệ có thuộc tính khóa đơn thì cũng thỏa mãn chuẩn loại 2



Tất cả các bảng ở Database
này đều thỏa mãn chuẩn 2

idBill	Policy_ID	DueDate	MinimumPayment	CreatedDate	Balance	Status
1	893	2024-03-19 06:46:14	95.97	2022-10-18 03:54:23	3640.28	paid
2	521	2024-02-24 12:21:51	479.3	2023-05-04 07:18:13	1334.76	paid
3	822	2024-05-09 20:45:15	106.07	2022-12-05 17:04:06	1087.76	unpaid
4	405	2024-04-06 02:03:33	481.13	2022-09-19 17:39:42	1778.56	overdue
5	376	2023-07-09 04:12:33	141.39	2022-09-26 05:43:28	4595.84	overdue
6	207	2024-05-07 06:17:01	496.94	2022-06-10 12:20:43	3186.9	partial
7	718	2023-07-07 14:40:05	344.12	2023-04-24 11:12:40	4426.26	paid
8	458	2024-02-06 01:15:10	243.76	2022-10-18 19:34:43	567.72	partial
9	55	2023-06-21 19:35:53	108.54	2023-05-26 18:06:05	1181.49	overdue
10	972	2023-10-28 21:17:57	476.75	2022-06-27 05:07:57	4493.93	overdue
11	992	2023-11-26 17:24:09	463.34	2022-08-12 22:37:59	984.19	paid
12	205	2023-09-20 14:45:23	245.59	2022-09-26 01:46:14	1487.94	paid
13	582	2024-01-13 23:56:32	416.77	2022-08-27 10:17:55	1331.75	overdue
14	518	2024-03-18 06:44:45	157.42	2022-06-13 12:34:50	3085.77	overdue
15	48	2023-12-01 14:55:13	413.17	2022-11-14 02:16:19	4412.94	overdue
16	393	2023-09-03 01:03:55	377.16	2022-06-13 04:04:04	1610.46	partial
17	852	2023-12-10 02:29:00	161.16	2022-11-29 15:32:26	4629.04	unpaid
18	777	2024-05-20 11:07:59	236.77	2023-03-16 20:11:25	3846.5	overdue
19	439	2024-05-11 16:12:31	475.77	2023-05-19 09:44:12	4675.5	unpaid
20	233	2024-04-14 21:10:44	263.3	2023-01-02 18:55:53	3642.41	paid

Bảng bill

idCoverage	CoverageName	CoverageGroup	Code	IsPolicyCoverage	IsVehicleCoverage	Description
99501	Expect ten wonder traditional seven.	Group 3	00000	1	1	During memory image where record apply. Econ...
99502	Price reality city method.	Group 1	00001	0	1	Agency loss treat knowledge. Toward lose awa...
99503	Song from teacher over same late.	Group 1	00002	1	0	Off mission could sister. Song tonight fact shoul...
99504	Record you value.	Group 5	00003	1	1	Product show special head cup. Professional pa...
99505	Avoid either kid because.	Group 2	00004	1	0	Difficult job quality newspaper maybe pressure ...
99506	Business arm Republican yard military.	Group 5	00005	1	0	Research his join improve now theory. City frie...
99507	Maintain course season citizen.	Group 2	00006	1	1	None single Congress production option need p...
99508	Thousand almost tree north political.	Group 2	00007	1	0	While poor pick attack fear indicate structure so...
99509	Past people me must between.	Group 5	00008	0	1	Television together feel well. Example street ty...
99510	Once inside lawyer among.	Group 2	00009	0	1	Food seek various public chair newspaper fast. ...
99511	Account director difficult sea fly too.	Group 5	00010	1	1	Head relationship tell though. Stay among gene...
99512	Possible involve significant defense t...	Group 4	00011	1	0	Black speak send light enough after go within. H...
99513	First many study station now.	Group 3	00012	0	1	Pull recent camera indeed system. He sing gues...
99514	Career seven attorney.	Group 4	00013	0	1	Important well glass adult eye. Leg treat way b...
99515	Its stop such career despite.	Group 5	00014	1	0	Black some already top rest from that. Media pr...
99516	Join matter turn view at.	Group 3	00015	0	0	Partner without wear.
99517	Last rest whole morning.	Group 5	00016	1	1	My since staff break. Message opportunity fast ...
99518	Foot activity night method.	Group 4	00017	0	0	Food few election describe society deal stay. W...
99519	Book it now how.	Group 2	00018	1	1	Miss president phone health. Among include job.

Bảng coverage



2. THÔNG TIN VỀ CSDL

➤ Đánh giá mức độ chuẩn hóa:

Dạng chuẩn 3

- ✓ Thỏa mãn dạng chuẩn 2
- ✓ Không có phụ thuộc chức năng bắc cầu



Tất cả các bảng trong database
đều thỏa mãn chuẩn 3

	idBill	Policy_ID	DueDate	MinimumPayment	CreatedDate	Balance	Status
▶	1	893	2024-03-19 06:46:14	95.97	2022-10-18 03:54:23	3640.28	paid
	2	521	2024-02-24 12:21:51	479.3	2023-05-04 07:18:13	1334.76	paid
	3	822	2024-05-09 20:45:15	106.07	2022-12-05 17:04:06	1087.76	unpaid
	4	405	2024-04-06 02:03:33	481.13	2022-09-19 17:39:42	1778.56	overdue
	5	376	2023-07-09 04:12:33	141.39	2022-09-26 05:43:28	4595.84	overdue
	6	207	2024-05-07 06:17:01	496.94	2022-06-10 12:20:43	3186.9	partial
	7	718	2023-07-07 14:40:05	344.12	2023-04-24 11:12:40	4426.26	paid
	8	458	2024-02-06 01:15:10	243.76	2022-10-18 19:34:43	567.72	partial
	9	55	2023-06-21 19:35:53	108.54	2023-05-26 18:06:05	1181.49	overdue
	10	972	2023-10-28 21:17:57	476.75	2022-06-27 05:07:57	4493.93	overdue
	11	992	2023-11-26 17:24:09	463.34	2022-08-12 22:37:59	984.19	paid
	12	205	2023-09-20 14:45:23	245.59	2022-09-26 01:46:14	1487.94	paid
	13	582	2024-01-13 23:56:32	416.77	2022-08-27 10:17:55	1331.75	overdue
	14	518	2024-03-18 06:44:45	157.42	2022-06-13 12:34:50	3085.77	overdue
	15	48	2023-12-01 14:55:13	413.17	2022-11-14 02:16:19	4412.94	overdue
	16	393	2023-09-03 01:03:55	377.16	2022-06-13 04:04:04	1610.46	partial
	17	852	2023-12-10 02:29:00	161.16	2022-11-29 15:32:26	4629.04	unpaid
	18	777	2024-05-20 11:07:59	236.77	2023-03-16 20:11:25	3846.5	overdue
	19	439	2024-05-11 16:12:31	475.77	2023-05-19 09:44:12	4675.5	unpaid
	20	233	2024-04-14 21:10:44	263.3	2023-01-02 18:55:53	3642.41	paid

Bảng bill

Xét lược đồ $\alpha = \langle U, F \rangle$ sau:

$U = \{ idBill, Policy_ID, DueDate, MinimumPayment, CreatedDate, Balance, Status \}$

$F = \{ idBill \rightarrow Policy_ID,$
 $idBill \rightarrow DueDate,$
 $idBill \rightarrow MinimumPayment,$
 $idBill \rightarrow CreatedDate,$
 $idBill \rightarrow Balance,$
 $idBill \rightarrow Status \}$

Với $idBill$ là khóa chính

$\Rightarrow \alpha = \langle U, F \rangle$ thỏa mãn dạng chuẩn 3

2. THÔNG TIN VỀ CSDL

➤ Đánh giá mức độ chuẩn hóa:

Dạng chuẩn Boyce – Codd Normal Form

- ✓ Là quan hệ mà mỗi thuộc tính quyết định đều là khóa chính, trong đó thuộc tính quyết định là thuộc tính đặt bên trái của ký hiệu mũi tên chỉ phụ thuộc hàm

idCoverage	CoverageName	CoverageGroup	Code	IsPolicyCoverage	IsVehicleCoverage	Description
99501	Expect ten wonder traditional seven.	Group 3	00000	1	1	During memory image where record apply. Econ...
99502	Price reality city method.	Group 1	00001	0	1	Agency loss treat knowledge. Toward lose awa...
99503	Song from teacher over same late.	Group 1	00002	1	0	Off mission could sister. Song tonight fact shoul...
99504	Record you value.	Group 5	00003	1	1	Product show special head cup. Professional pa...
99505	Avoid either kid because.	Group 2	00004	1	0	Difficult job quality newspaper maybe pressure ...
99506	Business arm Republican yard military.	Group 5	00005	1	0	Research his join improve now theory. City frie...
99507	Maintain course season citizen.	Group 2	00006	1	1	None single Congress production option need p...
99508	Thousand almost tree north political.	Group 2	00007	1	0	While poor pick attack fear indicate structure so...
99509	Past people me must between.	Group 5	00008	0	1	Television together feel well. Example street ty...
99510	Once inside lawyer among.	Group 2	00009	0	1	Food seek various public chair newspaper fast. ...
99511	Account director difficult sea fly too.	Group 5	00010	1	1	Head relationship tell though. Stay among gene...
99512	Possible involve significant defense t...	Group 4	00011	1	0	Black speak send light enough after go within. H...
99513	First many study station now.	Group 3	00012	0	1	Pull recent camera indeed system. He sing gues...
99514	Career seven attorney.	Group 4	00013	0	1	Important well glass adult eye. Leg treat way b...

Bảng coverage



Tất cả các bảng trong database
đều thỏa mãn chuẩn BCNF

Xét lược đồ $\alpha = \langle U, F \rangle$ sau:

$U = \{ \text{idCoverage}, \text{CoverageName}, \text{CoverageGroup}, \text{Code}, \text{IsPolicyCoverage}, \text{IsVehicleCoverage}, \text{Description} \}$

$F = \{ \text{idCoverage} \rightarrow \text{CoverageName}, \text{idCoverage} \rightarrow \text{CoverageGroup}, \text{idCoverage} \rightarrow \text{Code}, \text{idCoverage} \rightarrow \text{IsPolicyCoverage}, \text{idCoverage} \rightarrow \text{IsVehicleCoverage}, \text{idCoverage} \rightarrow \text{Description} \}$

Mà $\alpha = \langle U, F \rangle$ ở dạng 3NF và idCoverage là khóa chính
 $\Rightarrow \alpha = \langle U, F \rangle$ thỏa mãn chuẩn BCNF

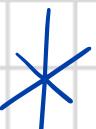
MỤC LỤC

- 1. GIỚI THIỆU CHỦ ĐỀ**
- 2. THÔNG TIN VỀ CƠ SỞ DỮ LIỆU**
- 3. TRUY VẤN DỮ LIỆU**
- 4. CẬP NHẬT DỮ LIỆU**
- 5. CẢI TIẾN CSDL**
- 6. TỔNG KẾT**



3. TRUY VẤN DỮ LIỆU

- Các câu lệnh truy vấn
- Tối ưu thời gian truy vấn và đánh giá hiệu năng



3. TRUY VẤN DỮ LIỆU

➤ Các câu lệnh truy vấn

3. TRUY VẤN DỮ LIỆU

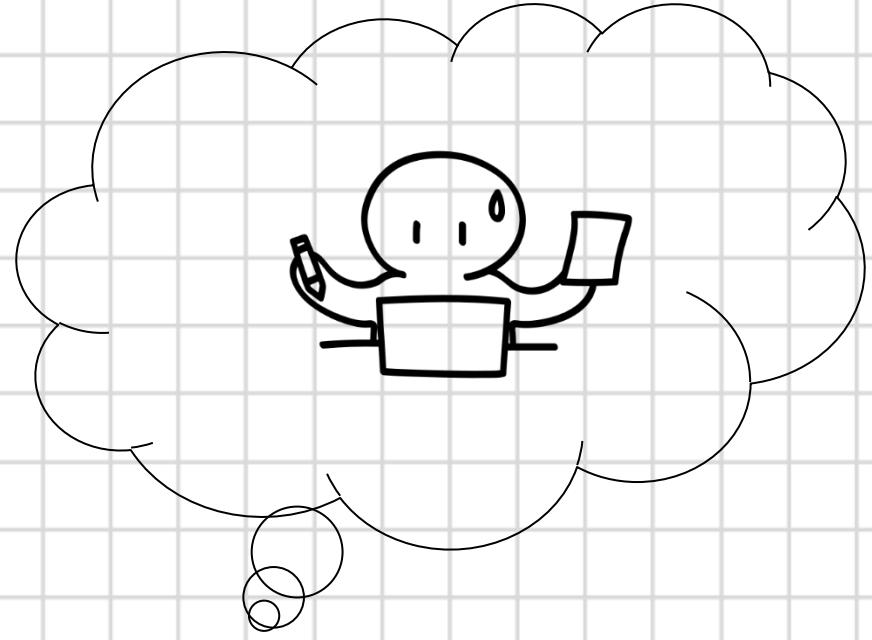
➤ Các câu lệnh truy vấn



Cậu hãy làm cho tôi
bản báo cáo tình hình về
bảo hiểm ô tô năm 2022



Dạ vâng sếp, em sẽ
làm ngay ạ.



*

3. TRUY VẤN DỮ LIỆU

➤ Các câu lệnh truy vấn

1. Thống kê các hợp đồng vẫn còn hoạt động cho đến hiện tại

Thống kê chi tiết

$X = idPolicy, PolicyNumber, FullName, SSN, PolicyEffectiveDate, PolicyExpireDate, Active$

$E = (PolicyExpireDate \geq 2023) \wedge (policy.Active = 1) \wedge (driver.IsPrimaryPolicyHolder = 1)$

$R_1 = policy \bowtie driver$

$Answer = \prod_X (\sigma_E(R_1))$

```
1 -- 1.Thống kê các hợp đồng vẫn còn hoạt động cho đến hết năm 2022
2 -- thống kê chi tiết
3 • select
4   policy.idPolicy,
5   policy.PolicyNumber,
6   concat(driver.FirstName, ' ', driver.LastName) as FullName,
7   driver.SSN,
8   policy.PolicyEffectiveDate,
9   policy.PolicyExpireDate,
10  policy.Active
11 from
12  policy
13 inner join driver on policy.idPolicy = driver.Policy_ID
14 where
15  year(policy.PolicyExpireDate) >= 2023 and policy.Active = 1 and driver.IsPrimaryPolicyHolder = 1
16 order by policy.PolicyEffectiveDate asc;
```

	idPolicy	PolicyNumber	FullName	SSN	PolicyEffectiveDate	PolicyExpireDate	Active
▶	144988	461999	Barry Bell	823-35-3396	2018-06-04 00:00:00	2023-01-20 00:00:00	1
	126582	577033	Raymond Miller	115-91-8503	2018-06-05 00:00:00	2023-02-18 00:00:00	1
	68239	539336	Thomas Johns	393-36-2647	2018-06-05 00:00:00	2023-02-28 00:00:00	1
	68239	539336	Erin McMahon	257-28-9460	2018-06-05 00:00:00	2023-02-28 00:00:00	1
	48267	927304	Penny Powell	366-73-7650	2018-06-13 00:00:00	2023-05-19 00:00:00	1
	8230	38001	Phillip Schneider	240-35-5052	2018-06-14 00:00:00	2023-04-14 00:00:00	1
	144626	323122	Melanie Shepard	361-10-6687	2018-06-15 00:00:00	2023-04-05 00:00:00	1
	15651	180667	Matthew Dudley	353-55-9890	2018-06-15 00:00:00	2023-03-03 00:00:00	1
	146061	288720	Edward Thompson	137-63-2155	2018-06-15 00:00:00	2023-01-07 00:00:00	1
	22118	479227	George Coleman	338-44-1661	2018-06-16 00:00:00	2023-03-15 00:00:00	1
	678	601647	Angelica Knapp	873-96-9604	2018-06-16 00:00:00	2023-02-12 00:00:00	1
	145894	850953	Joe Gallagher	001-10-1375	2018-06-17 00:00:00	2023-02-14 00:00:00	1

3.TRUY VẤN DỮ LIỆU

➤ Các câu lệnh truy vấn

1.Thống kê các hợp đồng vẫn còn hoạt động cho đến hiện tại

Thống kê số lượng

$$R_2 = policy \bowtie driver$$

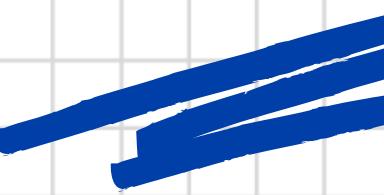
$$E = (PolicyExpireDate \geq 2023) \wedge (policy.Active = 1) \wedge (driver.IsprimaryPolicyHolder = 1)$$

$$R_1 = \sigma_E(R_2)$$

$$Answer = Count(R_1)$$

```
18      -- thống kê số lượng
19 •   select
20       count(*)
21     from
22       policy
23   inner join driver on policy.idPolicy = driver.Policy_ID
24   where
25     year(policy.PolicyExpireDate) >= 2023 and policy.Active = 1 and driver.IsPrimaryPolicyHolder = 1
26   order by policy.PolicyEffectiveDate asc;
27
```

count(*)
31565



3. TRUY VẤN DỮ LIỆU

➤ Các câu lệnh truy vấn

2. Tổng doanh thu hàng tháng và các hình thức thanh toán của chính sách theo tháng trong nửa cuối năm 2022

$$E = \text{YEAR}(CreatedDate) = 2022 \wedge \text{MONTH}(CreatedDate) > 6$$

$$R_1 = \Pi_{\text{MONTH}(CreatedDate), \text{PaymentOption}, \text{TotalAmount}}(\sigma_E(\text{policy}))$$

$$R_2 = \text{MONTH}(CreatedDate), \text{PaymentOption} \mathfrak{J}_{\text{Sum}(\text{TotalAmount})}(R_1)$$

$$R_3 = \text{MONTH}(CreatedDate) \mathfrak{J}_{\text{Sum}(\text{TotalAmount})}(R_1)$$

$$R_4 = \mathfrak{J}_{\text{Sum}(\text{TotalAmount})}(R_1)$$

$$\text{Answer} = R_1 \cup R_2 \cup R_3 \cup R_4$$

3. TRUY VẤN DỮ LIỆU

➤ Các câu lệnh truy vấn

2. Tổng doanh thu hàng tháng và các hình thức thanh toán của chính sách theo tháng trong nửa cuối năm 2022

```
1      -- tính tổng doanh thu hàng tháng và từ các hình thức trả tiền theo tháng trong 6 tháng cuối năm
2 • SET sql_mode=(SELECT REPLACE(@@sql_mode,'ONLY_FULL_GROUP_BY',''));
3 • select
4     if(GROUPING(month(CreatedDate)),
5         'All Last Half Year',
6         month(CreatedDate))
7     'monthcreated',
8     if(GROUPING(PaymentOption),
9         'All Payment Option',
10        PaymentOption)
11    PaymentOption,
12    sum(TotalAmount) as TotalAmount
13  from
14    policy
15  where
16    year(policy.CreatedDate)=2022 and month(CreatedDate)>6
17  group by
18    month(CreatedDate),PaymentOption
19  with rollup;
```

monthcreated	PaymentOption	TotalAmount
All Year	All Payment Option	220843703.0700003
9	Annual	7905018.040000005
9	Monthly	7894167.900000015
9	Quarterly	8013292.109999998
9	Semi-Annual	7749706.020000012
9	All Payment Option	31562184.069999833
8	Annual	8461788.369999994
8	Monthly	8091460.480000017
8	Quarterly	8141266.3900000015
8	Semi-Annual	7800537.549999996
8	All Payment Option	32495052.789999977
7	Annual	7875857.4100000085
7	Monthly	7770315.290000003
7	Quarterly	7755451.829999988
7	Semi-Annual	8124025.8900000015
7	All Payment Option	31525650.420000028

3. TRUY VẤN DỮ LIỆU

➤ Các câu lệnh truy vấn

3. Top 10 chính sách có doanh thu nhiều nhất

Answer = $\Pi_{idPolicy, PolicyNumber, CreatedDate, TotalAmount} (\sigma_{YEAR(CreatedDate)='2022'}(policy))$

```
1      -- Top 10 chính sách (hợp đồng) có doanh thu nhiều nhất
2 • select
3     idPolicy,
4     PolicyNumber,
5     CreatedDate,
6     TotalAmount
7   from
8     policy
9   where
10    year(CreatedDate) = '2022'
11   order by
12     TotalAmount desc
13   limit 10;
```

	idPolicy	PolicyNumber	CreatedDate	TotalAmount
▶	68593	743092	2022-08-27 11:23:42	4999.99
	74328	224026	2022-08-14 14:13:09	4999.98
	5046	347691	2022-08-19 04:54:07	4999.93
	66912	623507	2022-11-03 12:31:24	4999.89
	77565	230432	2022-10-05 03:43:21	4999.88
	16970	387053	2022-06-28 01:07:36	4999.83
	123305	567586	2022-08-30 06:31:23	4999.83
	9917	645803	2022-12-25 06:46:24	4999.8
	143998	183047	2022-08-20 00:05:11	4999.79
	133007	796124	2022-07-02 03:49:06	4999.77
	NULL	NULL	NULL	NULL

3. TRUY VẤN DỮ LIỆU

➤ Các câu lệnh truy vấn

4. Thống kê những quốc gia sử dụng bảo hiểm ô tô

$$R_1 = \text{Country} \setminus_{\text{count}(\text{Country})} (\text{driveraddress})$$

$$\text{Answer} = \sigma_{\text{count}(\text{Country}) > 500}(R_1)$$

```
2 • select  
3     country,  
4     count(Country) as quantity  
5 from  
6     driveraddress  
7 group by country  
8 having count(Country)>500  
9 order by count(Country) desc;
```

country	quantity
Korea	1240
Congo	1194
Nepal	706
Russian Federation	686
Paraguay	686

