

Fry Smarter, Taste Better!



CSD-2206 Database Design & SQL Term Project

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Product: Air Fryers

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Company Overview & Product

Company Name

V-Fry Fryers

Company Overview / Description

V-Fry Fryers, founded in the fall of 2023, headquartered in the beautiful place of Sarnia, Ontario. We are on a mission to redefine the cooking experience with our new air fryers. Our AIR FRY series combines the innovative technology with a commitment to health-conscious living. Discover the future of cooking with V-Fry Fryer's smart air fryers!

Product

V-Fry Fryers sell multiple series each containing diverse types of air fryers. Some of the most popular air fryers are:

- AIR FRY Series
 - AIR FRY Originals (Basket-style Air Fryers)
 - AIR FRY Oven (Oven-style Air Fryers)
 - AIR FRY Compact (Compact Air Fryers)
- SMART FRY Series
 - SMART FRY Innovate (Basket-style Air Fryers with smart interface)
 - SMART FRY Oven (Oven-style Air Fryers with smart interface)
 - SMART FRY Oil-less (Oil-less fryers)

Product Attributes

- Product ID (UID)
- Series ID (UID)
- Fryer ID (UID)
- Series Name (UID) → (AIR FRY Series, SMART FRY Series, CrispX Series, etc.)
- Product Type (UID) → (Basket-Style, Oven-Style, Compact, etc.)
- Product Name
- Product Description
- Product Dimensions → (Width, Height, Depth)
- Product Specification → (Color, Maximum / Minimum Temperature, Power Consumption)
- Product Special Features
- Interface Type

Customer Sales Invoice



INVOICE

COMPANY ADDRESS

V-Fry fryers,
3600 Exmouth St.
Sarnia, ON, N7S 0K0

BILL TO

JIM COOPER,
1457 London Rd,
Sarnia, ON, N7S 6K4

INVOICE ID 22344444
INVOICE DATE 2023/10/02
CUSTOMER ID 3955005
CUSTOMER NAME JIM COOPER

SHIP TO

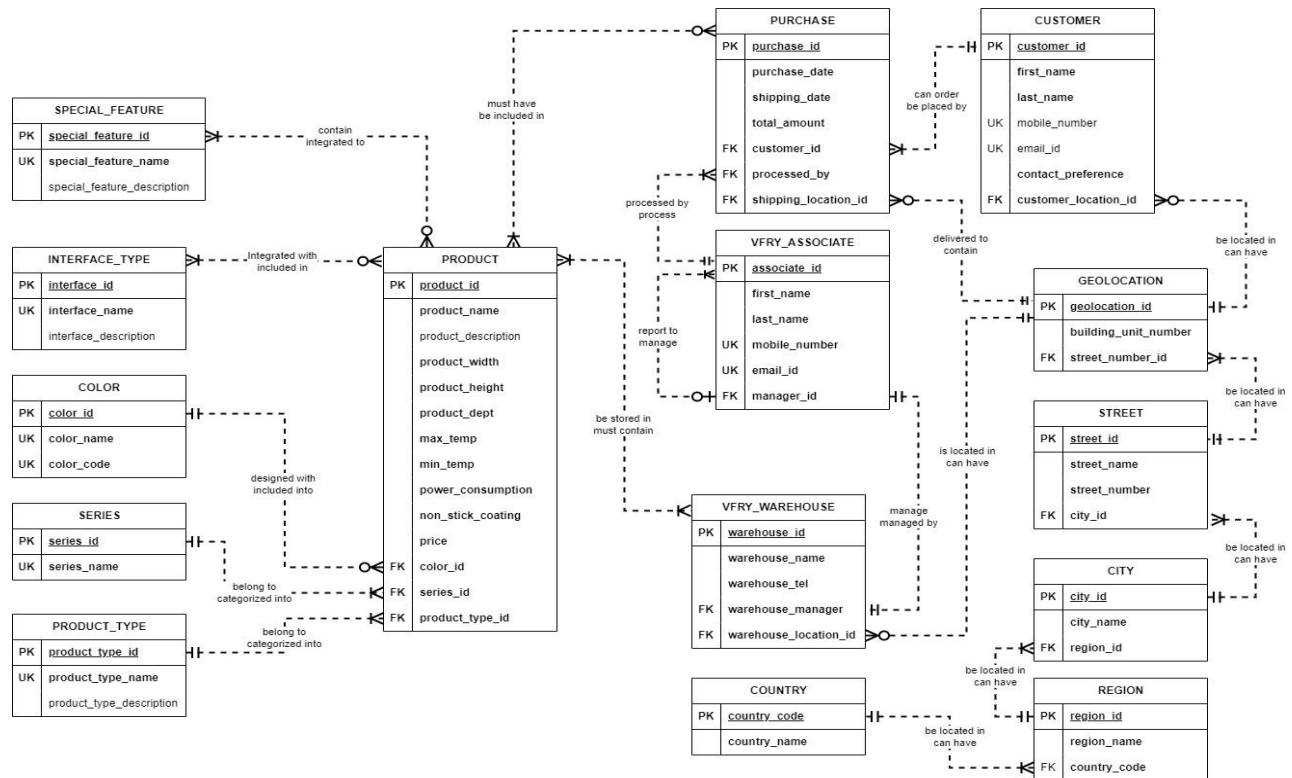
JIM COOPER,
1457 London Rd,
Sarnia, ON, N7S 6K4

