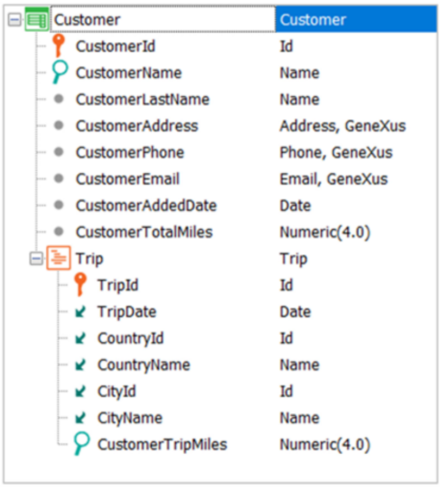
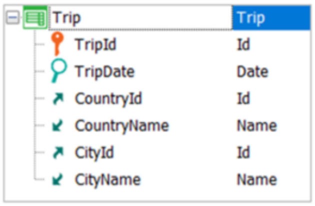
More Rules to Define Behavior

Add Rule

Scenario: Customers accrue miles with every trip they make



Customer	Customer
CustomerId	Id
CustomerName	Name
CustomerLastName	Name
CustomerAddress	Address, GeneXus
CustomerPhone	Phone, GeneXus
CustomerEmail	Email, GeneXus
CustomerAddedDate	Date
CustomerTotalMiles	Numeric(4.0)
Trip	Trip
TripId	Id
TripDate	Date
CountryId	Id
CountryName	Name
CityId	Id
CityName	Name
CustomerTripMiles	Numeric(4.0)

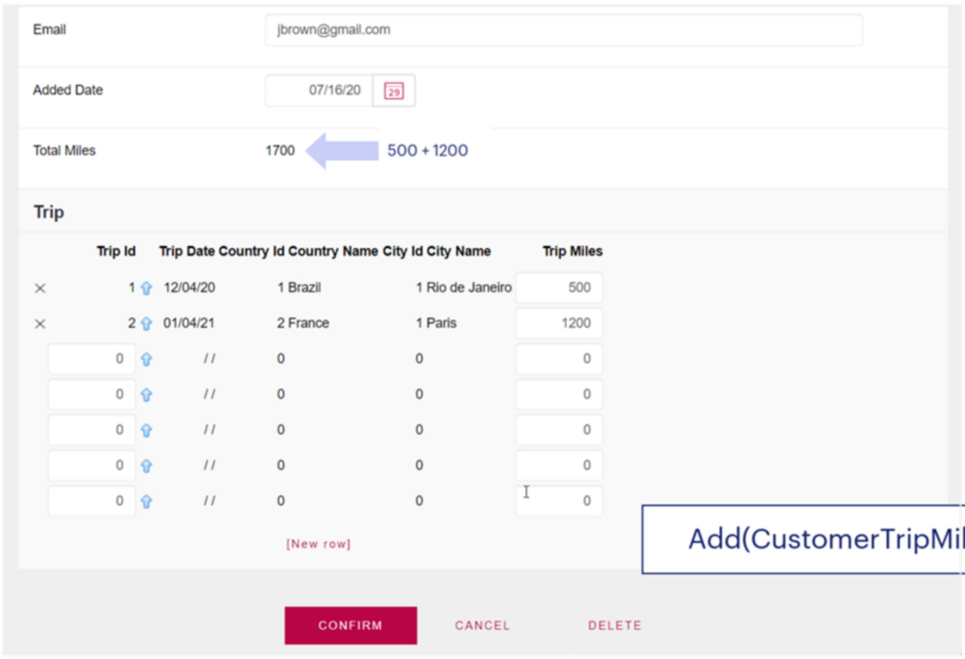


Trip	Trip
TripId	Id
TripDate	Date
CountryId	Id
CountryName	Name
CityId	Id
CityName	Name

In this video, we will analyze the behavior of some rules that will help you simplify the development of your application.

Let's start with the Add rule: to understand how this rule works, suppose that a customer earns miles for each trip purchased.