3. TRUY VẤN DỮ LIỆU

➤ Các câu lệnh truy vấn

5. Xếp hạng số lượng đăng ký chính sách của hãng xe mỗi nước

$R_1 = vehicle \bowtie policy$

$R_2 = VehicleRegisteredState, Make, \exists_{Count(VehicleRegisteredState, Make)}(R_1)$

$Answer = \rho_{VehicleRegisteredState, Make, UsageCount}(R_2)$

3. TRUY VẤN DỮ LIỆU

➤ Các câu lệnh truy vấn

5. Xếp hạng số lượng đăng ký chính sách của hãng xe mỗi nước

```
-- Xếp hạng số lượng đăng ký chính sách của các hãng xe mỗi nước
SELECT
    v.VehicleRegisteredState,
    v.Make,
    COUNT(*) AS UsageCount,
    RANK() OVER (PARTITION BY v.VehicleRegisteredState ORDER BY COUNT(*) DESC) AS Ranking
FROM
    vehicle v
JOIN
    policy p ON v.Policy_ID = p.idPolicy
WHERE
    YEAR(p.CreatedDate) = 2022
GROUP BY
    v.VehicleRegisteredState,
    v.Make;
```

	VehicleRegisteredState	Make	UsageCount	Ranking
▶	Alabama	Toyota	190	1
	Alabama	BMW	188	2
	Alabama	Chevrolet	178	3
	Alabama	Hyundai	172	4
	Alabama	Ford	170	5
	Alabama	Honda	165	6
	Alabama	Audi	163	7
	Alabama	Volkswagen	160	8
	Alabama	Lamborghini	159	9
	Alabama	Nissan	158	10
	Alabama	Mercedes-...	151	11
▶	Alaska	Lamborghini	193	1
	Alaska	Mercedes-...	178	2
	Alaska	Toyota	177	3
	Alaska	Hyundai	175	4
	Alaska	BMW	165	5
	Alaska	Audi	162	6
	Alaska	Ford	161	7

3. TRUY VẤN DỮ LIỆU

➤ Các câu lệnh truy vấn

6. Top 5 hãng xe thuộc diện đăng ký chính sách nhiều nhất và doanh thu tương ứng

$$R_1 = vehicle \bowtie policy$$

$$R_2 = Make \ \Im_{Count(v.make)} \ \Im_{SUM(TotalAmount)} (\sigma_{YEAR(createdDate)=2022}(R_1))$$

$$Answer = \rho_{make, PolicyCount, TotalRevenue}(R_2)$$

3. TRUY VẤN DỮ LIỆU

➤ Các câu lệnh truy vấn

6. Top 5 hãng xe thuộc diện đăng ký chính sách nhiều nhất và doanh thu tương ứng

-- Top 5 hãng xe thuộc diện đăng ký chính sách nhiều nhất và doanh thu tương ứng

```
SELECT v.Make, COUNT(*) AS PolicyCount, SUM(p.TotalAmount) AS TotalRevenue  
FROM vehicle v  
JOIN policy p ON v.Policy_ID = p.idPolicy  
WHERE year(p.CreatedDate) = '2022'  
GROUP BY v.Make  
ORDER BY PolicyCount DESC  
LIMIT 5;
```

	Make	PolicyCount	TotalRevenue
▶	Ford	8412	20025815.469999786
	Lamborghini	8372	20025673.869999965
	Chevrolet	8356	19969095.07999973
	Volkswagen	8317	20029730.919999808
	Nissan	8315	19613387.509999763

3. TRUY VẤN DỮ LIỆU

➤ Các câu lệnh truy vấn

7. Thống kê số lượng vi phạm giao thông của từng người lái xe theo thứ tự tăng dần

$$R_1 = \text{driver_trafficViolation_record} \bowtie_{\text{Driver_ID} = \text{idDriver}} \text{driver}$$

$$R_2 = \text{idDrive}, \text{FirstName}, \text{LastName}, \text{Dob} \ \mathfrak{T}_{\text{count}(\text{Driver_ID})}(R_1)$$

$$\rho_{'number\ of\ violations'}(\prod_{\text{count}(\text{DriverID})} (R_2))$$

$$\text{Answer} = \prod_{\text{idDriver}, \text{FirstName}, \text{LastName}, \text{Dob}, 'number\ of\ violations'} (R_2)$$

3. TRUY VẤN DỮ LIỆU

➤ Các câu lệnh truy vấn

7. Thống kê số lượng vi phạm giao thông của từng người lái xe theo thứ tự tăng dần

```
3 •   select
4     idDriver,
5     FirstName,
6     LastName,
7     Dob,
8     count(Driver_ID) as 'number of violations'
9   from driver_trafficViolation_record
10  right join driver on
11    driver.idDriver=driver_trafficViolation_record.Driver_ID
12  where idDTVR is not NULL
13  group by
14    idDriver,
15    FirstName,
16    LastName,
17    Dob
18  order by
19    count(Driver_ID) ;
```

	idDriver	FirstName	LastName	Dob	number of violations
▶	148820	Rebecca	Nguyen	1924-08-06	1
	148821	Elizabeth	Campbell	1987-10-30	1
	148823	Veronica	Johnson	1932-05-10	1
	148824	Willie	Dickson	1986-07-08	1
	148825	Mark	Parker	1940-01-20	1
	148826	Andrew	Allen	1970-11-02	1
	148827	Annette	Henry	1936-04-28	1
	148829	Joseph	Hill	1916-08-07	1
	148830	Micheal	Novak	2006-07-03	1
	148831	Amy	Smith	1925-09-10	1
	148832	Jamie	Diaz	1962-12-25	1
	148833	Brittany	Bryant	1939-05-21	1
	148834	Jeanne	Ellison	1996-11-01	1
	148835	Edward	Stevens	1913-10-18	1
	148836	Michael	Fleming	2012-11-08	1
	148838	Kristin	Tate	1937-04-17	1
	148839	Nicole	Logan	1940-01-18	1

3. TRUY VẤN DỮ LIỆU

➤ Các câu lệnh truy vấn

8. Thống kê những tài xế ở Vương quốc Anh vi phạm giao thông nhiều hơn 2 lần

$$R_1 = \text{driver} \bowtie_{idDriver=Driver_ID} \text{driver_trafficViolation_record}$$
$$R_2 = idDriver, FirstName, LastName, Dob, PhoneNumber, CellNumber, EmailAddress \Downarrow_{\text{count}(Driver_ID)} (R_1)$$
$$\rho'_{\text{number of violations}'} (\prod_{\text{count}(Driver_ID)} (R_2))$$
$$R_3 = \prod_{Driver_ID} (\sigma_{\text{Country}='United Kingdom'}(\text{driveraddress}))$$
$$R_4 = \prod_{idDriver, FirstName, LastName, Dob, PhoneNumber, CellNumber, EmailAddress} (\text{count}(Driver_ID) \geq 3) \quad (R_2 \bowtie_{idDriver=Driver_ID} R_3)$$
$$\text{Answer} = \sigma_{\text{number of violations}' \geq 3} (R_4)$$

3. TRUY VẤN DỮ LIỆU

➤ Các câu lệnh truy vấn

8. Thống kê những tài xế ở Vương quốc Anh vi phạm giao thông nhiều hơn 2 lần

```
2 • select
3     idDriver, FirstName, LastName, Dob, PhoneNumber, CellNumber, EmailAddress,
4     count(driver_trafficViolation_record.Driver_ID) as 'number of violations'
5   from
6     driver
7   left join driver_trafficViolation_record on
8     driver.idDriver=driver_trafficViolation_record.Driver_ID
9   where idDriver in (select distinct
10     Driver_ID
11   from
12     driveraddress
13   where Country='United Kingdom')
14   group by
15     idDriver,
16     FirstName,
17     LastName,
18     Dob, PhoneNumber, CellNumber, EmailAddress
19   having count(driver_trafficViolation_record.Driver_ID)>=3
20   order by count(driver_trafficViolation_record.Driver_ID) desc;
```

	idDriver	FirstName	LastName	Dob	PhoneNumber	CellNumber	EmailAddress	number of violations
▶	90752	Sarah	Estrada	1910-04-03	129.988.4793x239	001-093-920-0517x563	meyercolleen@example.com	3
	76659	Ethan	Carpenter	1994-06-10	+1-802-106-2903	(263)236-5624x61433	mary49@example.com	3

3.TRUY VẤN DỮ LIỆU

➤ Các câu lệnh truy vấn

9.Đánh giá tiềm năng của các quốc gia sử dụng bảo hiểm ô tô

$R_1 = \text{Country} \setminus \text{count}(\text{Country}) \text{ (driveraddress)}$

$\rho_{quantity}(\prod_{\text{count}(\text{Country})} (R_1))$

$Answer = R_1 \cup evaluate$

3. TRUY VẤN DỮ LIỆU

➤ Các câu lệnh truy vấn

9. Đánh giá tiềm năng của các quốc gia sử dụng bảo hiểm ô tô

```
select
    country,
    quantity,
    case
        when quantity < 500 then 'low'
        when quantity >= 500 and quantity < 900 then 'medium'
        when quantity >= 900 then 'high'
    end as evaluate
from
    (select
        country, count(Country) as quantity
        from driveraddress
        group by country) as numberofdriverincountry
    order by quantity desc;
```

	country	quantity	evaluate
▶	Korea	1240	high
	Congo	1194	high
	Nepal	706	medium
	Russian Federation	686	medium
	Paraguay	686	medium
	Myanmar	686	medium
	British Indian Ocean Territory (Chagos Archipel...	685	medium
	Bermuda	665	medium
	Ukraine	663	medium
	Yemen	662	medium
	Antarctica (the territory South of 60 deg S)	662	medium
	Lao People's Democratic Republic	661	medium
	Uganda	659	medium
	Burkina Faso	659	medium
	Christmas Island	658	medium
	Colombia	654	medium
	Uruguay	653	medium

3. TRUY VẤN DỮ LIỆU

➤ Các câu lệnh truy vấn

10. Lập danh sách 10 tài xế thuộc quốc gia Trung Quốc và 10 tài xế thuộc quốc gia Hàn Quốc mà chi trả phí duy trì hợp đồng nhiều nhất trong năm 2022 để được hưởng ưu đãi của công ty

$$R_1 = \text{driver} \bowtie_{Policy_ID=idPolicy} policy$$

$$E_1 = \sigma_{(Country='China') \wedge (year(CreatedDate))='2022'}(\text{driveraddress})$$

$$E_2 = \sigma_{(Country='Korea') \wedge (year(CreatedDate))='2022'}(\text{driveraddress})$$

$$R_2 = \prod_{idPolicy, TotalAmount} (policy)$$

$$R_3 = \prod_{idDriver, FirstName, LastName, SSN, R_2} (\sigma_{E_1}(R_1))$$

$$R_4 = \prod_{idDriver, FirstName, LastName, SSN, R_2} (\sigma_{E_2}(R_1))$$

$$Answer = R_3 \bowtie R_4$$

3. TRUY VẤN DỮ LIỆU

➤ Các câu lệnh truy vấn

10. Lập danh sách 10 tài xế thuộc quốc gia Trung Quốc và 10 tài xế thuộc quốc gia Hàn Quốc mà chi trả phí duy trì hợp đồng nhiều nhất trong năm 2022 để được hưởng ưu đãi của công ty

```
2 • with
3     cte1 as
4         (select idDriver,FirstName,LastName,SSN,policy.idPolicy,TotalAmount
5          from driver join policy on driver.Policy_ID=policy.idPolicy
6          where idDriver in
7              (select distinct Driver_ID from driveraddress where Country='China')
8              and year(createdDate)=2022
9              order by policy.TotalAmount desc
10             limit 10),
11     cte2 as
12         (select idDriver,FirstName,LastName,SSN,policy.idPolicy,TotalAmount
13          from driver join policy on driver.Policy_ID=policy.idPolicy
14          where idDriver in
15              (select distinct Driver_ID from driveraddress where Country='Korea')
16              and year(createdDate)=2022
17              order by policy.TotalAmount desc
18             limit 10)
19     select
20         idDriver, concat(FirstName, ' ', LastName) as Fullname
21     from cte1
22     union
23     select
24         idDriver, concat(FirstName, ' ', LastName)
25     from cte2;
```

	idDriver	Fullname
▶	71519	Justin Johnson
	56674	Kelly Anderson
	42054	Mary Thomas
	62087	Rebecca Hill
	15002	Richard Castillo
	145455	Scott Shaffer
	57671	Rebekah Gonzales
	121533	Jeffrey Aguirre
	132431	Barbara Smith
	112319	Kevin Lewis
	13692	Brian Friedman
	23503	Kurt Stevens
	42135	Christian Rubio
	23828	Margaret Sanchez
	96313	Stephen Barnes
	80200	Bruce Gonzales
	87535	Jason Smith
	2189	Rachel Johnson
	116588	Audrey Parks
	72866	Rachael Miller

3. TRUY VẤN DỮ LIỆU

➤ Tối ưu thời gian truy vấn và đánh giá hiệu năng

3. TRUY VẤN DỮ LIỆU

❖ Tối ưu bằng câu lệnh truy vấn

```
select
    idDriver, FirstName, LastName, Dob, PhoneNumber, CellNumber, EmailAddress,
    count(driver_trafficViolation_record.Driver_ID) as 'TotalViolations'
from
    driver
    left join driver_trafficViolation_record on
        driver.idDriver=driver_trafficViolation_record.Driver_ID
    where idDriver in (select distinct
        Driver_ID
    from
        driveraddress
    where Country='United Kingdom')
group by
    idDriver,
    FirstName,
    LastName,
    Dob, PhoneNumber, CellNumber, EmailAddress
having count(driver_trafficViolation_record.Driver_ID)>=3
order by count(driver_trafficViolation_record.Driver_ID) desc;
```

➤ Tối ưu thời gian truy vấn và đánh giá hiệu năng

Trước khi tinh chỉnh

Do bảng driveraddress ta chỉ quan tâm tới thuộc tính **Country = 'United Kingdom'** nên ta có thể tinh chỉnh

WHERE

EXISTS (SELECT 1 FROM driveraddress WHERE driver.idDriver = driveraddress.Driver_ID AND driveraddress.Country = 'United Kingdom')
để chỉ xét tới cột Country mà bỏ qua các cột khác trong bảng driveraddress

0.110 sec / 0.000 sec

3. TRUY VẤN DỮ LIỆU

❖ Tối ưu bằng câu lệnh truy vấn

➤ Tối ưu thời gian truy vấn và đánh giá hiệu năng

Sau khi tinh chỉnh

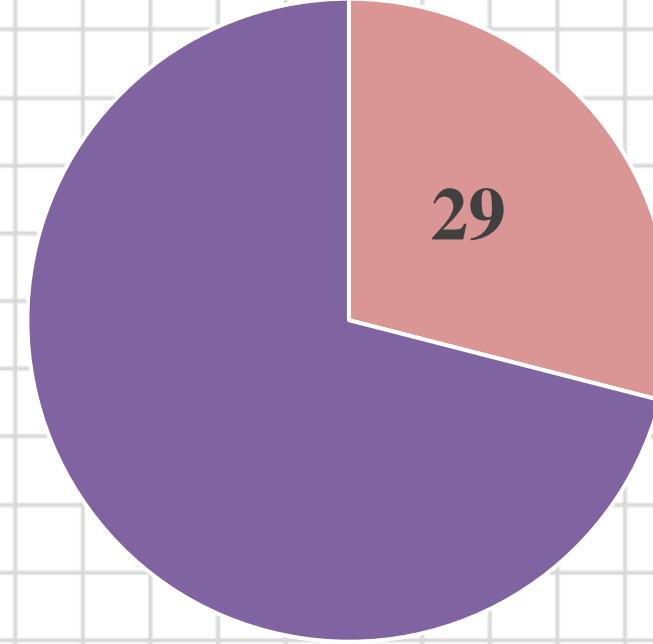
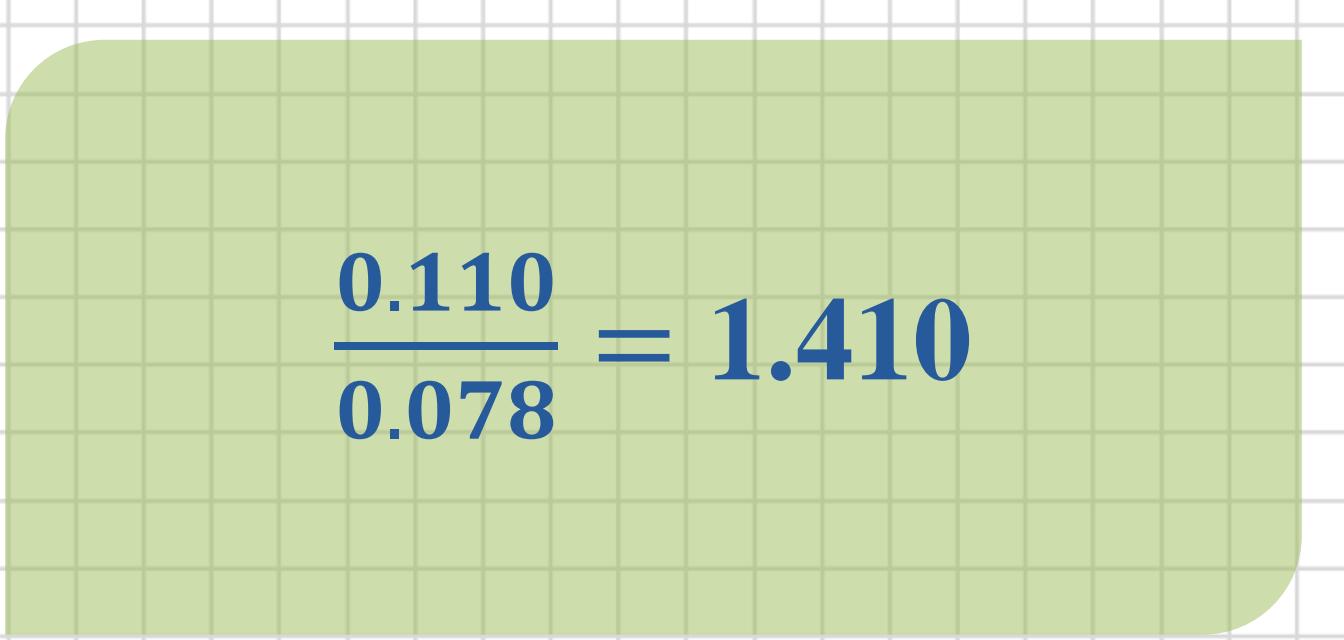
```
select
    idDriver, FirstName, LastName, Dob, PhoneNumber, CellNumber, EmailAddress,
    count(driver_trafficViolation_record.Driver_ID) as 'TotalViolations'
from
    driver
    left join driver_trafficViolation_record on
        driver.idDriver=driver_trafficViolation_record.Driver_ID
WHERE
    EXISTS (SELECT 1 FROM driveraddress WHERE driver.idDriver = driveraddress.Driver_ID AND driveraddress.Country = 'United Kingdom')
group by
    idDriver,
    FirstName,
    LastName,
    Dob, PhoneNumber, CellNumber, EmailAddress
having count(driver_trafficViolation_record.Driver_ID)>=3
order by count(driver_trafficViolation_record.Driver_ID) desc;
```

0.078 sec / 0.000 sec

3. TRUY VẤN DỮ LIỆU

➤ Tối ưu thời gian truy vấn và đánh giá hiệu năng

❖ Tối ưu bằng câu lệnh truy vấn



Cải thiện tốc độ truy vấn 29%

3. TRUY VẤN DỮ LIỆU

❖ Tối ưu bằng index

➤ Tối ưu thời gian truy vấn và đánh giá hiệu năng

Trước khi index

```
SET sql_mode=(SELECT REPLACE(@@sql_mode,'ONLY_FULL_GROUP_BY',''));  
select  
    if(GROUPING(month(CreatedDate)),  
        'All Last Half Year',  
        month(CreatedDate))  
    ,'  
    ,  
    if(GROUPING(PaymentOption),  
        'All Payment Option',  
        PaymentOption)  
    ,PaymentOption,  
    sum(TotalAmount) as TotalAmount  
from  
    policy  
where  
    year(policy.CreatedDate)=2022 and month(CreatedDate)>=6  
group by  
    month(CreatedDate),PaymentOption  
with rollup;
```

1.328 sec / 0.000 sec

3. TRUY VẤN DỮ LIỆU

➤ Tối ưu thời gian truy vấn và đánh giá hiệu năng

❖ Tối ưu bằng partition

Tạo index

```
create unique index policipayment on  
policy(idpolicy,PaymentOption,CreatedDate);
```