Product ID	Series	Model	Interface Type	Quantity	Unit Price	Total Price
40032033	AIR FRY	Originals	Analog Control	2	\$127.25	\$254.50
40062000	AIR FRY	Oven	Analog & Digital Control	1	\$188.98	\$188.98
40033011	SMART FRY	Originals	Slide Touch Controls	2	\$127.25	\$254.50
40023422	SMART FRY	Oven	Voice Control	1	\$339.99	\$339.99
40035555	SMART FRY	Oil-less	Gesture Recognition	1	\$127.48	\$127.48
40022413	AIR FRY	Compact	Analog Control	1	\$99.98	\$99.98
					Sub-total	\$1,265.43
					Tax (13% HST)	\$164.50
					Invoice	\$1,429.93

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Entity Relationship Diagram (ER – Diagram)

Many-to-Many Relationships (M:M)



Each **PRODUCT** should belong to one and only one **PRODUCT_TYPE**
 Each **PRODUCT_TYPE** can be categorized into one or many **PRODUCTS**

Each **PRODUCT** should belong to one and only one **SERIES**
 Each **SERIES** can be categorized into one or many **PRODUCTS**

Each **PRODUCT** must be designed with one and only one **COLOR**
 Each **COLOR** can be included into zero, one or many **PRODUCTS**

Each **PRODUCT** must be integrated with one or many **INTERFACE_TYPES**
 Each **INTERFACE_TYPE** can be integrated into zero, one or many **PRODUCTS**

Each **PRODUCT** may contain one or many **SPECIAL_FEATURES**
 Each **SPECIAL FEATURE** may be integrated into zero, one or many **PRODUCTS**

Each **VFRY WAREHOUSE** must contain one, or many **PRODUCTS**
 Each **PRODUCT** must be stored in one or many **VFRY WAREHOUSES**

Each **VFRY ASSOCIATE** must manage one and only one **VFRY WAREHOUSE**
 Each **VFRY WAREHOUSE** must be managed by one and only one **VFRY ASSOCIATE**

Each **VFRY ASSOCIATE** must process one or many **PURCHASES**
 Each **PURCHASE** must be processed by one and only one **VFRY ASSOCIATE**

Each **PURCHASE** must have one or many **PRODUCTS**
 Each **PRODUCT** may be included in zero, one or many **PURCHASES**

Each **MANAGER** must manage at least one or many **VFRY ASSOCIATES**
 Each **VFRY ASSOCIATE** must report to zero or one **MANAGER**

Each **CUSTOMER** can order one or many **PURCHASES**
 Each **PURCHASE** must be placed by one and only one **CUSTOMER**

Each **CUSTOMER** must be located in one and only one **GEOLOCATION**
 Each **GEOLOCATION** can have zero, one or many **CUSTOMERS**

Each **VFRY WAREHOUSE** is located in one and only one **GEOLOCATION**
 Each **GEOLOCATION** can have zero, one or many **VFRY WAREHOUSES**