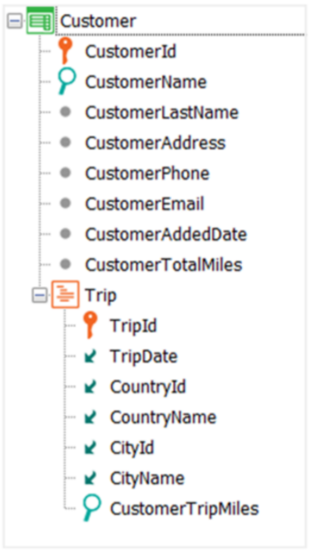
Add Rule



Email	jbrown@gmail.com
Added Date	07/16/20
Total Miles	1700

Trip

	Trip Id	Trip Date	Country Id	Country Name	City Id	City Name	Trip Miles
×	1	12/04/20	1	Brazil	1	Rio de Janeiro	500
×	2	01/04/21	2	France	1	Paris	1200
	0	/ /	0		0		0
	0	/ /	0		0		0
	0	/ /	0		0		0
	0	/ /	0		0		0
	0	/ /	0		0		0



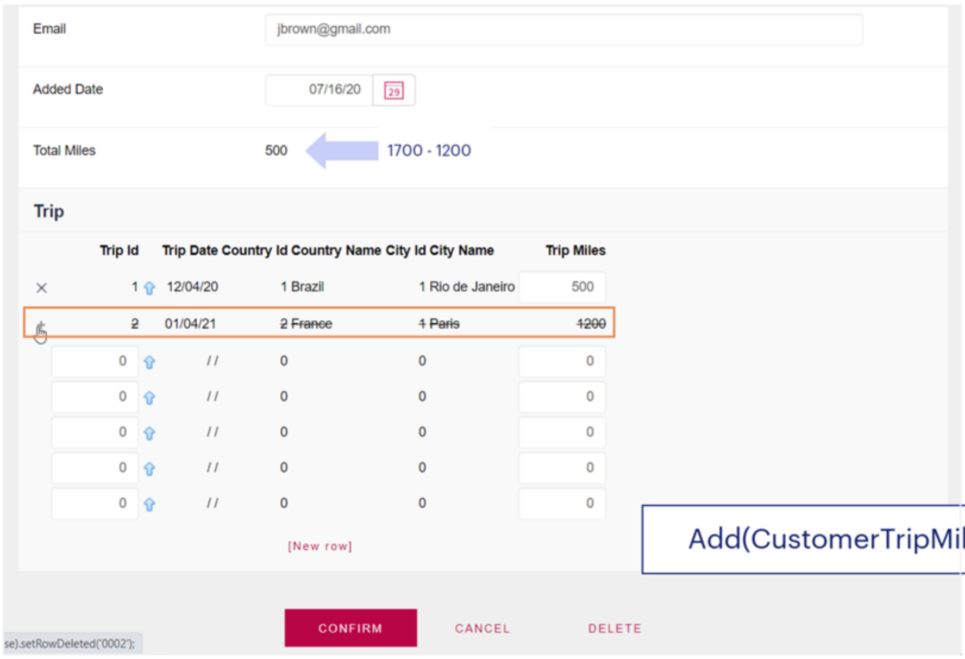
```
Customer
    CustomerId
    CustomerName
    CustomerLastName
    CustomerAddress
    CustomerPhone
    CustomerEmail
    CustomerAddedDate
    CustomerTotalMiles
    Trip
        TripId
        TripDate
        CountryId
        CountryName
        CityId
        CityName
        CustomerTripMiles
```

```
Add(CustomerTripMiles, CustomerTotalMiles)
```

Every time a trip is added for a customer, the miles corresponding to that trip must be added to the CustomerTotalMiles attribute, which contains the total miles earned by that customer.

To do so, we will use the Add rule.

Add Rule



Email	jbrown@gmail.com
Added Date	07/16/20
Total Miles	500

1700 - 1200

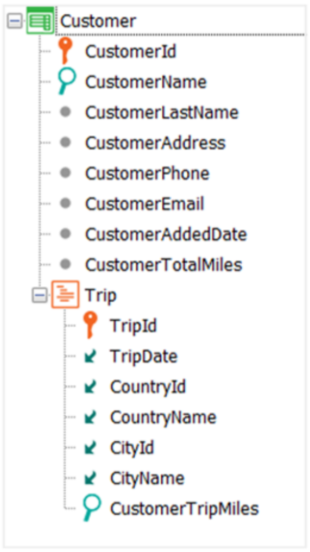
Trip

	Trip Id	Trip Date	Country Id	Country Name	City Id	City Name	Trip Miles
×	1	12/04/20	1	Brazil	1	Rio de Janeiro	500
	~~2~~	01/04/21	~~2~~	~~France~~	~~1~~	~~Paris~~	~~1200~~
	0	/ /	0		0		0
	0	/ /	0		0		0
	0	/ /	0		0		0
	0	/ /	0		0		0
	0	/ /	0		0		0

[New row]

CONFIRM CANCEL DELETE

se).setRowDeleted('0002');