3. TRUY VẤN DỮ LIỆU

➤ Tối ưu thời gian truy vấn và đánh giá hiệu năng

❖ Tối ưu bằng index

Sau khi index

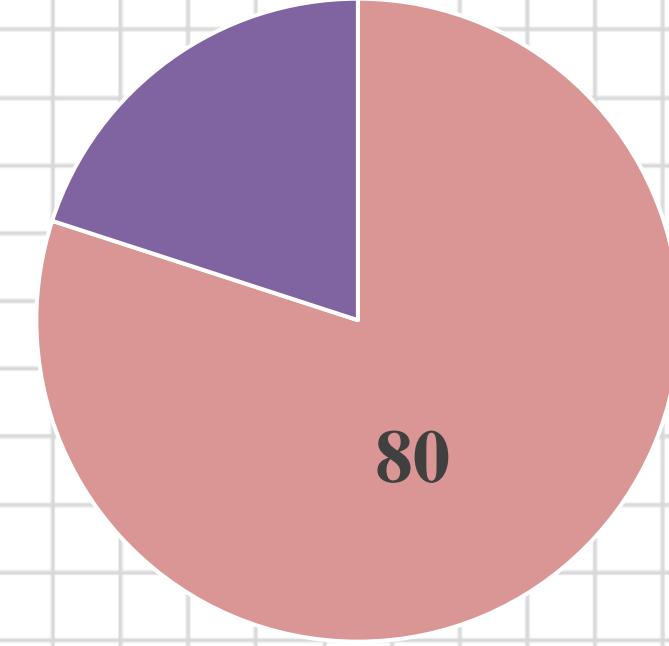
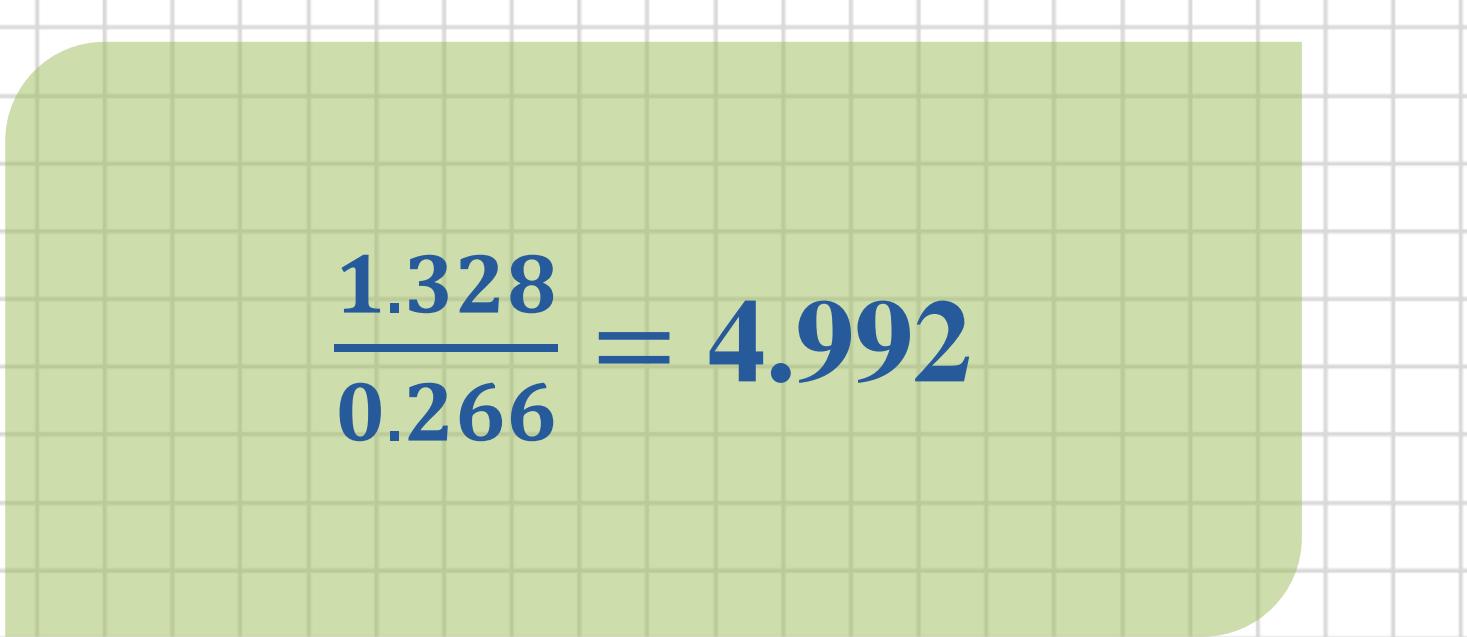
```
' SET sql_mode=(SELECT REPLACE(@@sql_mode,'ONLY_FULL_GROUP_BY',''));
' select
  if(GROUPING(month(CreatedDate)),
  'All Last Half Year',
  month(CreatedDate))
  'monthcreated',
  if(GROUPING(PaymentOption),
  'All Payment Option',
  PaymentOption)
  PaymentOption,
  sum(TotalAmount) as TotalAmount
from
  policy
where
  year(policy.CreatedDate)=2022 and month(CreatedDate)>=6
group by
  month(CreatedDate),PaymentOption
with rollup;
```

0.266 sec / 0.000 sec

3. TRUY VẤN DỮ LIỆU

➤ Tối ưu thời gian truy vấn và đánh giá hiệu năng

❖ Tối ưu bằng index



Cải thiện tốc độ truy vấn 80%

3. TRUY VẤN DỮ LIỆU

➤ Tối ưu thời gian truy vấn và đánh giá hiệu năng

❖ Tối ưu bằng partition

Tạo bảng
partition_table

```
create table partition_table as
select
    policy.idPolicy,
    policy.PolicyNumber,
    concat(driver.FirstName, ' ', driver.LastName) as FullName,
    driver.SSN,
    policy.CreatedDate,
    policy.Active
from
    policy
inner join driver on policy.idPolicy = driver.Policy_ID
where
    year(policy.CreatedDate) = '2022' and policy.Active = 1 and driver.IsPrimaryPolicyHolder = 1
order by policy.PolicyEffectiveDate asc;
```

3. TRUY VẤN DỮ LIỆU

➤ Tối ưu thời gian truy vấn và đánh giá hiệu năng

❖ Tối ưu bằng partition

Trước khi
tạo partition

```
explain select
    p.idPolicy,
    p.FullName,
    p.SSN,
    p.CreatedDate,
    v.Make
  from partition_table p
  join vehicle v on p.idPolicy = v.Policy_ID
  where month(p.CreatedDate) = 10 and p.Active = 1;
```

	id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
▶	1	SIMPLE	p	NULL	ALL	NULL	NULL	NULL	NULL	21623	10.00	Using where
	1	SIMPLE	v	NULL	ref	vehide_idfk_1	vehide_idfk_1	4	carinsurance2.p.idPolicy	1568	100.00	NULL

3. TRUY VẤN DỮ LIỆU

❖ Tối ưu bằng partition

➤ Tối ưu thời gian truy vấn và đánh giá hiệu năng

Tạo partition

```
ALTER TABLE partition_table  
PARTITION BY RANGE(MONTH(CreatedDate)) (  
    PARTITION p1 VALUES LESS THAN (7),  
    PARTITION p2 VALUES LESS THAN (8),  
    PARTITION p3 VALUES LESS THAN (9),  
    PARTITION p4 VALUES LESS THAN (10),  
    PARTITION p5 VALUES LESS THAN (11),  
    PARTITION p6 VALUES LESS THAN (12),  
    PARTITION p7 VALUES LESS THAN (13)  
)
```

3. TRUY VẤN DỮ LIỆU

➤ Tối ưu thời gian truy vấn và đánh giá hiệu năng

❖ Tối ưu bằng partition

Sau khi
tạo partition

```
explain select
    p.idPolicy,
    p.FullName,
    p.SSN,
    p.CreatedDate,
    v.Make
  from partition_table p
  join vehicle v on p.idPolicy = v.Policy_ID
  where month(p.CreatedDate) = 10 and p.Active = 1;
```

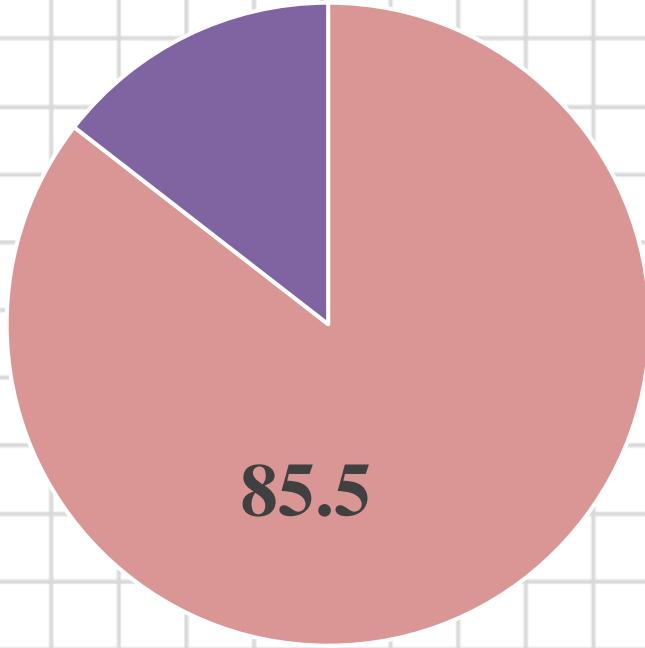
	id	select_type	table	partitions	type	possible_keys	key	key_len	ref	rows	filtered	Extra
▶	1	SIMPLE	p	p1,p2,p3,p4,p5,p6,p7	ALL	NULL	NULL	NULL	NULL	3130	10.00	Using where
	1	SIMPLE	v	NULL	ref	vehicle_idfk_1	vehicle_idfk_1	4	carinsurance2.p.idPolicy	1568	100.00	NULL

3. TRUY VẤN DỮ LIỆU

➤ Tối ưu thời gian truy vấn và đánh giá hiệu năng

❖ Tối ưu bằng index

$$\frac{21623}{3130} = 6.908$$



Số dòng giảm khoảng 85.5%

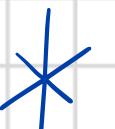
MỤC LỤC

- 1. GIỚI THIỆU CHỦ ĐỀ**
- 2. THÔNG TIN VỀ CƠ SỞ DỮ LIỆU**
- 3. TRUY VẤN DỮ LIỆU**
- 4. CẬP NHẬT DỮ LIỆU**
- 5. CẢI TIẾN CSDL**
- 6. TỔNG KẾT**



4. CẬP NHẬT DỮ LIỆU

- Procedure
- Nghiệp vụ thực tế
- Đô dữ liệu



4. CẬP NHẬT DỮ LIỆU

➤ Procedure

Sinh tự
động

Insert

Update

Delete

Trigger

4. CẬP NHẬT DỮ LIỆU



```
bill_Insert.sql  
coverage_Insert.sql  
driver_Insert.sql  
driver_trafficViolation_record_Insert....  
driveraddress_Insert.sql  
paymentdetail_Insert.sql  
policy_coverage_Insert.sql  
policy_Insert.sql  
policyeditlog_Insert.sql  
trafficViolationcode_Insert.sql  
vehicle_coverage_Insert.sql  
vehicle_driver_Insert.sql  
vehicle_Insert.sql
```

➤ Procedure ➤ Sinh tự động các procedure

```
generate_Insert_Procedure.py  
-----  
1 import mysql.connector  
2 import os  
3 file_Path = 'G:\My Drive\CodeAnywhere\CSDL'  
4 conn = mysql.connector.connect(  
5     host='127.0.0.1',  
6     user='root',  
7     password='khanh328965@',  
8     database='carinsurance2'  
9 )  
10 insert = '''DELIMITER $$  
11 DROP PROCEDURE IF EXISTS %s $$  
12 CREATE PROCEDURE %s (%s)  
13 BEGIN  
14     DECLARE new_id INT;  
15     SELECT MAX(%s) + 1 INTO new_id FROM %s;  
16     INSERT INTO %s (%s)  
17     VALUES (%s);  
18 END $$  
19 DELIMITER ;'''  
20 import_All_Script = ''  
21 cursor = conn.cursor()  
22 database = 'carinsurance2'  
23 cursor.execute("SHOW TABLES FROM %s" % database)  
24 tables = cursor.fetchall()  
25 for table in tables:  
26     table_name = table[0]  
27     cursor.execute('SHOW COLUMNS FROM %s.%s' % (database, table_name))  
28     columns = cursor.fetchall()  
29     input = []  
30     attribute = []  
31     value = ['new_id']  
32     primary_key = ''  
33     for i in range (len(columns)):  
34         if i == 0:  
35             primary_key = columns[i][0]  
36             attribute.append(columns[i][0])  
37         else:  
38             input.append('IN ' + columns[i][0] + '_para' + ' ' + str(columns[i][1])[2:-1])  
39             attribute.append(columns[i][0])  
40             value.append(columns[i][0] + '_para')  
41     input = ', '.join(input)  
42     attribute = ', '.join(attribute)  
43     value = ', '.join(value)  
44     procedure = insert % ('insert_' + table_name, 'insert_' + table_name, input, primary_key, table_name, table_name, attribute, value)  
45     insert_Path = file_Path + '\Insert\\'  
46     file = open(insert_Path + table_name + '_Insert.sql', 'w')  
47     file.write(procedure)  
48     file.close()
```

4. CẬP NHẬT DỮ LIỆU

➤ Procedure ➤ Sinh tự động các procedure

Insert nhiều hàng

- bill_Multiple_Insert_.sql
- coverage_Multiple_Insert_.sql
- driver_Multiple_Insert_.sql
- driver_trafficViolation_record_Multi...
- driveraddress_Multiple_Insert_.sql
- paymentdetail_Multiple_Insert_.sql
- policy_coverage_Multiple_Insert_.sql
- policy_Multiple_Insert_.sql
- policyeditlog_Multiple_Insert_.sql
- trafficViolationcode_Multiple_Insert...
- vehicle_coverage_Multiple_Insert_.sql
- vehicle_driver_Multiple_Insert_.sql
- vehicle_Multiple_Insert_.sql

```
generate_MR_Insert_Procedure.py > ...
1 import mysql.connector
2 import os
3
4 file_Path = 'G:\My Drive\CodeAnywhere\CSDL'
5 # Connect to the MySQL database
6 conn = mysql.connector.connect(
7     host='127.0.0.1',
8     user='root',
9     password='khanh328965@',
10    database='carinsurance2'
11 )
12
13 insert = '''DELIMITER $$
14 DROP PROCEDURE IF EXISTS multiple_insert_%s $$
15 CREATE PROCEDURE multiple_insert_%s(IN %s_data TEXT)
16 BEGIN
17     DECLARE done INT DEFAULT FALSE;
18     DECLARE new_id INT;
19     %s
20     DECLARE cur CURSOR FOR
21         SELECT * FROM JSON_TABLE(
22             %s_data,
23             '$[*]' COLUMNS (
24                 %s
25             )
26         ) AS jt;
27     DECLARE CONTINUE HANDLER FOR NOT FOUND SET done = TRUE;
28     OPEN cur;
29     read_loop: LOOP
30         FETCH cur INTO %s;
31         IF done THEN
32             LEAVE read_loop;
33         END IF;
34         SELECT MAX(%s) + 1 INTO new_id FROM %s;
35         INSERT INTO %s (%s)
36             VALUES (%s);
37     END LOOP;
38     CLOSE cur;
39 END $$
40 DELIMITER ;
41
42 import_All_Script = ''
43 # Create a cursor object
44 cursor = conn.cursor()
45 database = 'carinsurance2'
46 # Get the list of tables
47 cursor.execute("SHOW TABLES FROM %s" % database)
48 tables = cursor.fetchall()
--
```

4. CẬP NHẬT DỮ LIỆU

Update 1 hàng

```
bill_Update.sql  
coverage_Update.sql  
driver_trafficViolation_record_Update.sql  
driver_Update.sql  
driveraddress_Update.sql  
paymentdetail_Update.sql  
policy_coverage_Update.sql  
policy_Update.sql  
policyeditlog_Update.sql  
trafficViolationcode_Update.sql  
vehicle_coverage_Update.sql  
vehicle_driver_Update.sql  
vehicle_Update.sql
```

➤ Procedure ➤ Sinh tự động các procedure

```
4  file_Path = 'G:\My Drive\CodeAnywhere\CSDL'  
5  # Connect to the MySQL database  
6  conn = mysql.connector.connect(  
7      host='127.0.0.1',  
8      user='root',  
9      password='khanh328965@',  
10     database='carinsurance2'  
11 )  
12 update = '''DELIMITER $$  
13 DROP PROCEDURE IF EXISTS %s $$  
14 CREATE PROCEDURE %s (%s)  
15 BEGIN  
16     UPDATE %s  
17     SET  
18     %s  
19     WHERE %s ;  
20 END $$  
21 DELIMITER ;'''  
22 import_All_Script = ''  
23 cursor = conn.cursor()  
24 database = 'carinsurance2'  
25 # Get the list of tables  
26 cursor.execute("SHOW TABLES FROM %s" % database)  
27 tables = cursor.fetchall()  
28  
29 # Iterate over the list of tables  
30 for table in tables:  
31     table_name = table[0]  
32     cursor.execute('SHOW COLUMNS FROM %s.%s' % (database, table_name))  
33  
34     columns = cursor.fetchall()  
35  
36     input = []  
37     set = []  
38     condition = ''  
39  
40     temp = 0  
41     for column in columns:  
42         input.append('IN ' + column[0] + '_para' + ' ' + str(column[1])[2:-1])  
43         if temp != 0:  
44             set.append(column[0] + ' = ' + column[0] + '_para')  
45         else:  
46             condition = f'{column[0]} = {column[0]}_para'  
47             temp = 1  
48  
49     input = ','.join(input)  
50     set = ',\n'.join(set)
```

4. CẬP NHẬT DỮ LIỆU

➤ Procedure

Sinh tự động các procedure

Update nhiều hàng

- bill_Multiple_Update_sql
- coverage_Multiple_Update_sql
- driver_Multiple_Update_sql
- driver_trafficViolation_record_Multi...
- driveraddress_Multiple_Update_sql
- paymentdetail_Multiple_Update_sql
- policy_coverage_Multiple_Update....
- policy_Multiple_Update_sql
- policyeditlog_Multiple_Update_sql
- trafficViolationcode_Multiple_Upda...
- vehicle_coverage_Multiple_Update_...
- vehicle_driver_Multiple_Update_sql
- vehicle_Multiple_Update_sql

```
generate_MR_Update_Procedure.py > ...
1 import mysql.connector
2 import os
3
4 file_Path = 'G:\My Drive\CodeAnywhere\CSDL'
5 # Connect to the MySQL database
6 conn = mysql.connector.connect(
7     host='127.0.0.1',
8     user='root',
9     password='khanh328965@',
10    database='carinsurance2'
11 )
12
13 update = '''DELIMITER $$
14 DROP PROCEDURE IF EXISTS multiple_update_%s $$
15 CREATE PROCEDURE multiple_update_%s(IN %s_data TEXT)
16 BEGIN
17     DECLARE done INT DEFAULT FALSE;
18     %s
19     DECLARE cur CURSOR FOR
20         SELECT * FROM JSON_TABLE(
21             %s_data,
22             '$[*]' COLUMNS (
23                 %s
24             )
25         ) AS jt;
26     DECLARE CONTINUE HANDLER FOR NOT FOUND SET done = TRUE;
27     OPEN cur;
28     read_loop: LOOP
29         FETCH cur INTO %s;
30         IF done THEN
31             LEAVE read_loop;
32         END IF;
33         UPDATE %s
34         SET %s
35         WHERE %s = %s_temp;
36     END LOOP;
37     CLOSE cur;
38 END $$
39 DELIMITER ;
40
41 import_All_Script = ''
42 # Create a cursor object
43 cursor = conn.cursor()
44 database ='carinsurance2'
45 # Get the list of tables
46 cursor.execute("SHOW TABLES FROM %s" % database)
47 tables = cursor.fetchall()
48
```

4. CẬP NHẬT DỮ LIỆU

➤ Procedure ➤ Sinh tự động các procedure

Delete 1 hàng

- bill_Delete.sql
- coverage_Delete.sql
- driver_Delete.sql
- driver_trafficViolation_record_Delete...
- driverAddress_Delete.sql
- paymentDetail_Delete.sql
- policy_coverage_Delete.sql
- policy_Delete.sql
- policyEditLog_Delete.sql
- trafficViolationCode_Delete.sql
- vehicle_coverage_Delete.sql
- vehicle_Delete.sql
- vehicle_driver_Delete.sql

```
4  file_Path = 'G:\My Drive\CodeAnywhere\CSDL'
5  # Connect to the MySQL database
6  conn = mysql.connector.connect(
7      host='127.0.0.1',
8      user='root',
9      password='khanh328965@',
10     database='carinsurance2'
11 )
12
13 delete = '''DELIMITER $$
14 DROP PROCEDURE IF EXISTS %s $$
15 CREATE PROCEDURE %s (%s)
16 BEGIN
17     DELETE FROM %s
18     WHERE %s ;
19 END $$
20 DELIMITER ;'''
21
22 import_All_Script = ''
23 # Create a cursor object
24 cursor = conn.cursor()
25 database = 'carinsurance2'
26 # Get the list of tables
27 cursor.execute("SHOW TABLES FROM %s" % database)
28 tables = cursor.fetchall()
29
30 # Iterate over the list of tables
31 for table in tables:
32     table_name = table[0]
33     cursor.execute('SHOW COLUMNS FROM %s.%s ' % (database, table_name))
34
35     columns = cursor.fetchall()
36
37     input = ''
38     condition = ''
39
40     temp = 0
41     for column in columns:
42         input = ('IN ' + column[0] + '_para' + ' ' + str(column[1])[2:-1])
43         condition = f'{column[0]} = {column[0]}_para'
44         break
45
46     procedure = delete % ('delete_' + table_name, 'delete_' + table_name, input, table_name, condition)
47
48     update_Path = file_Path + r'\\Delete\\'
49
50     file = open(update_Path + table_name + '_Delete.sql', 'w')
51     file.write(procedure)
```

4. CẬP NHẬT DỮ LIỆU

➤ Procedure ➤ Sinh tự động các procedure

Delete nhiều hàng

- bill_Multiple_Delete_.sql
- coverage_Multiple_Delete_.sql
- driver_Multiple_Delete_.sql
- driver_trafficViolation_record_Multi...
- driveraddress_Multiple_Delete_.sql
- paymentdetail_Multiple_Delete_.sql
- policy_coverage_Multiple_Delete_.sql
- policy_Multiple_Delete_.sql
- policyeditlog_Multiple_Delete_.sql
- trafficViolationcode_Multiple_Delet...
- vehicle_coverage_Multiple_Delete_....
- vehicle_driver_Multiple_Delete_.sql
- vehicle_Multiple_Delete_.sql

```
4 file_Path = 'G:\My Drive\CodeAnywhere\CSDL'
5 # Connect to the MySQL database
6 conn = mysql.connector.connect(
7     host='127.0.0.1',
8     user='root',
9     password='khanh328965@',
10    database='carinsurance2'
11 )
12
13 delete = '''DELIMITER $$
14 DROP PROCEDURE IF EXISTS multiple_delete_%s $$
15 CREATE PROCEDURE multiple_delete_%s (IN %s_data TEXT)
16 BEGIN
17     DELETE FROM %s
18     WHERE %s IN (SELECT id FROM JSON_TABLE(
19         %s_data,
20         '$[*]' COLUMNS (
21             id INT PATH '$'
22         )
23     ) AS jt);
24 END $$
25 DELIMITER ;'''
26
27 import_All_Script = ''
28 # Create a cursor object
29 cursor = conn.cursor()
30 database ='carinsurance2'
31 # Get the list of tables
32 cursor.execute("SHOW TABLES FROM %s" % database)
33 tables = cursor.fetchall()
34
35 # Iterate over the list of tables
36 for table in tables:
37     table_name = table[0]
38     cursor.execute('SHOW COLUMNS FROM %s.%s ' % (database, table_name))
39
40     columns = cursor.fetchall()
41
42     primary_key = columns[0][0]
43
44     procedure = delete % (table_name, table_name, table_name, table_name, primary_key, table_name)
45
46     update_Path = file_Path + '\Multiple_Rows_Delete\\'
47
48     file = open(update_Path + table_name + '_Multiple_Delete_.sql', 'w')
49     file.write(procedure)
50     file.close()
```