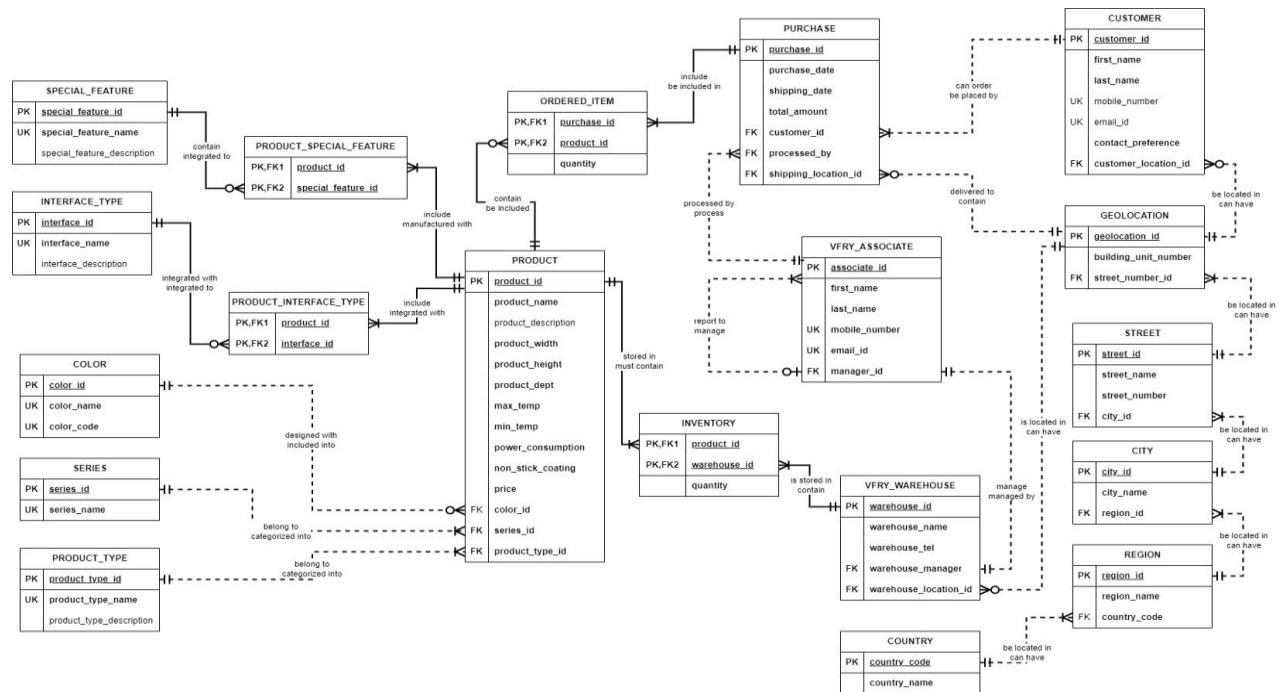
Each **GEOLOCATION** must be located in one and only one **STREET**
 Each **STREET** can have one, or many **GEOLOCATIONS**

Each **STREET** must be located in one and only one **CITY**
 Each **CITY** can have one, or many **STREETS**

Each **CITY** must be located in one and only one **REGION**
 Each **REGION** can have one or many **CITIES**

Each **REGION** must be located in one and only one **COUNTRY**
 Each **COUNTRY** can have one or many **REGIONS**

Many-to-Many Relationships (M:M) Resolved



Each PRODUCT should belong to one and only one PRODUCT_TYPE
 Each PRODUCT_TYPE can be categorized into one or many PRODUCTS

Each PRODUCT should belong to one and only one SERIES
 Each SERIES can be categorized into one or many PRODUCTS

Each PRODUCT must be designed with one and only one COLOR
 Each COLOR can be included into zero, one or many PRODUCTS

Each PRODUCT INTERFACE TYPE must be integrated with one or only one PRODUCT
 Each PRODUCT may include one or many PRODUCT INTERFACE TYPE

Each PRODUCT INTERFACE TYPE must be integrated with one and only one INTERFACE TYPE
 Each INTERFACE TYPE may be integrated to zero, one or many PRODUCT INTERFACE TYPE

Each PRODUCT may be manufactured with one or many PRODUCT SPECIAL FEATURES
 Each PRODUCT SPECIAL FEATURE must include one or only one PRODUCT

Each SPECIAL FEATURE may be integrated to zero, one or many PRODUCT SPECIAL FEATURE
 Each PRODUCT SPECIAL FEATURE must contain one and only one SPECIAL FEATURE

Each VFRY WAREHOUSE must contain one, or many INVENTORY
 Each INVENTORY must be stored in one or only one VFRY WAREHOUSE

Each PRODUCT must be stored in one or many INVENTORIES
 Each INVENTORY must contain one and only one PRODUCT

Each VFRY ASSOCIATE must manage one and only one VFRY WAREHOUSE
 Each VFRY WAREHOUSE must be managed by one and only one VFRY ASSOCIATE

Each VFRY ASSOCIATE must process one or many PURCHASES
 Each PURCHASE must be processed by one and only one VFRY ASSOCIATE