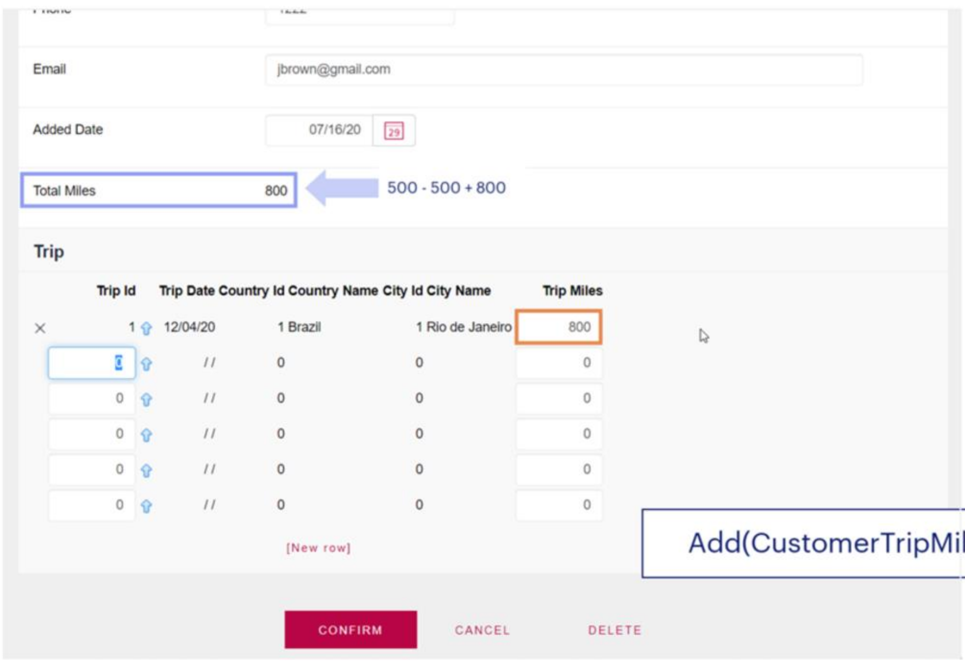


Add(CustomerTripMiles, CustomerTotalMiles)

But... what happens if, after doing this, the client cancels a trip?

In that case, the Add rule automatically subtracts the number of miles of the trip that is being deleted from the customer's total miles.

Add Rule



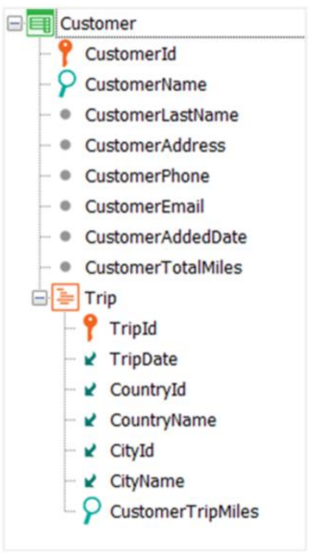
Email	jbrown@gmail.com
Added Date	07/16/20
Total Miles	800

500 - 500 + 800

Trip

	Trip Id	Trip Date	Country Id	Country Name	City Id	City Name	Trip Miles
×	1	12/04/20	1	Brazil	1	Rio de Janeiro	800
		/ /	0		0		0
	0	/ /	0		0		0
	0	/ /	0		0		0
	0	/ /	0		0		0
	0	/ /	0		0		0

[New row]



- Customer
  - CustomerId
  - CustomerName
  - CustomerLastName
  - CustomerAddress
  - CustomerPhone
  - CustomerEmail
  - CustomerAddedDate
  - CustomerTotalMiles
  - Trip
    - TripId
    - TripDate
    - CountryId
    - CountryName
    - CityId
    - CityName
    - CustomerTripMiles

Add(CustomerTripMiles, CustomerTotalMiles)

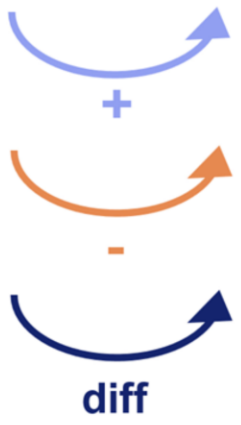
What if the number of miles awarded when taking a trip is modified; that is, the CustomerTripMiles attribute?