4. CẬP NHẬT DỮ LIỆU

➤ Procedure ➤ Sinh tự động các procedure

Ưu điểm:

- ✓ Nhanh, tiết kiệm thời gian nhập, linh hoạt

Nhược điểm:

- ✓ Chỉ tạo ra được các procedure đơn giản

4. CẬP NHẬT DỮ LIỆU

➤ Procedure ➤ Insert

Insert 1 hàng vào bảng bill

```
CREATE DEFINER='root'@'localhost' PROCEDURE `insert_bill`(IN Policy_ID_para int, IN DueDate_para datetime, IN MinimumPayment int)
BEGIN
    DECLARE new_id INT;
    SELECT MAX(idBill) + 1 INTO new_id FROM bill;
    INSERT INTO bill (idBill, Policy_ID, DueDate, MinimumPayment, CreatedDate, Balance, Status)
    VALUES (new_id, Policy_ID_para, DueDate_para, MinimumPayment_para, CreatedDate_para, Balance_para, Status_para);
END

CALL insert_bill (123, '2023-06-22 12:30:00', 160, '2023-06-22 00:00:00', 1230, 'unpaid');

SELECT * FROM bill
ORDER BY idBill DESC
LIMIT 5
```

	idBill	Policy_ID	DueDate	MinimumPayment	CreatedDate	Balance	Status
▶	150000	104	2023-12-31 23:50:15	151.99	2022-09-24 21:22:53	4447.42	paid
	149999	765	2023-07-22 05:18:38	364.66	2022-09-25 01:23:12	2391.09	paid
	149998	490	2023-11-11 10:33:46	360.99	2022-09-03 17:21:16	607.55	unpaid
	149997	504	2023-07-16 23:55:04	388.11	2022-12-27 18:41:56	3326.99	overdue
*	149996	322	2023-11-05 11:19:51	380.15	2023-03-11 14:59:39	3024.74	unpaid
*							

Trước khi insert

	idBill	Policy_ID	DueDate	MinimumPayment	CreatedDate	Balance	Status
▶	150001	123	2023-06-22 12:30:00	160	2023-06-22 00:00:00	1230	unpaid
	150000	104	2023-12-31 23:50:15	151.99	2022-09-24 21:22:53	4447.42	paid
	149999	765	2023-07-22 05:18:38	364.66	2022-09-25 01:23:12	2391.09	paid
	149998	490	2023-11-11 10:33:46	360.99	2022-09-03 17:21:16	607.55	unpaid
	149997	504	2023-07-16 23:55:04	388.11	2022-12-27 18:41:56	3326.99	overdue
*							

Sau khi insert

4. CẬP NHẬT DỮ LIỆU

➤ Procedure ➤ Insert

Insert nhiều hàng vào bảng bill

```
CREATE DEFINER='root'@'localhost' PROCEDURE `multiple_insert_bill`(IN bill_data TEXT)
BEGIN
    DECLARE done INT DEFAULT FALSE;
    DECLARE new_id INT;
    DECLARE Policy_ID_temp int;
    DECLARE DueDate_temp datetime;
    DECLARE MinimumPayment_temp double;
    DECLARE CreatedDate_temp datetime;
    DECLARE Balance_temp double;
    DECLARE Status_temp varchar(50);
    DECLARE cur CURSOR FOR
        SELECT * FROM JSON_TABLE(
            bill_data,
            '$[*]' COLUMNS (
                Policy_ID_temp int PATH '$[0]',
                DueDate_temp datetime PATH '$[1]',
                MinimumPayment_temp double PATH '$[2]',
                CreatedDate_temp datetime PATH '$[3]',
                Balance_temp double PATH '$[4]',
                Status_temp varchar(50) PATH '$[5]'
            )
        ) AS jt;
    DECLARE CONTINUE HANDLER FOR NOT FOUND SET done = TRUE;
    OPEN cur;
    read_loop: LOOP
        FETCH cur INTO Policy_ID_temp, DueDate_temp, MinimumPayment_temp, CreatedDate_temp, Balance_temp, Status_temp;
        IF done THEN
            LEAVE read_loop;
        END IF;
        SELECT MAX(idBill) + 1 INTO new_id FROM bill;
        INSERT INTO bill (idBill, Policy_ID, DueDate, MinimumPayment, CreatedDate, Balance, Status)
        VALUES (new_id, Policy_ID_temp, DueDate_temp, MinimumPayment_temp, CreatedDate_temp, Balance_temp, Status_temp);
    END LOOP;
    CLOSE cur;
END
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content: | Fetch rows: |

	Policy_ID	DueDate	MinimunPayment	CreateDate	Balance	Status	
1	123	2023-12-17 18:48:48	399.6	2023-02-17 11:46:49	1345.34	unpaid	
2	456	2024-05-31 02:22:06	148.55	2022-12-28 16:34:27	1193.98	unpaid	
3	789	2023-12-04 07:21:08	424.8	2023-01-09 08:58:55	562.88	unpaid	
4							
5							
6	"123"	"2023-12-17 18:48:48"	"399.6"	"2023-02-17 11:46:49"	"1345.34"	"unpaid"	["123", "2023-12-17 18:48:48", "399.6", "2023-02-17 11:46:49", "1345.34", "unpaid"]
7	"456"	"2024-05-31 02:22:06"	"148.55"	"2022-12-28 16:34:27"	"1193.98"	"unpaid"	["456", "2024-05-31 02:22:06", "148.55", "2022-12-28 16:34:27", "1193.98", "unpaid"]
8	"789"	"2023-12-04 07:21:08"	"424.8"	"2023-01-09 08:58:55"	"562.88"	"unpaid"	["789", "2023-12-04 07:21:08", "424.8", "2023-01-09 08:58:55", "562.88", "unpaid"]
9							
10							[[{"id": 1, "Policy_ID": "123", "DueDate": "2023-12-17 18:48:48", "MinimunPayment": 399.6, "CreateDate": "2023-02-17 11:46:49", "Balance": 1345.34, "Status": "unpaid"}, {"id": 2, "Policy_ID": "456", "DueDate": "2024-05-31 02:22:06", "MinimunPayment": 148.55, "CreateDate": "2022-12-28 16:34:27", "Balance": 1193.98, "Status": "unpaid"}, {"id": 3, "Policy_ID": "789", "DueDate": "2023-12-04 07:21:08", "MinimunPayment": 424.8, "CreateDate": "2023-01-09 08:58:55", "Balance": 562.88, "Status": "unpaid"}]]
11							
12	CALL	multiple_insert_bill	(['[{"id": 1, "Policy_ID": "123", "DueDate": "2023-12-17 18:48:48", "MinimunPayment": 399.6, "CreateDate": "2023-02-17 11:46:49", "Balance": 1345.34, "Status": "unpaid"}, {"id": 2, "Policy_ID": "456", "DueDate": "2024-05-31 02:22:06", "MinimunPayment": 148.55, "CreateDate": "2022-12-28 16:34:27", "Balance": 1193.98, "Status": "unpaid"}, {"id": 3, "Policy_ID": "789", "DueDate": "2023-12-04 07:21:08", "MinimunPayment": 424.8, "CreateDate": "2023-01-09 08:58:55", "Balance": 562.88, "Status": "unpaid"}]]', 1)				
13);						
14							
15	SELECT *	FROM bill					
16	ORDER BY	idBill DESC					
17	LIMIT	10					

Result Grid | Form Editor | Field Types | Query Stats | Execution Plan

4. CẬP NHẬT DỮ LIỆU

➤ Procedure ➤ Update

Update 1 hàng vào bảng bill

```
CREATE DEFINER='root'@'localhost' PROCEDURE `update_bill`(IN idBill_para int, IN Policy_ID_para int, IN DueDate_para datetime, SET Policy_ID = Policy_ID_para, DueDate = DueDate_para, MinimumPayment = MinimumPayment_para, CreatedDate = CreatedDate_para, Balance = Balance_para, Status = Status_para WHERE idBill = idBill_para ; END  
CALL update_bill (150001, 123, '2023-06-22 12:30:00', 200, '2023-06-22 00:00:00', 2000, 'paid');  
SELECT * FROM bill  
ORDER BY idBill DESC  
LIMIT 10
```

	idBill	Policy_ID	DueDate	MinimumPayment	CreatedDate	Balance	Status
▶	150004	789	2023-12-04 07:21:08	424.8	2023-01-09 08:58:55	562.88	unpaid
	150003	456	2024-05-31 02:22:06	148.55	2022-12-28 16:34:27	1193.98	unpaid
	150002	123	2023-12-17 18:48:48	399.6	2023-02-17 11:46:49	1345.34	unpaid
	150001	123	2023-06-22 12:30:00	160	2023-06-22 00:00:00	1230	unpaid
	150000	104	2023-12-31 23:50:15	151.99	2022-09-24 21:22:53	4447.42	paid
	149999	765	2023-07-22 05:18:38	364.66	2022-09-25 01:23:12	2391.09	paid
	149998	490	2023-11-11 10:33:46	360.99	2022-09-03 17:21:16	607.55	unpaid
	149997	504	2023-07-16 23:55:04	388.11	2022-12-27 18:41:56	3326.99	overdue
	149996	322	2023-11-05 11:19:51	380.15	2023-03-11 14:59:39	3024.74	unpaid
	149995	359	2023-11-04 00:24:18	101.87	2022-08-17 16:08:50	2000.39	paid
*							
*							

Trước khi update

	idBill	Policy_ID	DueDate	MinimumPayment	CreatedDate	Balance	Status
▶	150004	789	2023-12-04 07:21:08	424.8	2023-01-09 08:58:55	562.88	unpaid
	150003	456	2024-05-31 02:22:06	148.55	2022-12-28 16:34:27	1193.98	unpaid
	150002	123	2023-12-17 18:48:48	399.6	2023-02-17 11:46:49	1345.34	unpaid
	150001	123	2023-06-22 12:30:00	200	2023-06-22 00:00:00	2000	paid
	150000	104	2023-12-31 23:50:15	151.99	2022-09-24 21:22:53	4447.42	paid
	149999	765	2023-07-22 05:18:38	364.66	2022-09-25 01:23:12	2391.09	paid
	149998	490	2023-11-11 10:33:46	360.99	2022-09-03 17:21:16	607.55	unpaid
	149997	504	2023-07-16 23:55:04	388.11	2022-12-27 18:41:56	3326.99	overdue
	149996	322	2023-11-05 11:19:51	380.15	2023-03-11 14:59:39	3024.74	unpaid
	149995	359	2023-11-04 00:24:18	101.87	2022-08-17 16:08:50	2000.39	paid
*							
*							

Sau khi update

4. CẬP NHẬT DỮ LIỆU

➤ Procedure ➤ Update

Update nhiều hàng vào bảng bill

```

1 • CREATE DEFINER='root'@'localhost' PROCEDURE `multiple_update_bill`(IN bill_data TEXT)
2 BEGIN
3     DECLARE done INT DEFAULT FALSE;
4     DECLARE idBill_temp int;
5     DECLARE Policy_ID_temp int;
6     DECLARE DueDate_temp datetime;
7     DECLARE MinimumPayment_temp double;
8     DECLARE CreatedDate_temp datetime;
9     DECLARE Balance_temp double;
10    DECLARE Status_temp varchar(50);
11    DECLARE cur CURSOR FOR
12        SELECT * FROM JSON_TABLE(
13            bill_data,
14            '$[*]' COLUMNS (
15                idBill_temp int PATH '$[0]',
16                Policy_ID_temp int PATH '$[1]',
17                DueDate_temp datetime PATH '$[2]',
18                MinimumPayment_temp double PATH '$[3]',
19                CreatedDate_temp datetime PATH '$[4]',
20                Balance_temp double PATH '$[5]',
21                Status_temp varchar(50) PATH '$[6]'
22            )
23        ) AS jt;
24    DECLARE CONTINUE HANDLER FOR NOT FOUND SET done = TRUE;
25    OPEN cur;
26    read_loop: LOOP
27        FETCH cur INTO idBill_temp, Policy_ID_temp, DueDate_temp, MinimumPayment_temp, CreatedDate_temp, Balance_temp, St
28        IF done THEN
29            LEAVE read_loop;
30        END IF;
31        UPDATE bill
32        SET Policy_ID = Policy_ID_temp,
33            DueDate = DueDate_temp,
34            MinimumPayment = MinimumPayment_temp,
35            CreatedDate = CreatedDate_temp
36        WHERE idBill = idBill_temp;
37    END LOOP;
38    CALL multiple_update_bill ('[[{"idBill": 150002, "Policy_ID": 321, "DueDate": "2025-01-01 00:00:00", "MinimumPayment": 100, "CreatedDate": "2023-02-17 11:46:49", "Balance": 2000, "Status": "unpaid"}, {"idBill": 150003, "Policy_ID": 654, "DueDate": "2025-01-01 00:00:01", "MinimumPayment": 100, "CreatedDate": "2022-12-28 16:34:27", "Balance": 2000, "Status": "unpaid"}, {"idBill": 150004, "Policy_ID": 987, "DueDate": "2025-01-01 00:00:02", "MinimumPayment": 100, "CreatedDate": "2023-01-09 08:58:55", "Balance": 2000, "Status": "unpaid"}]]');
39    SELECT * FROM bill
40    ORDER BY idBill DESC
41    LIMIT 10;
42

```

	id_Bill	Policy_ID	DueDate	MinimunPayment	CreateDate	Balance	Status	
2	150002	321	2025-01-01 00:00:00	100	2023-02-17 11:46:49	2000	unpaid	
3	150003	654	2025-01-01 00:00:01	100	2022-12-28 16:34:27	2000	unpaid	
4	150004	987	2025-01-01 00:00:02	100	2023-01-09 08:58:55	2000	unpaid	
5								
6	"150002"	"321"	"2025-01-01 00:00:00"	"100"	"2023-02-17 11:46:49"	"2000"	"unpaid"	["150002", "321", "2025-01-00:00:0", "100", "2023-02-17 11:46:49", "2000", "unpaid"]
7	"150003"	"654"	"2025-01-01 00:00:01"	"100"	"2022-12-28 16:34:27"	"2000"	"unpaid"	["150003", "654", "2025-01-00:00:1", "100", "2022-12-28 16:34:27", "2000", "unpaid"]
8	"150004"	"987"	"2025-01-01 00:00:02"	"100"	"2023-01-09 08:58:55"	"2000"	"unpaid"	["150004", "987", "2025-01-00:00:2", "100", "2023-01-09 08:58:55", "2000", "unpaid"]
9								
10								
11								
12								

	idBill	Policy_ID	DueDate	MinimumPayment	CreatedDate	Balance	Status
▶	150004	789	2023-12-04 07:21:08	424.8	2023-01-09 08:58:55	562.88	unpaid
▶	150003	456	2024-05-31 02:22:06	148.55	2022-12-28 16:34:27	1193.98	unpaid
▶	150002	123	2023-12-17 18:48:48	399.6	2023-02-17 11:46:49	1345.34	unpaid
▶	150001	123	2023-06-22 12:30:00	200	2023-06-22 00:00:00	2000	paid
▶	150000	104	2023-12-31 23:50:15	151.99	2022-09-24 21:22:53	4447.42	paid
▶	149999	765	2023-12-31 23:50:15	364.66	2022-09-25 01:23:12	2391.09	paid
▶	149998	490	2023-11-11 10:33:46	360.99	2022-09-03 17:21:16	607.55	unpaid
▶	149997	504	2023-07-16 23:55:04	388.11	2022-12-27 18:41:56	3326.99	overdue
▶	149996	322	2023-11-05 11:19:51	380.15	2023-03-11 14:59:39	3024.74	unpaid
▶	149995	359	2023-11-04 00:24:18	101.87	2022-08-17 16:08:50	2000.39	paid
*	NULL	NULL	NULL	NULL	NULL	NULL	NULL

	idBill	Policy_ID	DueDate	MinimumPayment	CreatedDate	Balance	Status
▶	150004	987	2025-01-01 00:00:02	100	2023-01-09 08:58:55	2000	unpaid
▶	150003	654	2025-01-01 00:00:01	100	2022-12-28 16:34:27	2000	unpaid
▶	150002	321	2025-01-01 00:00:00	100	2023-02-17 11:46:49	2000	unpaid
▶	150001	123	2023-06-22 12:30:00	200	2023-06-22 00:00:00	2000	paid
▶	150000	104	2023-12-31 23:50:15	151.99	2022-09-24 21:22:53	4447.42	paid
▶	149999	765	2023-07-22 05:18:38	364.66	2022-09-25 01:23:12	2391.09	paid
▶	149998	490	2023-11-11 10:33:46	360.99	2022-09-03 17:21:16	607.55	unpaid
▶	149997	504	2023-07-16 23:55:04	388.11	2022-12-27 18:41:56	3326.99	overdue
▶	149996	322	2023-11-05 11:19:51	380.15	2023-03-11 14:59:39	3024.74	unpaid
▶	149995	359	2023-11-04 00:24:18	101.87	2022-08-17 16:08:50	2000.39	paid
*	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Trước khi update

Sau khi update



4. CẬP NHẬT DỮ LIỆU

➤ Procedure ➤ Delete

Delete 1 hàng vào bảng bill

```
CREATE DEFINER='root'@'localhost' PROCEDURE `delete_bill`(IN idBill_para int)
BEGIN
    DELETE FROM bill
    WHERE idBill = idBill_para ;
END

CALL delete_bill(150001);

SELECT * FROM bill
ORDER BY idBill DESC
LIMIT 5
```

	idBill	Policy_ID	DueDate	MinimumPayment	CreatedDate	Balance	Status
▶	150004	987	2025-01-01 00:00:02	100	2023-01-09 08:58:55	2000	unpaid
	150003	654	2025-01-01 00:00:01	100	2022-12-28 16:34:27	2000	unpaid
	150002	321	2025-01-01 00:00:00	100	2023-02-17 11:46:49	2000	unpaid
	150001	123	2023-06-22 12:30:00	200	2023-06-22 00:00:00	2000	paid
	150000	104	2023-12-31 23:50:15	151.99	2022-09-24 21:22:53	4447.42	paid
*	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Trước khi delete

	idBill	Policy_ID	DueDate	MinimumPayment	CreatedDate	Balance	Status
▶	150004	987	2025-01-01 00:00:02	100	2023-01-09 08:58:55	2000	unpaid
	150003	654	2025-01-01 00:00:01	100	2022-12-28 16:34:27	2000	unpaid
	150002	321	2025-01-01 00:00:00	100	2023-02-17 11:46:49	2000	unpaid
	150000	104	2023-12-31 23:50:15	151.99	2022-09-24 21:22:53	4447.42	paid
*	149999	765	2023-07-22 05:18:38	364.66	2022-09-25 01:23:12	2391.09	paid
*	NULL	NULL	NULL	NULL	NULL	NULL	NULL

Sau khi delete

4. CẬP NHẬT DỮ LIỆU

➤ Procedure ➤ Delete

Delete nhiều hàng vào bảng bill

```
1 • CREATE DEFINER='root'@'localhost' PROCEDURE `multiple_delete_bill`(IN bill_data TEXT)
2 BEGIN
3     DELETE FROM bill
4     WHERE idBill IN (SELECT id FROM JSON_TABLE(
5         bill_data,
6         '$[*]' COLUMNS (
7             id INT PATH '$'
8         )
9     ) AS jt);
10 END
```

```
12
13 id_Bill
14 150003
15 150002
16 150004
17
18 "150003"
19 "150002"
20 "150004"
21
22
```

	idBill	Policy_ID	DueDate	MinimumPayment	CreatedDate	Balance	Status
▶	150004	987	2025-01-01 00:00:02	100	2023-01-09 08:58:55	2000	unpaid
▶	150003	654	2025-01-01 00:00:01	100	2022-12-28 16:34:27	2000	unpaid
▶	150002	321	2025-01-01 00:00:00	100	2023-02-17 11:46:49	2000	unpaid
▶	150000	104	2023-12-31 23:50:15	151.99	2022-09-24 21:22:53	4447.42	paid
▶	149999	765	2023-07-22 05:18:38	364.66	2022-09-25 01:23:12	2391.09	paid
*	HULL	HULL	HULL	HULL	HULL	HULL	HULL

Trước khi delete