Each MANAGER must manage at least one or many VFRY ASSOCIATES
 Each VFRY ASSOCIATE must report to zero or one MANAGER

Each CUSTOMER can order one or many PURCHASES
 Each PURCHASE must be placed by one and only one CUSTOMER

Each Purchase must include one or many ORDERED ITEMS
 Each ORDERED ITEM must be included in one and only one PURCHASE

Each ORDERED ITEM must contain one and only one PRODUCT
 Each PRODUCT may be included in zero, one or many ORDERED ITEM

Each CUSTOMER must be located in one and only one GEOLOCATION
 Each GEOLOCATION can have zero, one or many CUSTOMERS

Each VFRY WAREHOUSE is located in one an only one GEOLOCATION
 Each GEOLOCATION can have zero, one or many VFRY WAREHOUSES

Each GEOLOCATION must be located in one and only one STREET
 Each STREET can have one, or many GEOLOCATIONS

Each STREET must be located in one and only one CITY
 Each CITY can have one, or many STREETS

Each CITY must be located in one and only one REGION
 Each REGION can have one or many CITIES

Each REGION must be located in one and only one COUNTRY
 Each COUNTRY can have one or many REGIONS

Relational Model

PRODUCT				
Key Type	Optionality	Column Name	Data Type	Length
PK	*	product_id	INTEGER	
	*	product_name	VARCHAR	30
	O	product_description	VARCHAR	80
	*	product_width	DECIMALS	(3,2)
	*	product_height	DECIMALS	(3,2)
	*	product_depth	DECIMALS	(3,2)
	*	power_consumption	DECIMALS	(4,2)
	*	max_temp	INTEGER	
	*	min_temp	INTEGER	
	*	non_stick_coating	VARCHAR	1
	*	price	DECIMALS	(4,2)
FK	*	series_id	INTEGER	
FK	*	product_type_id	INTEGER	
FK	*	color_id	INTEGER	

PRODUCT_TYPE				
Key Type	Optionality	Column Name	Data Type	Length
PK	*	product_type_id	INTEGER	
UK	*	product_type_name	VARCHAR	30
	O	product_type_description	VARCHAR	80

SERIES				
Key Type	Optionality	Column Name	Data Type	Length
PK	*	series_id	INTEGER	
UK	*	series_name	VARCHAR	30

COLOR				
Key Type	Optionality	Column Name	Data Type	Length
PK	*	color_id	INTEGER	
UK	*	color_name	VARCHAR	30
UK	*	color_code	VARCHAR	7

PRODUCT_INTERFACE_TYPE				
Key Type	Optionality	Column Name	Data Type	Length
PK, FK1	*	product_id	INTEGER	
PK, FK2	*	interface_id	INTEGER	

INTERFACE_TYPE				
Key Type	Optionality	Column Name	Data Type	Length
PK	*	interface_id	INTEGER	
UK	*	interface_name	VARCHAR	30
	O	Interface_description	VARCHAR	80

PRODUCT_SPECIAL_FEATURE				
Key Type	Optionality	Column Name	Data Type	Length
PK, FK1	*	product_id	INTEGER	
PK, FK2	*	special_feature_id	INTEGER	

SPECIAL_FEATURE				
Key Type	Optionality	Column Name	Data Type	Length
PK	*	special_feature_id	INTEGER	
UK	*	special_feature_name	VARCHAR	30
	O	special_feature_description	VARCHAR	80

ORDERED_ITEM				
Key Type	Optionality	Column Name	Data Type	Length
PK, FK1	*	purchase_id	INTEGER	
PK, FK2	*	product_id	INTEGER	
	*	quantity	INTEGER	

PURCHASE				
Key Type	Optionality	Column Name	Data Type	Length
PK	*	purchase_id	INTEGER	
	*	purchase_date	DATE	
		shipping_date		
	*	total_amount	DECIMALS	(6,2)
FK	*	shipping_location_id	INTEGER	
FK	*	customer_id	INTEGER	
FK	*	processed_by	INTEGER	

INVENTORY				
Key Type	Optionality	Column Name	Data Type	Length
PK, FK1	*	product_id	INTEGER	
PK, FK2	*	warehouse_id	INTEGER	
	*	quantity	INTEGER	

VFRY_WAREHOUSE				
Key Type	Optionality	Column Name	Data Type	Length
PK	*	warehouse_id	INTEGER	

	*	warehouse_name	VARCHAR	30
	*	warehouse_tel	VARCHAR	15
FK	*	warehouse_manager	INTEGER	
FK	*	warehouse_location_id	INTEGER	