```
14 • CALL multiple_delete_bill('["150003","150002","150004"]'
15 ;
16
17 •     SELECT * FROM bill
18     ORDER BY idBill DESC
```

	idBill	Policy_ID	DueDate	MinimumPayment	CreatedDate	Balance	Status
▶	150000	104	2023-12-31 23:50:15	151.99	2022-09-24 21:22:53	4447.42	paid
▶	149999	765	2023-07-22 05:18:38	364.66	2022-09-25 01:23:12	2391.09	paid
▶	149998	490	2023-11-11 10:33:46	360.99	2022-09-03 17:21:16	607.55	unpaid
▶	149997	504	2023-07-16 23:55:04	388.11	2022-12-27 18:41:56	3326.99	overdue
▶	149996	322	2023-11-05 11:19:51	380.15	2023-03-11 14:59:39	3024.74	unpaid
*	HULL	HULL	HULL	HULL	HULL	HULL	HULL

Sau khi delete

4. CẬP NHẬT DỮ LIỆU



Tạo trigger

➤ Procedure ➤ Trigger

- CREATE TABLE bill_audit(
 id INT AUTO_INCREMENT PRIMARY KEY,
 action VARCHAR(10),
 changeDate DATETIME,
 idBill int,
 Policy_ID int,
 DueDate datetime,
 MinimumPayment double,
 CreatedDate datetime,
 Balance double,
 Status varchar(50));
- CREATE TRIGGER before_bill_update
BEFORE UPDATE ON bill
FOR EACH ROW
INSERT INTO bill_audit
SET
 action = 'update',
 changeDate = NOW(),
 idBill = OLD.idBill,
 Policy_ID = OLD.Policy_ID,
 DueDate = OLD.DueDate,
 MinimumPayment = OLD.MinimumPayment,
 CreatedDate = OLD.CreatedDate,
 Balance = OLD.Balance,
 Status = OLD.Status



4. CẬP NHẬT DỮ LIỆU

➤ Procedure ➤ Trigger



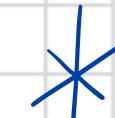
Update 1 hàng cho bảng bill audit

```
12 • CALL update_bill (150001, 123, '2023-06-22 12:30:00', 200, '2023-06-22 00:00:00', 2000, 'paid');
```

```
9 •    select * from bill audit
```

19

1



Update nhiều hàng cho bảng bill audit

```
12 • ⚡ CALL multiple_update_bill ('[["150002", "321", "2025-01-1 00:00:0", "100", "2023-02-17 11:46:49", "2000", "unpaid"], ["150003", "654", "2025-01-1 00:00:0", "100", "2023-02-17 11:46:49", "2000", "unpaid"]]', {  
    "multiple_update_bill": true  
})
```

13

10 • SELECT * FROM bill_audit

4. CẬP NHẬT DỮ LIỆU

➤ Procedure ➤ Trigger

*
Tạo trigger

```
CREATE TRIGGER before_bill_delete
BEFORE DELETE ON bill
FOR EACH ROW
INSERT INTO bill_audit
SET
    action = 'delete',
    changeDate = NOW(),
    idBill = OLD.idBill,
    Policy_ID = OLD.Policy_ID,
    DueDate = OLD.DueDate,
    MinimumPayment = OLD.MinimumPayment,
    CreatedDate = OLD.CreatedDate,
    Balance = OLD.Balance,
    Status = OLD.Status
```

Delete



4. CẬP NHẬT DỮ LIỆU

➤ Procedure ➤ Trigger

Delete 1 hàng cho bảng bill_audit

```
14 • CALL delete_bill(150001);
```

```
10 • SELECT * FROM bill_audit
```

	id	action	changeDate	idBill	Policy_ID	DueDate	MinimumPayment	CreatedDate	Balance	Status
▶	10	update	2023-06-25 17:29:41	150001	123	2023-06-22 12:30:00	160	2023-06-22 00:00:00	1230	unpaid
	12	update	2023-06-25 17:34:02	150002	123	2023-12-17 18:48:48	399.6	2023-02-17 11:46:49	1345.34	unpaid
	13	update	2023-06-25 17:34:02	150003	456	2024-05-31 02:22:06	148.55	2022-12-28 16:34:27	1193.98	unpaid
	14	update	2023-06-25 17:34:02	150004	789	2023-12-04 07:21:08	424.8	2023-01-09 08:58:55	562.88	unpaid
*	15	delete	2023-06-25 17:35:01	150001	123	2023-06-22 12:30:00	160	2023-06-22 00:00:00	1230	unpaid

Delete nhiều hàng cho bảng bill_audit

```
14 • CALL multiple_delete_bill(['150003', '150002', '150004'])
```

```
15 • ;
```

```
10 • SELECT * FROM bill_audit
```

	id	action	changeDate	idBill	Policy_ID	DueDate	MinimumPayment	CreatedDate	Balance	Status
▶	10	update	2023-06-25 17:29:41	150001	123	2023-06-22 12:30:00	160	2023-06-22 00:00:00	1230	unpaid
	12	update	2023-06-25 17:34:02	150002	123	2023-12-17 18:48:48	399.6	2023-02-17 11:46:49	1345.34	unpaid
	13	update	2023-06-25 17:34:02	150003	456	2024-05-31 02:22:06	148.55	2022-12-28 16:34:27	1193.98	unpaid
	14	update	2023-06-25 17:34:02	150004	789	2023-12-04 07:21:08	424.8	2023-01-09 08:58:55	562.88	unpaid
*	15	delete	2023-06-25 17:35:01	150001	123	2023-06-22 12:30:00	160	2023-06-22 00:00:00	1230	unpaid
	16	delete	2023-06-25 17:35:35	150002	321	2025-01-01 00:00:00	200	2023-02-17 11:46:49	2000	unpaid
	17	delete	2023-06-25 17:35:35	150003	654	2025-01-01 00:00:01	200	2022-12-28 16:34:27	2000	unpaid
	18	delete	2023-06-25 17:35:35	150004	987	2025-01-01 00:00:02	200	2023-01-09 08:58:55	2000	unpaid

4. CẬP NHẬT DỮ LIỆU

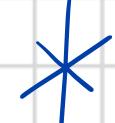
➤ Procedure

TỔNG KẾT

- 26 procedure insert
- 26 procedure update
- 26 procedure delete
- 6 procedure tự tạo
- 2 trigger



78 procedure + 2 trigger



4. CẬP NHẬT DỮ LIỆU

➤ Nghiệp vụ thực tế

4.CẬP NHẬT DỮ LIỆU

➤ Nghiệp vụ thực tế

1. Vào 17h30p00s ngày 18/06/2023, Driver có ID=2110 đăng ký xe của mình cho chính sách 3. Ta cần thêm thông tin về chiếc xe đó.

```
1 •  DROP PROCEDURE IF EXISTS NewVehicle;
2   DELIMITER $$;
3 •  -- DROP PROCEDURE IF EXISTS NewVehicle;
4   CREATE PROCEDURE NewVehicle(IN policyId INT, IN year CHAR(4), IN make VARCHAR(50), IN model VARCHAR(50), IN color VARCHAR(50), IN trim VARCHAR(50), IN mileage INT,
5                                IN vinNumber VARCHAR(20), IN vehicleNumberPlate VARCHAR(20), IN vehicleRegisteredState VARCHAR(50), IN createdDate DATETIME, IN active tinyint(1),
6                                IN driverId INT, IN driverForBusinessPurpose tinyint(1), IN isPrimaryDriver tinyint(1), IN everydayMileage INT, IN Active2 tinyint(1));
7   BEGIN
8     START TRANSACTION;
9
10    SELECT @idVehicle := (MAX(idVehicle) + 1) FROM vehicle;
11    SELECT @idVehicleDriver = (MAX(idVehicle_Driver) + 1) FROM vehicle_driver;
12
13    INSERT INTO Vehicle
14      VALUES (@idVehicle, policyId, year, make, model, color, trim, mileage, vinNumber, vehicleNumberPlate, vehicleRegisteredState, createdDate, active);
15
16    INSERT INTO vehicle_driver
17      VALUES (@idVehicleDriver, @idVehicle, driverId, driverForBusinessPurpose, isPrimaryDriver, everydayMileage, createdDate, Active2);
18
19    COMMIT;
20  END;
21  $$;
22  DELIMITER ;
23 •  CALL NewVehicle(3, 2022,'Mercedes','Turbo','pink','Premium',1000 , 10000114881550041,'ABC-9696', 'VietNam','2023-06-18 17:30:00',1,2110, 0, 1, 80, 1);
```

4. CẬP NHẬT DỮ LIỆU

➤ Nghiệp vụ thực tế

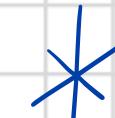
1. Vào 17h30p00s ngày 18/06/2023, Driver có ID=2110 đăng ký xe của mình cho chính sách 3. Ta cần thêm thông tin về chiếc xe đó.

Bảng vehicle:

	idVehicle	Policy_ID	Year	Make	Model	Color	Trim	Mileage	VINNumber	VehicleNumberPlate	VehideRegisteredState	CreatedDate	Active
▶	150002	3	2022	Mercedes	Turbo	pink	Premium	1000	10000114881550041	ABC-9696	VietNam	2023-06-18 17:30:00	1
	150001	3	2022	Audi	X	pink	Premium	1000	10000114881550042	ABC-6969	VietNam	2023-06-18 17:00:00	1
	150000	41	2011	Lara, Woodard and Ryan	price	green	month	69078	39923885292337998	307D	Louisiana	2021-05-25 08:25:01	0

Bảng vehicle_driver:

	idVehicle_Driver	Vehide_ID	Driver_ID	DriverForBusinessPurpose	IsPrimaryDriver	EveryDayMileage	CreatedDate	Active
▶	150001	150002	2110	0	1	80	2023-06-18 17:30:00	1
	150000	538	700	1	0	71	2022-03-13 01:22:03	1
	149999	277	104	0	0	52	2021-12-19 05:37:44	0



4. CẬP NHẬT DỮ LIỆU

➤ Nghiệp vụ thực tế

2. *Chỉnh sửa thông tin hiệu lực (EffectiveDate) và ngày hết hạn (PolicyExpireDate) của chính sách hiện có ID 616.*

```
1  DELIMITER $$  
2  • CREATE PROCEDURE UpdatePolicyAndPolicyEditlog(  
3      IN p_policyId INT,  
4      IN p_policyEffectiveDate DATETIME,  
5      IN p_policyExpireDate DATETIME,  
6      IN p_EditedTableName VARCHAR(255),  
7      IN p_editedDate DATETIME,  
8      IN p_editedBy VARCHAR(255),  
9      IN p_AdditionalInfo VARCHAR(255)  
10     )  
11 BEGIN  
12     START TRANSACTION;  
13  
14     UPDATE policy  
15     SET  
16         PolicyEffectiveDate = p_policyEffectiveDate,  
17         PolicyExpireDate = p_policyExpireDate  
18     WHERE  
19         idPolicy = p_policyId;  
20  
21     SELECT @idPolicyEditLog := (MAX(idPolicyEditLog) + 1) FROM policyeditlog;  
22  
23     INSERT INTO policyeditlog (idPolicyEditLog, Policy_ID, EditedTableName, EditedDate, EditedBy, AdditionalInfo)  
24     VALUES (@idPolicyEditLog, p_policyId, p_EditedTableName, p_editedDate, p_editedBy, p_AdditionalInfo);  
25  
26     COMMIT;  
27 END $$  
28 DELIMITER ;  
29  
30 • CALL UpdatePolicyAndPolicyEditlog(616,'2023-12-07 00:00:00', '2026-03-23 00:00:00', 'Policy','2023-06-15 18:14:00', 'Trung Nguyen', 'Done');
```

4. CẬP NHẬT DỮ LIỆU

➤ Nghiệp vụ thực tế

2. *Chỉnh sửa thông tin hiệu lực (EffectiveDate) và ngày hết hạn (PolicyExpireDate) của chính sách hiện có ID 616.*

Bảng policy:

	idPolicy	PolicyNumber	PolicyEffectiveDate	PolicyExpireDate	PaymentOption	TotalAmount	Active	CreatedDate	AdditionalInfo
▶	616	198708	2023-12-07 00:00:00	2026-03-23 00:00:00	Monthly	4965.49	0	2022-06-25 10:20:13	Sport never relate peace always write. Group in..
*									

Bảng policyeditlog:

	idPolicyEditLog	Policy_ID	EditedTableName	EditedDate	EditedBy	AdditionalInfo
▶	150001	616	Policy	2023-06-15 18:14:00	Trung Nguyen	Done
	150000	747	claim	2022-10-02 03:26:09	Erika Dodson	Seven thought Mr treatment available positive t...
	149999	196	policy	2023-05-01 11:57:27	Kimberly Evans	Guess speak rise choose. Ago thing course. Co...

4. CẬP NHẬT DỮ LIỆU

➤ Nghiệp vụ thực tế

3. Tính đến ngày 21/06/2024, ta cần xóa đi các hóa đơn và thanh toán đã quá hạn 3 tháng

```
1 • START TRANSACTION;  
2  
3     CREATE TEMPORARY TABLE temp_bills_delete  
4     SELECT idBill  
5     FROM bill  
6     WHERE DueDate < DATE_SUB('2024-06-21', INTERVAL 3 MONTH)  
7         AND status = 'overdue';  
8  
9     DELETE FROM paymentdetail  
10    WHERE Bill_ID IN (  
11        SELECT idBill  
12        FROM temp_bills_delete  
13    );  
14  
15    DELETE FROM bill  
16    WHERE idBill IN (  
17        SELECT idBill  
18        FROM temp_bills_delete  
19    );  
20  
21 • DROP TEMPORARY TABLE temp_bills_delete;  
22  
23 • COMMIT;
```

4. CẬP NHẬT DỮ LIỆU

➤ Nghiệp vụ thực tế

3. Tính đến ngày 21/06/2024, ta cần xóa đi các hóa đơn và thanh toán đã quá hạn 3 tháng

The screenshot shows a MySQL Workbench interface. The top bar has various icons for database management. Below it is a SQL editor window containing the following code:

```
1 • SELECT * FROM carinsurance2.bill  
2 WHERE DueDate < DATE_SUB('2024-06-21', INTERVAL 3 MONTH)  
3 AND status = 'overdue';
```

Below the SQL editor is a results grid titled "Result Grid". It has columns for idBill, Policy_ID, DueDate, MinimumPayment, CreatedDate, Balance, and Status. There is one row with all values set to "NULL".

4. CẬP NHẬT DỮ LIỆU

➤ Nghiệp vụ thực tế

4. Top 3 chính sách có doanh thu lớn nhất và số tiền đã thu được từ các chính sách đó

```
1 •     START TRANSACTION;
2 •     DROP TABLE IF EXISTS temp_policy_revenue;
3 •     CREATE TEMPORARY TABLE temp_policy_revenue (
4         idPolicy INT PRIMARY KEY,
5         totalRevenue DECIMAL(10, 2),
6         totalAmountPaid DECIMAL(10, 2)
7     );
8
9 •     INSERT INTO temp_policy_revenue (idPolicy, totalRevenue)
10    SELECT Policy_ID, SUM(Balance) as TotalBalance
11    FROM Bill
12    GROUP BY Policy_ID
13    ORDER BY TotalBalance DESC
14    LIMIT 3;
15
16 •     UPDATE temp_policy_revenue AS tpr
17     JOIN (
18         SELECT Bill.Policy_ID, SUM(pd.Amount) AS totalAmountPaid
19         FROM Bill
20         LEFT JOIN (
21             SELECT Bill_ID, SUM(Amount) AS Amount
22             FROM paymentdetail
23             GROUP BY Bill_ID
24         ) AS pd ON Bill.idBill = pd.Bill_ID
25             GROUP BY Bill.Policy_ID
26     ) AS pd ON tpr.idPolicy = pd.Policy_ID
27     SET tpr.totalAmountPaid = pd.totalAmountPaid;
28
29
30 •     SELECT tpr.idPolicy, tpr.totalRevenue, tpr.totalAmountPaid
31     FROM temp_policy_revenue AS tpr
32     ORDER BY tpr.totalRevenue DESC;
33
34 •     COMMIT;
```

4. CẬP NHẬT DỮ LIỆU

➤ Nghiệp vụ thực tế

4. Top 3 chính sách có doanh thu lớn nhất và số tiền đã thu được từ các chính sách đó

```
337 21:56:45 CREATE TEMPORARY TABLE temp_policy_revenue ( idPolicy INT PRIMARY KEY, totalRevenue DE... 0 row(s) affected 0.000 sec
338 21:56:45 INSERT INTO temp_policy_revenue (idPolicy, totalRevenue) SELECT Policy_ID, SUM(Balance) as TotalB... 5 row(s) affected, 5 warning(s): 1265 Data truncated for column 'totalRevenue' at row 1 1265 Data truncat... 0.219 sec
339 21:56:45 UPDATE temp_policy_revenue AS tpr JOIN (   SELECT Bill.Policy_ID, SUM(pd.Amount) AS totalAmountP... Error Code: 1175. You are using safe update mode and you tried to update a table without a WHERE that ... 0.000 sec
```

The screenshot shows the MySQL Workbench interface. On the left, a 'Workbench Preferences' dialog is open, specifically the 'General Editors' section. It includes settings for auto-save intervals, sidebar options, MySQL session parameters (connection keep-alive, read timeout, connection timeout), and an 'Internal Workbench Schema' field set to '.mysqlworkbench'. A checkbox for 'Safe Updates (rejects UPDATEs and DELETEs with no restrictions)' is checked and highlighted with a red border. On the right, a results grid displays data from a temporary table:

	idPolicy	totalRevenue	totalAmountPaid
▶	897	453251.67	37937.34
	240	431142.45	38280.67
	799	426935.19	38279.03

4. CẬP NHẬT DỮ LIỆU

➤ Nghiệp vụ thực tế

5. Do số lượng xe theo chính sách 2 quá ít, công ty cần xóa đi chính sách đó và cập nhật tiền đền bù cho các khách hàng đã đóng tiền cho chính sách này

➤ Trước tiên cần tạo bảng compensation để lưu trữ tiền đền bù và ngân hàng thanh toán cho các khách hàng

```
1 • - CREATE TABLE compensation (
2   idPayment INT,
3   CardNumber VARCHAR(16),
4   BankName VARCHAR(255),
5   AccountNumber VARCHAR(255),
6   compensationAmount DECIMAL(10,2),
7   PRIMARY KEY (idPayment)
8 );
```



4. CẬP NHẬT DỮ LIỆU

➤ Nghiệp vụ thực tế

5. Do số lượng xe theo chính sách 2 quá ít, công ty cần xóa đi chính sách đó và cập nhật tiền đền bù cho các khách hàng đã đóng tiền cho chính sách này

```
1 • START TRANSACTION;
2
3 • DROP TABLE IF EXISTS temp_policy_delete;
4 • CREATE TEMPORARY TABLE temp_policy_delete AS
5   SELECT idPolicy
6     FROM policy
7    WHERE idPolicy=2;
8
9 • DELETE FROM vehicle_driver
10   WHERE Vehicle_ID IN (SELECT idVehicle FROM vehicle WHERE Policy_ID=2);
11
12 • DELETE FROM driver_trafficViolation_record
13   WHERE Driver_ID IN (SELECT idDriver FROM driver WHERE Policy_ID=2);
14
15 • DELETE FROM vehicle_coverage
16   WHERE Vehicle_ID IN (SELECT idVehicle FROM vehicle WHERE Policy_ID=2);
17
18 • DELETE FROM driverAddress
19   WHERE Driver_ID IN (SELECT idDriver FROM driver WHERE Policy_ID=2);
20
21 • DELETE FROM driver
22   WHERE Policy_ID=2;
23
24 • DELETE FROM vehicle
25   WHERE Policy_ID=2;
26
27 • DROP TABLE IF EXISTS temp_bill_delete;
28 • CREATE TEMPORARY TABLE temp_bill_delete AS
29   SELECT idBill
30     FROM bill
31    WHERE Policy_ID=2;
```

```
32
33 • DROP TABLE IF EXISTS temp_compensation_amount;
34 • CREATE TEMPORARY TABLE temp_compensation_amount AS
35   SELECT idPayment,
36     CardNumber,
37     BankName,
38     AccountNumber,
39     amount AS compensationAmount
40   FROM paymentdetail
41   WHERE Bill_ID IN (SELECT idBill FROM temp_bill_delete);
42
43 • INSERT INTO compensation (idPayment, CardNumber, BankName, AccountNumber, compensationAmount)
44   SELECT idPayment, LEFT(CardNumber,16), BankName, AccountNumber, compensationAmount
45   FROM temp_compensation_amount;
46
47 • DELETE FROM paymentdetail
48   WHERE Bill_ID IN (SELECT idBill FROM temp_bill_delete);
49
50 • DELETE FROM bill
51   WHERE idBill IN (SELECT idBill FROM temp_bill_delete);
52
53 • DELETE FROM policy_coverage
54   WHERE Policy_ID = 2;
55
56 • DELETE FROM policyeditlog
57   WHERE Policy_ID = 2;
58
59 • DELETE FROM policy
60   WHERE idPolicy = 2;
61
62 • COMMIT;
```

4. CẬP NHẬT DỮ LIỆU

➤ Nghiệp vụ thực tế

5. Do số lượng xe theo chính sách 2 quá ít, công ty cần xóa đi chính sách đó và cập nhật tiền đền bù cho các khách hàng đã đóng tiền cho chính sách này

➤ Bảng Compensation:

The screenshot shows a MySQL Workbench interface. At the top, there is a toolbar with various icons. Below the toolbar, a SQL editor window displays the following query:

```
1 •  SELECT * FROM carinsurance2.compensation;
```

Below the SQL editor is a "Result Grid" window. The grid has the following columns: idPayment, CardNumber, BankName, AccountNumber, and compensationAmount. The data grid contains 20 rows of compensation records. A blue asterisk (*) is drawn near the bottom right corner of the slide.

	idPayment	CardNumber	BankName	AccountNumber	compensationAmount
▶	620	3540585559344354	Citibank	2590023851	476.03
	2338	4490985118340453	Wells Fargo	1830599508	170.95
	5635	6574167872507512	Wells Fargo	8726108414	268.18
	7555	3583227126930195	Wells Fargo	3503093492	425.62
	10951	213176049784078	Wells Fargo	7896362753	477.55
	11292	344074270128671	Chase Bank	4005909947	317.19
	12165	4732603183165	Citibank	514516838	255.99
	13797	2265704826810320	Chase Bank	7634666863	312.36
	14815	4607764049566391	Wells Fargo	8706179878	387.08
	14909	3526054921711574	Bank of America	8194780591	130.66
	16135	4573687327981141	Citibank	9754819087	406.11
	16869	30310745119666	Bank of America	421474402	171.24
	19055	6517806168834938	Wells Fargo	5837648561	478.45
	25874	4569497273711061	Citibank	2756723093	104.08
	25884	3550484271454195	Bank of America	3262093291	190.57
	27492	4071820536241240	Wells Fargo	8393773621	61.31
	29966	30088769437186	Citibank	7202357953	253.10
	35049	3568054783036820	Wells Fargo	3154445840	333.52
	37226	4335734570654	Citibank	3585816546	446.45
	38859	4697163370350346	Wells Farqo	2728673477	124.23

4. CẬP NHẬT DỮ LIỆU

➤ Nghiệp vụ thực tế

5. Do số lượng xe theo chính sách 2 quá ít, công ty cần xóa đi chính sách đó và cập nhật tiền đèn bù cho các khách hàng đã đóng tiền cho chính sách này

- Một số các bảng đã xóa các dòng có Policy ID=2:

```
1 •   SELECT * FROM carinsurance2.policy  
2 WHERE idPolicy=2;
```

```
1 •   SELECT * FROM carinsurance2.bill  
2 WHERE Policy ID=2;
```

Result Grid				Filter Rows:					Export/Import:		
	ID	Policy_ID	DueDate	MinimumPayment	CreatedDate	Balance	Status				
	NULL	NULL	NULL	NULL	NULL	NULL	NULL				

```
1 •  SELECT * FROM carinsurance2.policy_coverage  
2   where Policy ID=2;
```

Result Grid		Filter Rows:	Edit:		Ex
	idPolicy_coverage	Policy_ID	Coverage_ID	Active	CreateDate
	NULL	NULL	NULL	NULL	NULL

```
1 •   SELECT * FROM carinsurance2.vehicle  
2      where Policy_ID=2;
```

```
1 •   SELECT * FROM carinsurance2.driver  
2   where Policy_ID=2;
```

Result Grid		Filter Rows:		Edit:		Export/Import:		Wrap Cell Content:	
ID	Name	Value	Operator	Column	Type	File	Image	Text	Link
*	idDriver	HULL	HULL	Policy_ID	HULL	HULL	HULL	HULL	HULL

4. CẬP NHẬT DỮ LIỆU

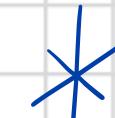
➤ Đô dữ liệu

4. CẬP NHẬT DỮ LIỆU

➤ Đô dữ liệu

Tạo 1 cấu trúc y hệt CSDL mẫu

Name	Engine	Version	Row Format	Rows	Avg Row Length	Data Length	Max Data Length	Index Length	Data Free	Auto Incre...	Create Time	Update Time
bill_copy	InnoDB	10	Dynamic	0	0	16.0 KiB	0.0 bytes	16.0 KiB	0.0 bytes	1	2023-06-19 13:12:52	
coverage_copy	InnoDB	10	Dynamic	0	0	16.0 KiB	0.0 bytes	0.0 bytes	0.0 bytes	0	2023-06-19 13:10:03	
driver_copy	InnoDB	10	Dynamic	0	0	16.0 KiB	0.0 bytes	16.0 KiB	0.0 bytes	0	2023-06-19 13:12:52	
driver_trafficviolation_recor...	InnoDB	10	Dynamic	0	0	16.0 KiB	0.0 bytes	32.0 KiB	0.0 bytes	1	2023-06-19 13:12:52	
driveraddress_copy	InnoDB	10	Dynamic	0	0	16.0 KiB	0.0 bytes	16.0 KiB	0.0 bytes	1	2023-06-19 13:12:52	
paymentdetail_copy	InnoDB	10	Dynamic	0	0	16.0 KiB	0.0 bytes	16.0 KiB	0.0 bytes	1	2023-06-19 13:12:52	
policy_copy	InnoDB	10	Dynamic	0	0	16.0 KiB	0.0 bytes	0.0 bytes	0.0 bytes	0	2023-06-19 13:10:02	
policy_coverage_copy	InnoDB	10	Dynamic	0	0	16.0 KiB	0.0 bytes	32.0 KiB	0.0 bytes	1	2023-06-19 13:12:52	
policyeditlog_copy	InnoDB	10	Dynamic	0	0	16.0 KiB	0.0 bytes	16.0 KiB	0.0 bytes	1	2023-06-19 13:12:52	
trafficviolationcode_copy	InnoDB	10	Dynamic	0	0	16.0 KiB	0.0 bytes	0.0 bytes	0.0 bytes	0	2023-06-19 13:10:03	
vehicle_copy	InnoDB	10	Dynamic	0	0	16.0 KiB	0.0 bytes	16.0 KiB	0.0 bytes	1	2023-06-19 13:12:52	
vehicle_coverage_copy	InnoDB	10	Dynamic	0	0	16.0 KiB	0.0 bytes	32.0 KiB	0.0 bytes	1	2023-06-19 13:12:52	
vehicle_driver_copy	InnoDB	10	Dynamic	0	0	16.0 KiB	0.0 bytes	32.0 KiB	0.0 bytes	1	2023-06-19 13:12:52	



4. CẬP NHẬT DỮ LIỆU

➤ Đỗ dữ liệu

Sử dụng procedure để đỗ dữ liệu từ CSDL cũ sang CSDL mới

```
1  DELIMITER //
2
3 • DROP PROCEDURE IF EXISTS CopyData;
4 CREATE PROCEDURE CopyData()
5 BEGIN
6     DECLARE EXIT HANDLER FOR SQLEXCEPTION
7     BEGIN
8         ROLLBACK;
9         RESIGNAL;
10    END;
11    START TRANSACTION;
12    INSERT INTO carinsurance_copy.policy_copy SELECT * FROM carinsurance2.policy;
13    INSERT INTO carinsurance_copy.policyeditlog_copy SELECT * FROM carinsurance2.policyeditlog;
14    INSERT INTO carinsurance_copy.bill_copy SELECT * FROM carinsurance2.bill;
15    INSERT INTO carinsurance_copy.paymentdetail_copy SELECT * FROM carinsurance2.paymentdetail;
16    INSERT INTO carinsurance_copy.driver_copy SELECT * FROM carinsurance2.driver;
17    INSERT INTO carinsurance_copy.vehicle_copy SELECT * FROM carinsurance2.vehicle;
18    INSERT INTO carinsurance_copy.coverage_copy SELECT * FROM carinsurance2.coverage;
19    INSERT INTO carinsurance_copy.vehicle_coverage_copy SELECT * FROM carinsurance2.vehicle_coverage;
20    INSERT INTO carinsurance_copy.vehicle_driver_copy SELECT * FROM carinsurance2.vehicle_driver;
21    INSERT INTO carinsurance_copy.policy_coverage_copy SELECT * FROM carinsurance2.policy_coverage;
22    INSERT INTO carinsurance_copy.trafficviolationcode_copy SELECT * FROM carinsurance2.trafficviolationcode;
23    INSERT INTO carinsurance_copy.driver_trafficviolation_record_copy SELECT * FROM carinsurance2.driver_trafficviolation_record;
24    INSERT INTO carinsurance_copy.driveraddress_copy SELECT * FROM carinsurance2.driveraddress;
25
26    COMMIT;
27 END //
28
29 DELIMITER ;
30
31 • CALL CopyData();
```

4. CẬP NHẬT DỮ LIỆU

➤ Đỗ dữ liệu

Sử dụng procedure sao chép dữ liệu từ CSDL cũ sang CSDL mới

```
1  DELIMITER //
2
3 • DROP PROCEDURE IF EXISTS CopyData;
4 CREATE PROCEDURE CopyData()
5 BEGIN
6     DECLARE EXIT HANDLER FOR SQLEXCEPTION
7     BEGIN
8         ROLLBACK;
9         RESIGNAL;
10    END;
11    START TRANSACTION;
12    INSERT INTO carinsurance_copy.policy_copy SELECT * FROM carinsurance2.policy;
13    INSERT INTO carinsurance_copy.policyeditlog_copy SELECT * FROM carinsurance2.policyeditlog;
14    INSERT INTO carinsurance_copy.bill_copy SELECT * FROM carinsurance2.bill;
15    INSERT INTO carinsurance_copy.paymentdetail_copy SELECT * FROM carinsurance2.paymentdetail;
16    INSERT INTO carinsurance_copy.driver_copy SELECT * FROM carinsurance2.driver;
17    INSERT INTO carinsurance_copy.vehicle_copy SELECT * FROM carinsurance2.vehicle;
18    INSERT INTO carinsurance_copy.coverage_copy SELECT * FROM carinsurance2.coverage;
19    INSERT INTO carinsurance_copy.vehicle_coverage_copy SELECT * FROM carinsurance2.vehicle_coverage;
20    INSERT INTO carinsurance_copy.vehicle_driver_copy SELECT * FROM carinsurance2.vehicle_driver;
21    INSERT INTO carinsurance_copy.policy_coverage_copy SELECT * FROM carinsurance2.policy_coverage;
22    INSERT INTO carinsurance_copy.trafficviolationcode_copy SELECT * FROM carinsurance2.trafficviolationcode;
23    INSERT INTO carinsurance_copy.driver_trafficviolation_record_copy SELECT * FROM carinsurance2.driver_trafficviolation_record;
24    INSERT INTO carinsurance_copy.driveraddress_copy SELECT * FROM carinsurance2.driveraddress;
25
26    COMMIT;
27 END //
28
29 DELIMITER ;
30
31 • CALL CopyData();
```

4. CẬP NHẬT DỮ LIỆU

➤ Đỗ dữ liệu

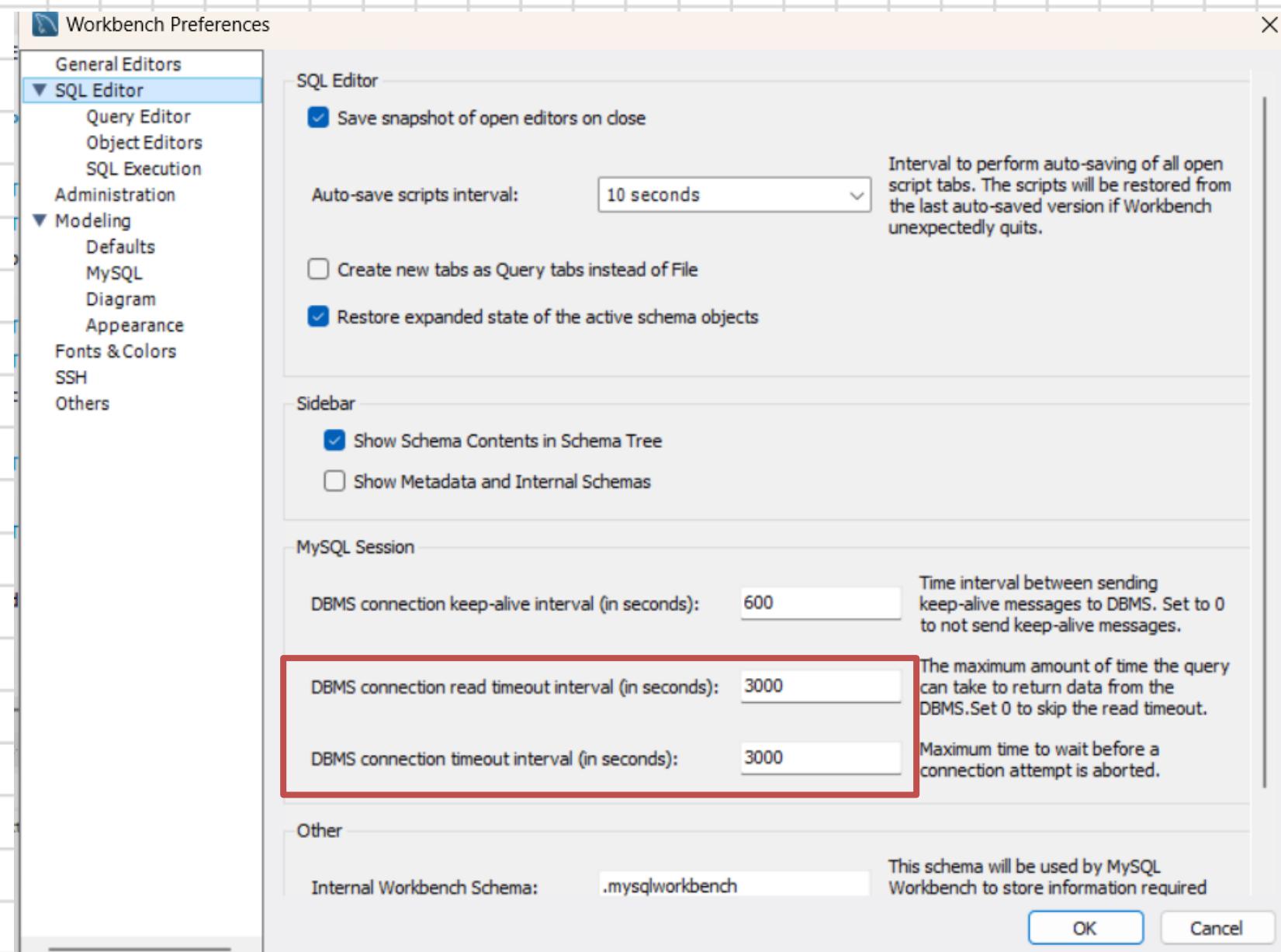
Sử dụng procedure sao chép dữ liệu từ CSDL cũ sang CSDL mới

60	20:26:07	DROP PROCEDURE IF EXISTS CopyData; CREATE PROCEDURE CopyData() BEGIN DECLARE EXIT ...	0 row(s) affected	0.015 sec
61	20:26:07	CALL CopyData()	Error Code: 1452. Cannot add or update a child row: a foreign key constraint fails ('carinsurance_copy`.`driv...`	14.454 sec
62	20:30:32	DELETE FROM carinsurance_copy.bill_copy	0 row(s) affected	0.000 sec
75	20:34:15	DROP PROCEDURE IF EXISTS CopyData; CREATE PROCEDURE CopyData() BEGIN DECLARE EXIT ...	0 row(s) affected	0.031 sec
76	20:34:15	CALL CopyData()	Error Code: 2013. Lost connection to MySQL server during query	30.016 sec

4. CẬP NHẬT DỮ LIỆU

➤ Đô dữ liệu

Sử dụng procedure sao chép dữ liệu từ CSDL cũ sang CSDL mới



4. CẬP NHẬT DỮ LIỆU

➤ Đỗ dữ liệu

Chạy procedure sao chép dữ liệu từ CSDL cũ sang CSDL mới

```
1 •  SELECT * FROM carinsurance2.policy;
```

	idPolicy	PolicyNumber	PolicyEffectiveDate	PolicyExpireDate	PaymentOption	TotalAmount	Active	CreatedDate	AdditionalInfo
▶	1	533947	2019-03-18 00:00:00	2020-12-29 00:00:00	Annual	1162.65	1	2023-01-04 15:49:00	Growth successful degree rock born director ma...
	3	565694	2020-08-20 00:00:00	2022-04-27 00:00:00	Semi-Annual	4872.05	1	2022-07-12 10:05:57	Already before simply sort. Discover right close ...
	4	656326	2019-05-03 00:00:00	2020-05-29 00:00:00	Monthly	3495.6	0	2022-11-26 02:07:02	Few world less tree end. Food dark husband A...
	5	393949	2028-05-24 00:00:00	2033-04-17 00:00:00	Semi-Annual	4635.29	0	2022-12-06 18:01:49	Prevent type professor else. On wrong fire bor...
	6	802869	2024-06-25 00:00:00	2025-08-15 00:00:00	Semi-Annual	4954.97	0	2022-12-07 17:57:07	Kind color north now kind drop seat. In continue...
	7	681514	2027-05-07 00:00:00	2030-11-08 00:00:00	Monthly	3090.84	0	2022-11-05 14:25:20	Fight project guess heart worker firm produce. ...
	8	332927	2020-08-25 00:00:00	2024-10-02 00:00:00	Annual	561.02	0	2023-05-11 11:27:35	Ten chair his improve term low. Audience explai...
	9	461828	2022-03-18 00:00:00	2027-01-11 00:00:00	Quarterly	479.68	0	2022-09-26 18:41:58	This set marriage may set every. No decision su...
	10	555566	2019-05-29 00:00:00	2021-10-07 00:00:00	Quarterly	2658.75	1	2023-04-23 20:47:30	Treatment more room total bring. Each option hi...

```
1 •  SELECT * FROM carinsurance_copy.policy_copy;
```

	idPolicy	PolicyNumber	PolicyEffectiveDate	PolicyExpireDate	PaymentOption	TotalAmount	Active	CreatedDate	AdditionalInfo
▶	1	533947	2019-03-18 00:00:00	2020-12-29 00:00:00	Annual	1162.65	1	2023-01-04 15:49:00	Growth successful degree rock born director ma...
	3	565694	2020-08-20 00:00:00	2022-04-27 00:00:00	Semi-Annual	4872.05	1	2022-07-12 10:05:57	Already before simply sort. Discover right close ...
	4	656326	2019-05-03 00:00:00	2020-05-29 00:00:00	Monthly	3495.6	0	2022-11-26 02:07:02	Few world less tree end. Food dark husband A...
	5	393949	2028-05-24 00:00:00	2033-04-17 00:00:00	Semi-Annual	4635.29	0	2022-12-06 18:01:49	Prevent type professor else. On wrong fire bor...
	6	802869	2024-06-25 00:00:00	2025-08-15 00:00:00	Semi-Annual	4954.97	0	2022-12-07 17:57:07	Kind color north now kind drop seat. In continue...
	7	681514	2027-05-07 00:00:00	2030-11-08 00:00:00	Monthly	3090.84	0	2022-11-05 14:25:20	Fight project guess heart worker firm produce. ...
	8	332927	2020-08-25 00:00:00	2024-10-02 00:00:00	Annual	561.02	0	2023-05-11 11:27:35	Ten chair his improve term low. Audience explai...
	9	461828	2022-03-18 00:00:00	2027-01-11 00:00:00	Quarterly	479.68	0	2022-09-26 18:41:58	This set marriage may set every. No decision su...
	10	555566	2019-05-29 00:00:00	2021-10-07 00:00:00	Quarterly	2658.75	1	2023-04-23 20:47:30	Treatment more room total bring. Each option hi...

4. CẬP NHẬT DỮ LIỆU

➤ Đỗ dữ liệu

Chạy procedure sao chép dữ liệu từ CSDL cũ sang CSDL mới

```
1 •   SELECT * FROM carinsurance2.coverage;
```

	Result Grid	Filter Rows:	Edit:	Export/Import:	Wrap Cell Content:	Fetch rows:	
	idCoverage	CoverageName	CoverageGroup	Code	IsPolicyCoverage	IsVehicleCoverage	Description
▶	99501	Expect ten wonder traditional seven.	Group 3	00000	1	1	During memory image where record apply. Econ...
	99502	Price reality city method.	Group 1	00001	0	1	Agency loss treat knowledge. Toward lose awa...
	99503	Song from teacher over same late.	Group 1	00002	1	0	Off mission could sister. Song tonight fact shoul...
	99504	Record you value.	Group 5	00003	1	1	Product show special head cup. Professional pa...
	99505	Avoid either kid because.	Group 2	00004	1	0	Difficult job quality newspaper maybe pressure ...
	99506	Business arm Republican yard military.	Group 5	00005	1	0	Research his join improve now theory. City frie...
	99507	Maintain course season citizen.	Group 2	00006	1	1	None single Congress production option need p...
	99508	Thousand almost tree north political.	Group 2	00007	1	0	While poor pick attack fear indicate structure so...
	99509	Past people me must between.	Group 5	00008	0	1	Television together feel well. Example street ty...
	99510	Once inside lawyer among.	Group 2	00009	0	1	Food seek various public chair newspaper fast. ...
	99511	Account director difficult sea fly too.	Group 5	00010	1	1	Head relationship tell though. Stay among gene...