VFRY_ASSOCIATE				
Key Type	Optionality	Column Name	Data Type	Length
PK	*	associate_id	INTEGER	
	*	first_name	VARCHAR	30
	*	last_name	VARCHAR	30
UK	*	mobile_number	VARCHAR	15
UK	*	email_id	VARCHAR	60
FK	*	manager_id	INTEGER	

CUSTOMER				
Key Type	Optionality	Column Name	Data Type	Length
PK	*	customer_id	INTEGER	
	*	first_name	VARCHAR	30
	*	last_name	VARCHAR	30
UK	O	mobile_number	VARCHAR	15
UK	O	email_id	VARCHAR	60
	*	contact_preference	VARCHAR	1
FK	*	customer_location_id	INTEGER	

GEOLOCATION				
Key Type	Optionality	Column Name	Data Type	Length
PK	*	geolocation_id	INTEGER	
	*	building_unit_number	INTEGER	
FK	*	street_number_id	INTEGER	

STREET				
Key Type	Optionality	Column Name	Data Type	Length
PK	*	street_number_id	INTEGER	
	*	street_name	VARCHAR	30
	*	street_number	VARCHAR	4
	*	city_id	INTEGER	

CITY				
Key Type	Optionality	Column Name	Data Type	Length
PK	*	city_id	INTEGER	
	*	city_name	VARCHAR	30
	*	region_id	INTEGER	

REGION				
Key Type	Optionality	Column Name	Data Type	Length
PK	*	region_id	INTEGER	
	*	region_name	VARCHAR	30
FK	*	country_code	VARCHAR	3

COUNTRY				
Key Type	Optionality	Column Name	Data Type	Length
PK	*	country_code	VARCHAR	3
	*	country_name	VARCHAR	30

FK Relational Mapping

PRODUCT

FK color_id → COLOR

FK series_id → SERIES

FK product_type_id → PRODUCT_TYPE

PRODUCT_INTERFACE_TYPE

FK product_id → PRODUCT

FK interface_id → INTERFACE_TYPE

PRODUCT_FEATURE

FK product_id → PRODUCT

FK feature_id → FEATURE

ORDERED_ITEM

FK purchase_id → PURCHASE

FK product_id → PRODUCT

ORDER

FK customer_id → CUSTOMER

FK processed_by → VFRY_ASSOCIATE

FK shipping_location_id → GEOLOCATION

CUSTOMER

FK customer_location_id → GEOLOCATION

ASSOCIATE

FK manager_id → VFRY_ASSOCIATE

INVENTORY

FK product_id → PRODUCT

FK warehouse_id → VFRY_WAREHOUSE

WAREHOUSE

FK warehouse_manager → VFRY_ASSOCIATE

FK warehouse_location_id → GEOLOCATION

GEOLOCATION

FK street_number_id → STREET

STREET

FK city_id → CITY

CITY

FK region_id → REGION

Additional Business Requirements

PRODUCT TABLE:

- Product ID is auto generated.
- Minimum Temperature should be in range of 100F to 500F.
- Maximum Temperature should be in range of 100F to 500F.
- Temperature Range → Minimum Temperature < Maximum Temperature.
- Product width, product height, product depth must be greater than 0 cm.
- Power Consumption should be greater than 1000 watts and less than 2000 watts.
- Non-Stick Coating attribute should be a Boolean “Y” for Yes, and “N” for No.
- Default Value of Non-Stick Coating is “N” for No.

CUSTOMER TABLE:

- Customer ID is auto generated.
- Customer should enter one of the following methods of communication: Email or Mobile
- Contact Preference must be character value “E” for email, “M” for mobile, “A” for any.
- Default Value of Contact Preference is “A” for Any.

VFRY ASSOCIATE TABLE:

- Employee ID is auto generated.
- Manager ID can be NULL, if there are no manager allocated to that specific associate.

COLOR TABLE:

- Color ID is auto generated.
- Color Code should be a hexadecimal and the starting character should be “#” followed by 6 Characters or 3 Characters.

PURCHASE TABLE:

- Shipping date must be ahead of Purchase Date.

SEQUENCES:

- **PRODUCT_INTERFACE_TYPE TABLE** → Product ID and Interface ID should be a sequence.
- **PRODUCT_FEATURE TABLE** → Product ID and Feature ID is a sequence.
- **ORDERED_ITEM TABLE** → Order ID and Product ID should be a sequence.
- **INVENTORY TABLE** → Warehouse ID and Product ID should be a sequence.