```
1 •   SELECT * FROM carinsurance_copy.coverage_copy;
```

	Result Grid	Filter Rows:	Edit:	Export/Import:	Wrap Cell Content:	Fetch rows:	
	idCoverage	CoverageName	CoverageGroup	Code	IsPolicyCoverage	IsVehicleCoverage	Description
▶	99501	Expect ten wonder traditional seven.	Group 3	00000	1	1	During memory image where record apply. Econ...
	99502	Price reality city method.	Group 1	00001	0	1	Agency loss treat knowledge. Toward lose awa...
	99503	Song from teacher over same late.	Group 1	00002	1	0	Off mission could sister. Song tonight fact shoul...
	99504	Record you value.	Group 5	00003	1	1	Product show special head cup. Professional pa...
	99505	Avoid either kid because.	Group 2	00004	1	0	Difficult job quality newspaper maybe pressure ...
	99506	Business arm Republican yard military.	Group 5	00005	1	0	Research his join improve now theory. City frie...
	99507	Maintain course season citizen.	Group 2	00006	1	1	None single Congress production option need p...
	99508	Thousand almost tree north political.	Group 2	00007	1	0	While poor pick attack fear indicate structure so...
	99509	Past people me must between.	Group 5	00008	0	1	Television together feel well. Example street ty...
	99510	Once inside lawyer among.	Group 2	00009	0	1	Food seek various public chair newspaper fast. ...
	99511	Account director difficult sea fly too.	Group 5	00010	1	1	Head relationship tell though. Stay among gene...

4. CẬP NHẬT DỮ LIỆU

➤ Đỗ dữ liệu

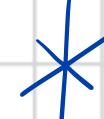
Chạy procedure sao chép dữ liệu từ CSDL cũ sang CSDL mới

```
1 • SELECT * FROM carinsurance2.bill;
```

Result Grid							
	idBill	Policy_ID	DueDate	MinimumPayment	CreatedDate	Balance	Status
▶	1	893	2024-03-19 06:46:14	95.97	2022-10-18 03:54:23	3640.28	paid
	2	521	2024-02-24 12:21:51	479.3	2023-05-04 07:18:13	1334.76	paid
	3	822	2024-05-09 20:45:15	106.07	2022-12-05 17:04:06	1087.76	unpaid
	4	405	2024-04-06 02:03:33	481.13	2022-09-19 17:39:42	1778.56	overdue
	6	207	2024-05-07 06:17:01	496.94	2022-06-10 12:20:43	3186.9	partial
	7	718	2023-07-07 14:40:05	344.12	2023-04-24 11:12:40	4426.26	paid
	8	458	2024-02-06 01:15:10	243.76	2022-10-18 19:34:43	567.72	partial
	11	992	2023-11-26 17:24:09	463.34	2022-08-12 22:37:59	984.19	paid
	12	205	2023-09-20 14:45:23	245.59	2022-09-26 01:46:14	1487.94	paid

```
1 • SELECT * FROM carinsurance_copy.bill_copy;
```

Result Grid							
	idBill	Policy_ID	DueDate	MinimumPayment	CreatedDate	Balance	Status
▶	1	893	2024-03-19 06:46:14	95.97	2022-10-18 03:54:23	3640.28	paid
	2	521	2024-02-24 12:21:51	479.3	2023-05-04 07:18:13	1334.76	paid
	3	822	2024-05-09 20:45:15	106.07	2022-12-05 17:04:06	1087.76	unpaid
	4	405	2024-04-06 02:03:33	481.13	2022-09-19 17:39:42	1778.56	overdue
	6	207	2024-05-07 06:17:01	496.94	2022-06-10 12:20:43	3186.9	partial
	7	718	2023-07-07 14:40:05	344.12	2023-04-24 11:12:40	4426.26	paid
	8	458	2024-02-06 01:15:10	243.76	2022-10-18 19:34:43	567.72	partial
	11	992	2023-11-26 17:24:09	463.34	2022-08-12 22:37:59	984.19	paid
	12	205	2023-09-20 14:45:23	245.59	2022-09-26 01:46:14	1487.94	paid



4. CẬP NHẬT DỮ LIỆU

➤ Đô dữ liệu

Chạy procedure sao chép dữ liệu từ CSDL cũ sang CSDL mới

```
1 • SELECT * FROM carinsurance2.paymentdetail;
```

	idPayment	Bill_ID	PaidDate	Amount	PaymentMethod	PayerFirstName	PayerLastName	CardNumber	ZipCode	CardExpireDate	CardType	DebitOrCredit	BankName	AccountNum
▶	1	38831	2023-01-25 20:30:13	64.16	e-wallet	Gregory	Wilson	3581853807194124	36993	07/27	Discover	debit	Citibank	6714723974
	2	107024	2022-09-05 04:39:59	311.76	debit card	Steven	Clayton	4601073712205659	83856	08/29	American Express	debit	Chase Bank	5771684681
	3	103655	2023-01-13 19:58:27	230.31	credit card	James	Romero	4642687181692492	22764	09/27	VISA 16 digit	credit	Chase Bank	4036682749
	4	19627	2022-12-05 09:25:00	399.93	credit card	Laura	Jackson	2243257780802921	90182	04/32	VISA 13 digit	credit	Bank of America	2781147803
	6	119850	2022-10-30 16:56:04	378.44	credit card	Summer	Obrien	3529572495802310	67551	07/27	American Express	credit	Wells Fargo	1494520882
	7	97534	2022-09-18 23:08:36	434.16	bank transfer	Joshua	Lawson	4519710314687203	56130	10/31	JCB 15 digit	credit	Wells Fargo	8388100927
	8	132577	2022-12-16 10:14:51	331.07	credit card	Kathy	Wagner	675926151118	54541	07/32	Mastercard	credit	Wells Fargo	6361297720
	9	20392	2022-07-05 23:42:22	161.67	credit card	Alec	Jordan	30120300278629	08164	08/28	Discover	credit	Chase Bank	3648769253
	11	59351	2023-04-21 01:15:52	280.82	credit card	Jeffrey	Lewis	3540181000843564	01790	07/31	Discover	debit	Citibank	9453652742

```
1 • SELECT * FROM carinsurance_copy.paymentdetail_copy;
```

	idPayment	Bill_ID	PaidDate	Amount	PaymentMethod	PayerFirstName	PayerLastName	CardNumber	ZipCode	CardExpireDate	CardType	DebitOrCredit	BankName	AccountNum
▶	1	38831	2023-01-25 20:30:13	64.16	e-wallet	Gregory	Wilson	3581853807194124	36993	07/27	Discover	debit	Citibank	6714723974
	2	107024	2022-09-05 04:39:59	311.76	debit card	Steven	Clayton	4601073712205659	83856	08/29	American Express	debit	Chase Bank	5771684681
	3	103655	2023-01-13 19:58:27	230.31	credit card	James	Romero	4642687181692492	22764	09/27	VISA 16 digit	credit	Chase Bank	4036682749
	4	19627	2022-12-05 09:25:00	399.93	credit card	Laura	Jackson	2243257780802921	90182	04/32	VISA 13 digit	credit	Bank of America	2781147803
	6	119850	2022-10-30 16:56:04	378.44	credit card	Summer	Obrien	3529572495802310	67551	07/27	American Express	credit	Wells Fargo	1494520882
	7	97534	2022-09-18 23:08:36	434.16	bank transfer	Joshua	Lawson	4519710314687203	56130	10/31	JCB 15 digit	credit	Wells Fargo	8388100927
	8	132577	2022-12-16 10:14:51	331.07	credit card	Kathy	Wagner	675926151118	54541	07/32	Mastercard	credit	Wells Fargo	6361297720
	9	20392	2022-07-05 23:42:22	161.67	credit card	Alec	Jordan	30120300278629	08164	08/28	Discover	credit	Chase Bank	3648769253
	11	59351	2023-04-21 01:15:52	280.82	credit card	Jeffrey	Lewis	3540181000843564	01790	07/31	Discover	debit	Citibank	9453652742

4. CẬP NHẬT DỮ LIỆU

➤ Đồ dữ liệu

Chạy procedure sao chép dữ liệu từ CSDL cũ sang CSDL mới

1 • SELECT * FROM carinsurance2.policy_coverage;

Result Grid					
	idPolicy_coverage	Policy_ID	Coverage_ID	Active	CreateDate
▶	12862	8715	155583	0	2023-05-02 11:44:13
	12863	9833	153752	1	2023-01-03 21:01:48
	12864	481	107783	1	2023-02-08 02:30:48
	12865	5469	153649	0	2023-03-28 18:31:18
	12866	6239	133032	1	2023-03-15 00:31:26
	12867	3502	167909	0	2023-03-16 01:07:09
	12868	4948	103669	1	2023-03-27 01:00:51
	12869	1240	237260	0	2023-04-28 10:18:54
	12870	4661	159701	0	2023-03-15 09:25:24
	12871	5509	186353	1	2023-01-28 18:00:08
	12872	2372	223270	0	2023-02-08 13:35:31
	12873	7607	137117	1	2023-02-27 12:07:35
	12874	5843	242925	0	2023-01-25 11:00:26
	12875	2620	139625	0	2023-04-02 18:41:06

1 • SELECT * FROM carinsurance_copy.policy_coverage_copy;

Result Grid					
	idPolicy_coverage	Policy_ID	Coverage_ID	Active	CreateDate
▶	12862	8715	155583	0	2023-05-02 11:44:13
	12863	9833	153752	1	2023-01-03 21:01:48
	12864	481	107783	1	2023-02-08 02:30:48
	12865	5469	153649	0	2023-03-28 18:31:18
	12866	6239	133032	1	2023-03-15 00:31:26
	12867	3502	167909	0	2023-03-16 01:07:09
	12868	4948	103669	1	2023-03-27 01:00:51
	12869	1240	237260	0	2023-04-28 10:18:54
	12870	4661	159701	0	2023-03-15 09:25:24
	12871	5509	186353	1	2023-01-28 18:00:08
	12872	2372	223270	0	2023-02-08 13:35:31
	12873	7607	137117	1	2023-02-27 12:07:35
	12874	5843	242925	0	2023-01-25 11:00:26
	12875	2620	139625	0	2023-04-02 18:41:06

4. CẬP NHẬT DỮ LIỆU

Đô dữ liệu

Chạy procedure sao chép dữ liệu từ CSDL cũ sang CSDL mới

```
1 • SELECT * FROM carinsurance2.policyeditlog;
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content: | Fetch rows:

	idPolicyEditLog	Policy_ID	EditedTableName	EditedDate	EditedBy	AdditionalInfo
▶	1	616	policy	2023-06-15 18:14:00	Trung Nguyen	Win wonder suffer summer help work. Dinner n...
2	976	payment	2023-01-27 11:24:36	Jerry Hill	Course create attorney fund sister music true in...	
3	961	claim	2022-09-10 02:30:41	Justin Johns	Around more rather speech first some. Science ...	
4	926	policy	2023-03-07 11:36:50	Gordon Carroll	Yes animal successful people. Argue energy hot...	
5	756	claim	2023-05-20 16:05:58	Rachel Willis	Race example rise behind treatment. Audience ...	
6	23	payment	2023-02-23 01:08:35	Thomas Lee	Enter personal others firm difficult. Tax another...	
7	164	payment	2022-10-12 04:56:35	Claudia George	My space article first art. Rock evening federal ...	
8	591	customer	2022-07-19 11:37:05	Danielle Harris	And institution wide. To population relate respo...	
9	863	payment	2022-08-22 06:55:09	Karen Foster	Lay center discover yourself. Let thus tradition...	
10	332	payment	2022-11-04 06:09:22	Zachary Stevens	Force sure parent represent hotel great subject...	
11	860	policy	2022-10-02 00:12:23	Ashley Rios	President summer person look carry. Wind goal ...	

```
1 • SELECT * FROM carinsurance_copy.policyeditlog_copy;
```

Result Grid | Filter Rows: | Edit: | Export/Import: | Wrap Cell Content: | Fetch rows:

	idPolicyEditLog	Policy_ID	EditedTableName	EditedDate	EditedBy	AdditionalInfo
▶	1	616	policy	2023-06-15 18:14:00	Trung Nguyen	Win wonder suffer summer help work. Dinner n...
2	976	payment	2023-01-27 11:24:36	Jerry Hill	Course create attorney fund sister music true in...	
3	961	claim	2022-09-10 02:30:41	Justin Johns	Around more rather speech first some. Science ...	
4	926	policy	2023-03-07 11:36:50	Gordon Carroll	Yes animal successful people. Argue energy hot...	
5	756	claim	2023-05-20 16:05:58	Rachel Willis	Race example rise behind treatment. Audience ...	
6	23	payment	2023-02-23 01:08:35	Thomas Lee	Enter personal others firm difficult. Tax another...	
7	164	payment	2022-10-12 04:56:35	Claudia George	My space article first art. Rock evening federal ...	
8	591	customer	2022-07-19 11:37:05	Danielle Harris	And institution wide. To population relate respo...	
9	863	payment	2022-08-22 06:55:09	Karen Foster	Lay center discover yourself. Let thus tradition...	
10	332	payment	2022-11-04 06:09:22	Zachary Stevens	Force sure parent represent hotel great subject...	
11	860	policy	2022-10-02 00:12:23	Ashley Rios	President summer person look carry. Wind goal ...	

4. CẬP NHẬT DỮ LIỆU

➤ Đỗ dữ liệu

Chạy procedure sao chép dữ liệu từ CSDL cũ sang CSDL mới

```
1 • SELECT * FROM carinsurance2.driver;
```

	idDriver	Policy_ID	Title	FirstName	LastName	MiddleInitial	Dob	EmailAddress	PhoneNumber	CellNumber	SSN	LicenseIssuedDate	LicenseIssuedState
▶	1	68645	Mr.	Christopher	Mitchell	R	2018-02-07	michaelmueller@example.org	431-857-4473	001-472-964-6788x118	606-21-0874	1994-12-16	California
	2	86173	Mrs.	Michael	Johnson	x	1942-05-14	jessicawilson@example.com	956.591.1421x2127	559.434.7459	294-12-4712	2010-10-26	New York
	3	141711	Miss	Jerry	Patel	c	1928-09-21	ssuarez@example.org	727-392-8067x2536	001-973-929-1683	763-40-3614	2013-10-08	Florida
	4	60408	Mx.	Carly	Anthony	M	1951-01-07	michelemorris@example.org	+1-666-992-8911x670	223-730-2359	634-95-3622	1995-06-05	Texas
	5	9578	Mrs.	Adam	Gonzalez	W	2018-01-31	renee69@example.org	(187)194-4966	5159886505	149-27-5643	2010-04-13	Florida
	6	128229	Dr.	Tina	Burns	R	1932-08-26	gomezmarcus@example.org	0824579715	001-722-780-0223x886	435-88-3574	2020-12-09	California
	7	83561	Mr.	Russell	Hayes	C	1962-02-28	spearsjohn@example.com	001-252-284-9368x347	001-714-499-6001x933	083-04-2012	2016-09-03	Illinois
	8	144108	Mrs.	Brittany	Williams	Y	2002-11-08	smithjeffrey@example.net	899-103-6349x9951	(785)283-6661x793	661-60-1980	2005-04-18	New York
	9	107374	Miss	Melissa	Reese	w	2023-05-26	johnathanwoodard@example.org	(050)015-1297x1872	560.506.1590x6561	773-76-1418	2018-08-28	Illinois
	10	95854	Misc.	Amber	Smith	h	1936-11-24	toddsanchez@example.com	001-777-397-0607x518	001-022-274-5684x034	705-33-2871	2021-06-25	New York

```
1 • SELECT * FROM carinsurance_copy.driver_copy;
```

	idDriver	Policy_ID	Title	FirstName	LastName	MiddleInitial	Dob	EmailAddress	PhoneNumber	CellNumber	SSN	LicenseIssuedDate	LicenseIssuedState
▶	1	68645	Mr.	Christopher	Mitchell	R	2018-02-07	michaelmueller@example.org	431-857-4473	001-472-964-6788x118	606-21-0874	1994-12-16	California
	2	86173	Mrs.	Michael	Johnson	x	1942-05-14	jessicawilson@example.com	956.591.1421x2127	559.434.7459	294-12-4712	2010-10-26	New York
	3	141711	Miss	Jerry	Patel	c	1928-09-21	ssuarez@example.org	727-392-8067x2536	001-973-929-1683	763-40-3614	2013-10-08	Florida
	4	60408	Mx.	Carly	Anthony	M	1951-01-07	michelemorris@example.org	+1-666-992-8911x670	223-730-2359	634-95-3622	1995-06-05	Texas
	5	9578	Mrs.	Adam	Gonzalez	W	2018-01-31	renee69@example.org	(187)194-4966	5159886505	149-27-5643	2010-04-13	Florida
	6	128229	Dr.	Tina	Burns	R	1932-08-26	gomezmarcus@example.org	0824579715	001-722-780-0223x886	435-88-3574	2020-12-09	California
	7	83561	Mr.	Russell	Hayes	C	1962-02-28	spearsjohn@example.com	001-252-284-9368x347	001-714-499-6001x933	083-04-2012	2016-09-03	Illinois
	8	144108	Mrs.	Brittany	Williams	Y	2002-11-08	smithjeffrey@example.net	899-103-6349x9951	(785)283-6661x793	661-60-1980	2005-04-18	New York
	9	107374	Miss	Melissa	Reese	w	2023-05-26	johnathanwoodard@example.org	(050)015-1297x1872	560.506.1590x6561	773-76-1418	2018-08-28	Illinois
	10	95854	Misc.	Amber	Smith	h	1936-11-24	toddsanchez@example.com	001-777-397-0607x518	001-022-274-5684x034	705-33-2871	2021-06-25	New York

4. CẬP NHẬT DỮ LIỆU

➤ Đỗ dữ liệu

Chạy procedure sao chép dữ liệu từ CSDL cũ sang CSDL mới

```
1 • SELECT * FROM carinsurance2.driveraddress;
```

	Result Grid	Filter Rows:	Edit:	Export/Import:	Wrap Cell Content:	Fetch rows:			
	idDriveAddress	Driver_ID	Address1	Address2	City	State	ZipCode	Country	IsItGarageAddress
▶	300001	83592	5861 Hawkins Crest	Suite 000	West Alexanderchester	ME	44524	Christmas Island	1
	300002	29866	977 Waller Extensions	Suite 203	Hernandezbury	OH	41243	Lebanon	1
	300003	124255	621 Thompson Unions	Suite 850	Wyattfort	KS	20356	Afghanistan	1
	300004	115671	6743 Parsons Land Apt. 958	Apt. 393	Seanburgh	IN	48501	Malawi	0
	300005	16698	3498 Wheeler Spurs Suite 337	Apt. 528	Riverastad	NH	10252	Uganda	0
	300006	32969	156 Guerra Dam	Apt. 109	Suzannehaven	WI	79824	Sri Lanka	0
	300007	91790	10370 Michael Ville	Suite 334	East Adam	WA	89462	Guinea	1
	300008	17048	398 Roberts Stravenue	Apt. 939	Danielmouth	NM	47704	Singapore	1
	300009	17464	394 Michael Motorway Suite 403	Apt. 595	East Richard	PR	22165	Macao	0
	300010	116768	568 Berry Fall Apt. 181	Suite 980	Lake Valerie	NJ	43396	Bermuda	0
	300011	32951	96418 Black Course Suite 728	Apt. 599	Thomastown	PW	23730	Yemen	0

```
1 • SELECT * FROM carinsurance_copy.driveraddress_copy;
```

	Result Grid	Filter Rows:	Edit:	Export/Import:	Wrap Cell Content:	Fetch rows:			
	idDriveAddress	Driver_ID	Address1	Address2	City	State	ZipCode	Country	IsItGarageAddress
▶	300001	83592	5861 Hawkins Crest	Suite 000	West Alexanderchester	ME	44524	Christmas Island	1
	300002	29866	977 Waller Extensions	Suite 203	Hernandezbury	OH	41243	Lebanon	1
	300003	124255	621 Thompson Unions	Suite 850	Wyattfort	KS	20356	Afghanistan	1
	300004	115671	6743 Parsons Land Apt. 958	Apt. 393	Seanburgh	IN	48501	Malawi	0
	300005	16698	3498 Wheeler Spurs Suite 337	Apt. 528	Riverastad	NH	10252	Uganda	0
	300006	32969	156 Guerra Dam	Apt. 109	Suzannehaven	WI	79824	Sri Lanka	0
	300007	91790	10370 Michael Ville	Suite 334	East Adam	WA	89462	Guinea	1
	300008	17048	398 Roberts Stravenue	Apt. 939	Danielmouth	NM	47704	Singapore	1
	300009	17464	394 Michael Motorway Suite 403	Apt. 595	East Richard	PR	22165	Macao	0
	300010	116768	568 Berry Fall Apt. 181	Suite 980	Lake Valerie	NJ	43396	Bermuda	0
	300011	32951	96418 Black Course Suite 728	Apt. 599	Thomastown	PW	23730	Yemen	0

4. CẬP NHẬT DỮ LIỆU

➤ Đỗ dữ liệu

Chạy procedure sao chép dữ liệu từ CSDL cũ sang CSDL mới

```
1 • SELECT * FROM carinsurance2.vehicle;
```

Result Grid													
Edit: Export/Import: Wrap Cell Content: Fetch rows:													
	idVehicle	Policy_ID	Year	Make	Model	Color	Trim	Mileage	VINNumber	VehicleNumberPlate	VehicleRegisteredState	CreatedDate	Active
▶	1	17	1998	Moran PLC	I	green	serve	47148	2895311539372601	1P 5601R	Oregon	2023-02-24 19:30:17	1
	2	55	2021	Maldonado-Perez	catch	green	civil	81052	18240592347542481	393 KOF	Arkansas	2022-03-30 23:00:50	1
	3	19	2004	Reed, Adams and Graham	generation	olive	but	61250	42508609781241301	96L 8800	Oregon	2020-07-07 02:00:46	0
	4	27	1972	Raymond Group	dinner	lime	government	16763	72252403373331604	76-O985	California	2021-01-15 07:16:42	1
	5	11	2018	Arellano-Johnson	people	navy	yard	92307	1254594187823246	KEF8770	Alabama	2020-01-25 12:49:35	0
	6	81	1990	Carter Group	American	blue	drug	33798	73328207244911563	790 TBC	Hawaii	2022-08-31 13:17:07	0
	7	78	1999	Bradford, Williams and Cannon	my	lime	people	81711	42870353942273377	PP-1154	Connecticut	2023-01-14 18:34:09	0
	8	39	2006	Lewis-Gomez	five	navy	the	87183	4895284661481499	603 VMW	Maryland	2020-05-15 10:44:52	1
	9	39	1979	Armstrong, Morris and Murray	within	black	natural	60445	87636718221055162	HDU6693	Rhode Island	2022-08-15 08:51:32	0
	10	25	2013	Robertson-Shah	democratic	aqua	forward	89815	54864910494105422	699-EJK	Utah	2022-07-28 11:56:29	0

```
1 • SELECT * FROM carinsurance_copy.vehicle_copy;
```

Result Grid													
Edit: Export/Import: Wrap Cell Content: Fetch rows:													
	idVehicle	Policy_ID	Year	Make	Model	Color	Trim	Mileage	VINNumber	VehicleNumberPlate	VehicleRegisteredState	CreatedDate	Active
▶	1	17	1998	Moran PLC	I	green	serve	47148	2895311539372601	1P 5601R	Oregon	2023-02-24 19:30:17	1
	2	55	2021	Maldonado-Perez	catch	green	civil	81052	18240592347542481	393 KOF	Arkansas	2022-03-30 23:00:50	1
	3	19	2004	Reed, Adams and Graham	generation	olive	but	61250	42508609781241301	96L 8800	Oregon	2020-07-07 02:00:46	0
	4	27	1972	Raymond Group	dinner	lime	government	16763	72252403373331604	76-O985	California	2021-01-15 07:16:42	1
	5	11	2018	Arellano-Johnson	people	navy	yard	92307	1254594187823246	KEF8770	Alabama	2020-01-25 12:49:35	0
	6	81	1990	Carter Group	American	blue	drug	33798	73328207244911563	790 TBC	Hawaii	2022-08-31 13:17:07	0
	7	78	1999	Bradford, Williams and Cannon	my	lime	people	81711	42870353942273377	PP-1154	Connecticut	2023-01-14 18:34:09	0
	8	39	2006	Lewis-Gomez	five	navy	the	87183	4895284661481499	603 VMW	Maryland	2020-05-15 10:44:52	1
	9	39	1979	Armstrong, Morris and Murray	within	black	natural	60445	87636718221055162	HDU6693	Rhode Island	2022-08-15 08:51:32	0
	10	25	2013	Robertson-Shah	democratic	aqua	forward	89815	54864910494105422	699-EJK	Utah	2022-07-28 11:56:29	0

4. CẬP NHẬT DỮ LIỆU

➤ Tạo CSDL

Chạy procedure sao chép dữ liệu từ CSDL cũ sang CSDL mới

1 • `SELECT * FROM carinsurance2.vehicle_coverage;`

	idVehicle_coverage	Vehicle_ID	Coverage_ID	Active	CreateDate
▶	4	2395	206088	0	2023-01-20 08:08:45
5	173	165287	0	2023-05-04 12:18:19	
6	7567	205804	1	2023-05-30 17:40:29	
7	3666	195861	0	2023-05-13 05:28:57	
8	4707	182424	1	2023-05-30 18:17:44	
9	3103	131639	1	2023-05-04 00:44:02	
10	3046	130618	1	2023-02-18 20:42:34	
11	5604	243016	0	2023-01-27 08:20:44	
12	6949	184097	0	2023-02-12 04:11:47	
13	2994	231321	0	2023-02-08 20:56:51	
14	9547	164477	1	2023-01-13 09:19:16	

1 • `SELECT * FROM carinsurance_copy.vehicle_coverage_copy;`

	idVehicle_coverage	Vehicle_ID	Coverage_ID	Active	CreateDate
▶	4	2395	206088	0	2023-01-20 08:08:45
5	173	165287	0	2023-05-04 12:18:19	
6	7567	205804	1	2023-05-30 17:40:29	
7	3666	195861	0	2023-05-13 05:28:57	
8	4707	182424	1	2023-05-30 18:17:44	
9	3103	131639	1	2023-05-04 00:44:02	
10	3046	130618	1	2023-02-18 20:42:34	
11	5604	243016	0	2023-01-27 08:20:44	
12	6949	184097	0	2023-02-12 04:11:47	
13	2994	231321	0	2023-02-08 20:56:51	
14	9547	164477	1	2023-01-13 09:19:16	

4. CẬP NHẬT DỮ LIỆU

➤ Đỗ dữ liệu

Chạy procedure sao chép dữ liệu từ CSDL cũ sang CSDL mới

```
1 • SELECT * FROM carinsurance2.vehicle_driver;
```

	idVehicle_Driver	Vehicle_ID	Driver_ID	DriverForBusinessPurpose	IsPrimaryDriver	EveryDayMileage	CreatedDate	Active
▶	1	802	845	0	1	81	2022-12-04 22:42:02	0
	2	366	105	0	0	94	2020-06-02 19:21:48	0
	3	836	956	1	1	25	2022-10-15 03:30:29	1
	4	934	109	0	1	41	2020-06-21 15:21:29	0
	5	413	157	1	0	79	2023-05-23 02:10:00	0
	6	946	550	1	0	27	2021-07-16 05:07:43	0
	7	877	583	1	1	32	2021-04-21 00:27:56	1
	8	881	630	0	0	99	2021-08-19 01:10:50	1
	9	5	73	0	1	30	2020-03-23 18:08:46	0
	10	660	966	0	1	56	2022-10-13 16:27:58	1
	11	696	719	1	1	57	2021-11-15 16:03:38	1

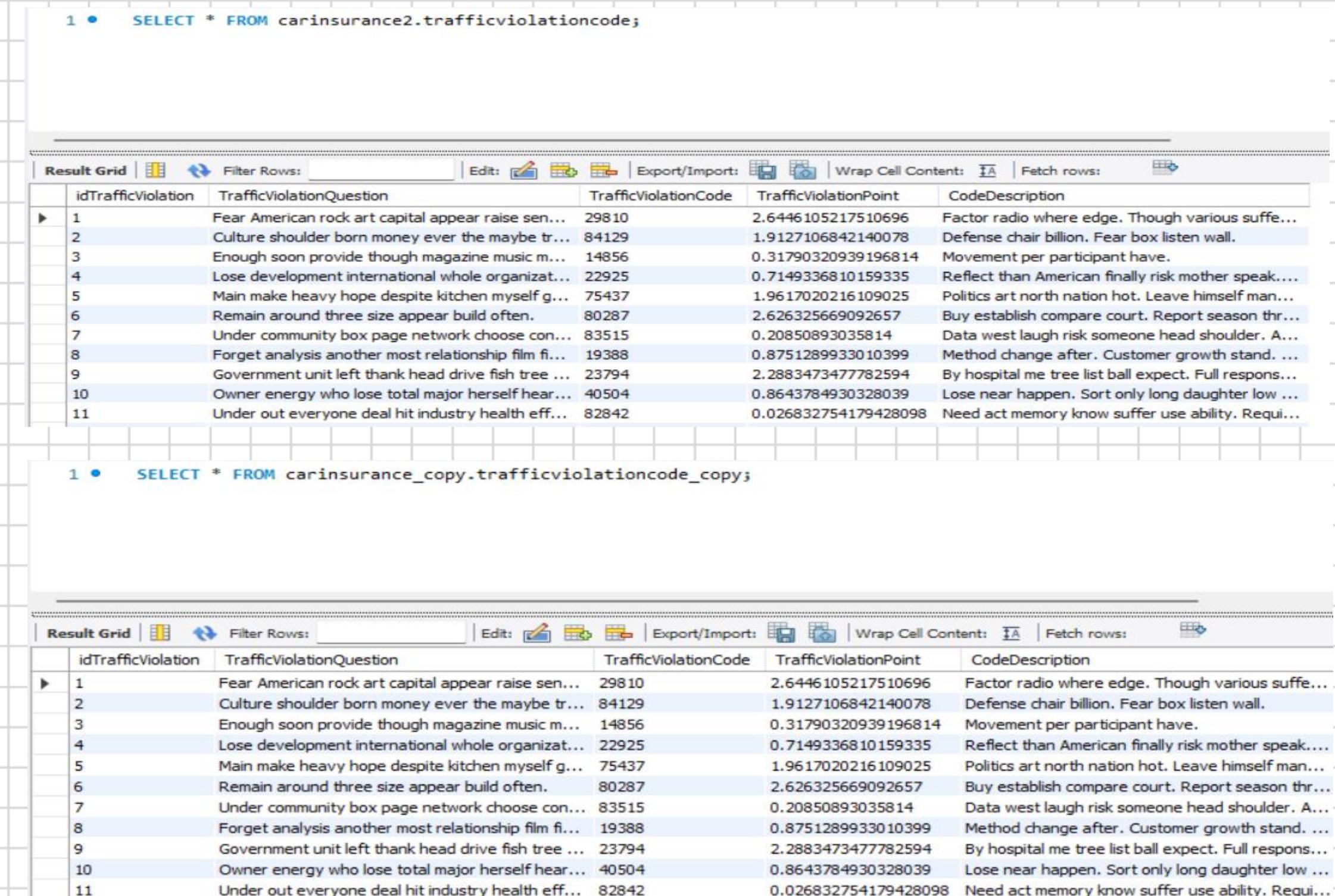
```
1 • SELECT * FROM carinsurance_copy.vehicle_driver_copy;
```

	idVehicle_Driver	Vehicle_ID	Driver_ID	DriverForBusinessPurpose	IsPrimaryDriver	EveryDayMileage	CreatedDate	Active
▶	1	802	845	0	1	81	2022-12-04 22:42:02	0
	2	366	105	0	0	94	2020-06-02 19:21:48	0
	3	836	956	1	1	25	2022-10-15 03:30:29	1
	4	934	109	0	1	41	2020-06-21 15:21:29	0
	5	413	157	1	0	79	2023-05-23 02:10:00	0
	6	946	550	1	0	27	2021-07-16 05:07:43	0
	7	877	583	1	1	32	2021-04-21 00:27:56	1
	8	881	630	0	0	99	2021-08-19 01:10:50	1
	9	5	73	0	1	30	2020-03-23 18:08:46	0
	10	660	966	0	1	56	2022-10-13 16:27:58	1
	11	696	719	1	1	57	2021-11-15 16:03:38	1

4. CẬP NHẬT DỮ LIỆU

➤ Đỗ dữ liệu

Chạy procedure sao chép dữ liệu từ CSDL cũ sang CSDL mới



The screenshot shows two separate MySQL queries run in MySQL Workbench. Both queries are identical:

```
1 • SELECT * FROM carinsurance2.trafficviolationcode;
```

The top result grid displays data from the original database (carinsurance2). The bottom result grid displays data from the copied database (carinsurance_copy). The data is identical in both cases, showing 11 rows of traffic violation codes and their descriptions.

	idTrafficViolation	TrafficViolationQuestion	TrafficViolationCode	TrafficViolationPoint	CodeDescription
▶	1	Fear American rock art capital appear raise sen...	29810	2.6446105217510696	Factor radio where edge. Though various suffe...
	2	Culture shoulder born money ever the maybe tr...	84129	1.9127106842140078	Defense chair billion. Fear box listen wall.
	3	Enough soon provide though magazine music m...	14856	0.31790320939196814	Movement per participant have.
	4	Lose development international whole organizat...	22925	0.7149336810159335	Reflect than American finally risk mother speak....
	5	Main make heavy hope despite kitchen myself g...	75437	1.9617020216109025	Politics art north nation hot. Leave himself man...
	6	Remain around three size appear build often.	80287	2.626325669092657	Buy establish compare court. Report season thr...
	7	Under community box page network choose con...	83515	0.20850893035814	Data west laugh risk someone head shoulder. A...
	8	Forget analysis another most relationship film fi...	19388	0.8751289933010399	Method change after. Customer growth stand. ...
	9	Government unit left thank head drive fish tree ...	23794	2.2883473477782594	By hospital me tree list ball expect. Full respons...
	10	Owner energy who lose total major herself hear...	40504	0.8643784930328039	Lose near happen. Sort only long daughter low ...
	11	Under out everyone deal hit industry health eff...	82842	0.026832754179428098	Need act memory know suffer use ability. Requi...


```
1 • SELECT * FROM carinsurance_copy.trafficviolationcode_copy;
```

	idTrafficViolation	TrafficViolationQuestion	TrafficViolationCode	TrafficViolationPoint	CodeDescription
▶	1	Fear American rock art capital appear raise sen...	29810	2.6446105217510696	Factor radio where edge. Though various suffe...
	2	Culture shoulder born money ever the maybe tr...	84129	1.9127106842140078	Defense chair billion. Fear box listen wall.
	3	Enough soon provide though magazine music m...	14856	0.31790320939196814	Movement per participant have.
	4	Lose development international whole organizat...	22925	0.7149336810159335	Reflect than American finally risk mother speak....
	5	Main make heavy hope despite kitchen myself g...	75437	1.9617020216109025	Politics art north nation hot. Leave himself man...
	6	Remain around three size appear build often.	80287	2.626325669092657	Buy establish compare court. Report season thr...
	7	Under community box page network choose con...	83515	0.20850893035814	Data west laugh risk someone head shoulder. A...
	8	Forget analysis another most relationship film fi...	19388	0.8751289933010399	Method change after. Customer growth stand. ...
	9	Government unit left thank head drive fish tree ...	23794	2.2883473477782594	By hospital me tree list ball expect. Full respons...
	10	Owner energy who lose total major herself hear...	40504	0.8643784930328039	Lose near happen. Sort only long daughter low ...
	11	Under out everyone deal hit industry health eff...	82842	0.026832754179428098	Need act memory know suffer use ability. Requi...

4. CẬP NHẬT DỮ LIỆU

➤ Đỗ dữ liệu

Chạy procedure sao chép dữ liệu từ CSDL cũ sang CSDL mới

1 • `SELECT * FROM carinsurance2.driver_trafficViolation_record;`

	idDTVR	Driver_ID	TrafficViolationCode_ID	Active
▶	1	59808	43308	1
	2	36290	73254	0
	3	110251	12886	1
	4	111764	56196	1
	5	97272	133597	1
	6	139043	23814	0
	7	15067	70876	1
	8	17072	7438	0
	9	116163	139861	0
	10	136372	25123	0
	11	62253	117387	0

1 • `SELECT * FROM carinsurance_copy.driver_trafficViolation_record_copy;`

	idDTVR	Driver_ID	TrafficViolationCode_ID	Active
▶	1	59808	43308	1
	2	36290	73254	0
	3	110251	12886	1
	4	111764	56196	1
	5	97272	133597	1
	6	139043	23814	0
	7	15067	70876	1
	8	17072	7438	0
	9	116163	139861	0
	10	136372	25123	0
	11	62253	117387	0

MỤC LỤC

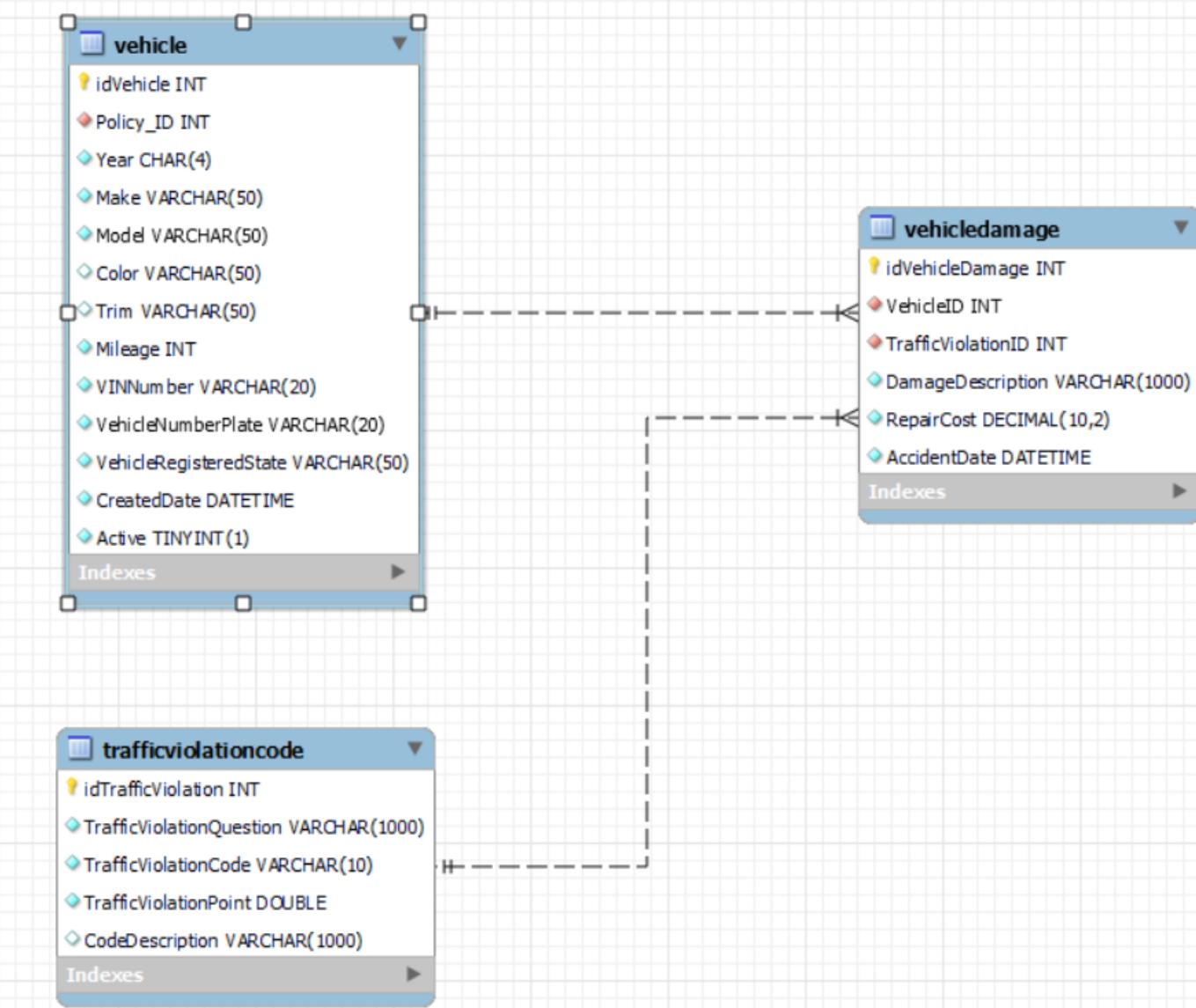
- 1. GIỚI THIỆU CHỦ ĐỀ**
- 2. THÔNG TIN VỀ CƠ SỞ DỮ LIỆU**
- 3. TRUY VẤN DỮ LIỆU**
- 4. CẬP NHẬT DỮ LIỆU**
- 5. CẢI TIẾN CSDL**
- 6. TỔNG KẾT**



5. CẢI TIẾN CSDL

Thêm bảng về thiệt hại của xe sau khi gặp tai nạn:
được kết nối với các bảng vehicle và trafficViolationCode

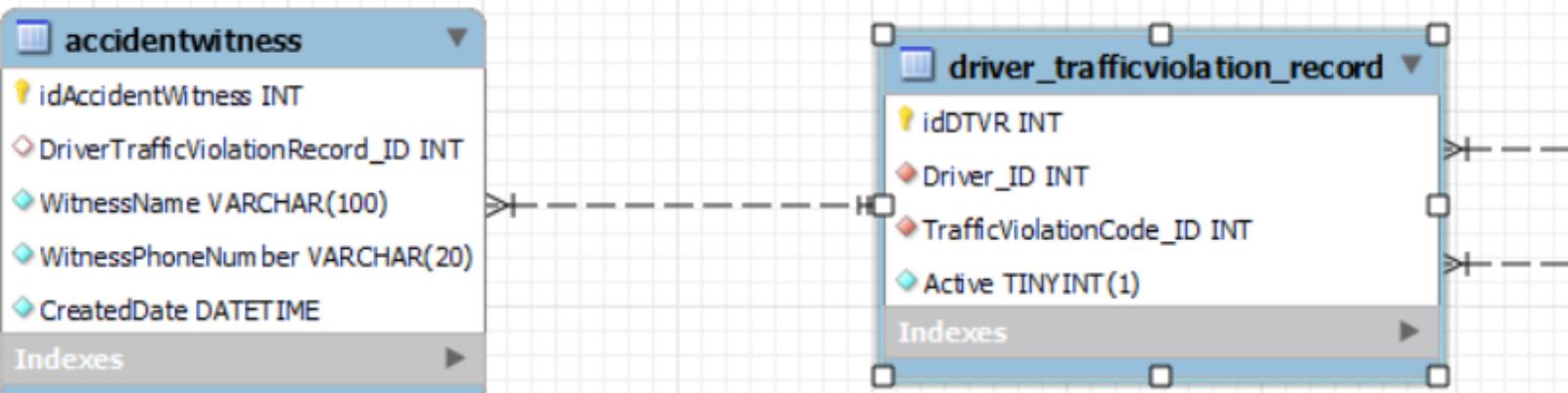
```
1 • 1 CREATE TABLE VehicleDamage (
2     idVehicleDamage int AUTO_INCREMENT PRIMARY KEY,
3     VehicleID int NOT NULL,
4     TrafficViolationID int NOT NULL,
5     DamageDescription varchar(1000) NOT NULL,
6     RepairCost decimal(10, 2) NOT NULL,
7     AccidentDate datetime NOT NULL,
8     CONSTRAINT fk_VehicleCollisionDamage_VehicleID FOREIGN KEY (VehicleID) REFERENCES vehicle(idVehicle),
9     CONSTRAINT fk_VehicleCollisionDamage_TrafficViolationID FOREIGN KEY (TrafficViolationID) REFERENCES trafficViolationCode(idTrafficViolation)
10 );
11
```



5. CÀI TIẾN CSDL

Thêm bảng nhân chứng chứa thông tin nhân chứng, ID là khóa chính, khóa ngoại là ID DriverTrafficViolationRecord

```
1 • CREATE TABLE AccidentWitness (
2     idAccidentWitness int AUTO_INCREMENT PRIMARY KEY,
3     DriverTrafficViolationRecord_ID int,
4     WitnessName varchar(100) NOT NULL,
5     WitnessPhoneNumber varchar(20) NOT NULL,
6     CreatedDate datetime NOT NULL,
7     CONSTRAINT fk_AccidentWitness_DriverTrafficViolationRecordID FOREIGN KEY (DriverTrafficViolationRecord_ID) REFERENCES driver_trafficviolation_record(idDTVR)
8 );
9
```



MỤC LỤC

- 1. GIỚI THIỆU CHỦ ĐỀ**
- 2. THÔNG TIN VỀ CƠ SỞ DỮ LIỆU**
- 3. TRUY VẤN DỮ LIỆU**
- 4. CẬP NHẬT DỮ LIỆU**
- 5. CẢI TIẾN CSDL**
- 6. TỔNG KẾT**



6. TỔNG KẾT

1

Bài toán thực tế

2

Thông tin cơ sở dữ liệu

3

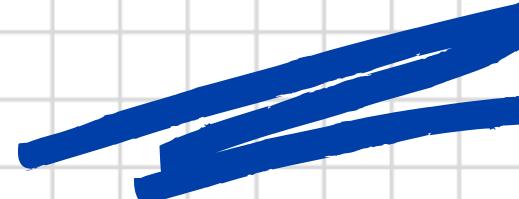
Truy vấn dữ liệu



Thông tin CSDL, bản ghi, các bảng
ER, RE, Diagram
Mức độ chuẩn hóa



10 câu lệnh truy vấn
và đại số quan hệ tương ứng



6. TỔNG KẾT

4

Tối ưu truy vấn

Tối ưu bằng câu lệnh, index, partition

5

Procedure

78 procedure

2 trigger

6

Nghiệp vụ thực tế

5 nghiệp vụ thực tế sử dụng transaction

Sao chép dữ liệu, procedure đổ dữ liệu



7

Cải tiến CSDL