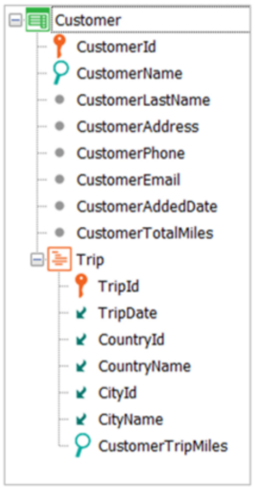
The rule subtracts the value of the miles associated with the trip from the customer's total number of miles, and then adds the new value, so that the information is up to date.

Add Rule behavior

Add(CustomerTripMiles, CustomerTotalMiles);

- If a new trip is entered for the Customer
- If a trip is deleted for the Customer
- If a trip is changed for a Customer



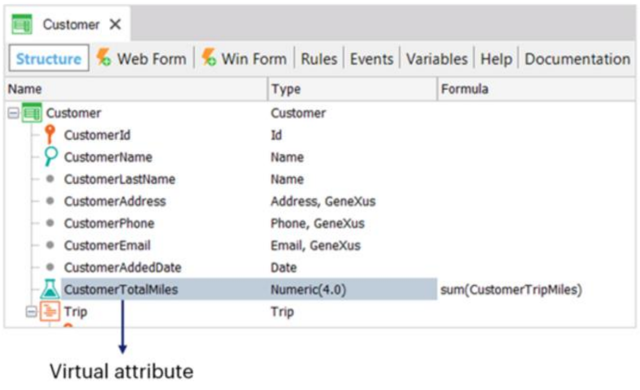


In short, this rule adjusts its behavior depending on how the transaction is being used: when inserting data, the value of the first attribute is added to the second one.

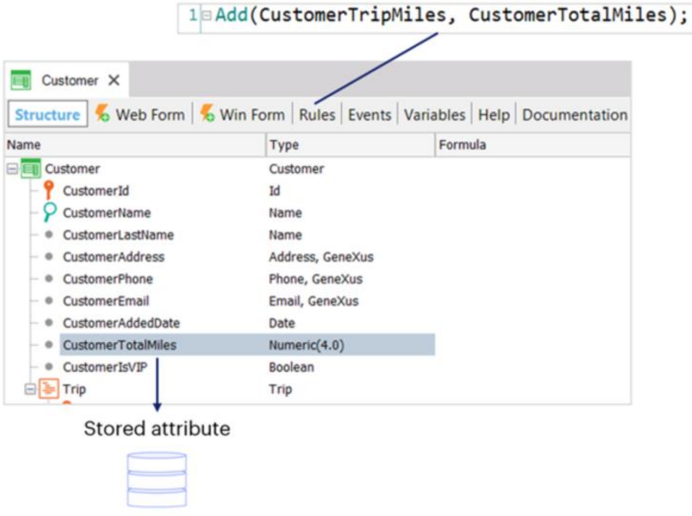
When deleting data, the value of the first attribute is subtracted from the second one.

And when changing data, the difference between the new value and the old value of the first attribute is added to the value of the second one.

Sum Formula / Add Rule



Name	Type	Formula
Customer	Customer	
CustomerId	Id	
CustomerName	Name	
CustomerLastName	Name	
CustomerAddress	Address, GeneXus	
CustomerPhone	Phone, GeneXus	
CustomerEmail	Email, GeneXus	
CustomerAddedDate	Date	
CustomerTotalMiles	Numeric(4.0)	sum(CustomerTripMiles)
Trip	Trip	



```
Add(CustomerTripMiles, CustomerTotalMiles);
```

Name	Type	Formula
Customer	Customer	
CustomerId	Id	
CustomerName	Name	
CustomerLastName	Name	
CustomerAddress	Address, GeneXus	
CustomerPhone	Phone, GeneXus	
CustomerEmail	Email, GeneXus	
CustomerAddedDate	Date	
CustomerTotalMiles	Numeric(4.0)	
CustomerIsVIP	Boolean	
Trip	Trip	

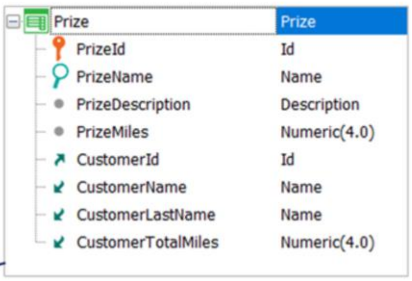
Perhaps the most natural thing in this case would have been to use a Sum formula, which would avoid all this.

But what if we don't always want the miles to be calculated according to this sum? What if we wanted to be able to increase the customer's miles according to some other criteria?
For example, because we want to give VIP customers miles as a gift from time to time. In this case, we need the customer's miles to be a stored attribute, which, although it is calculated by adding up the miles of each trip, it can also be modified by other means.

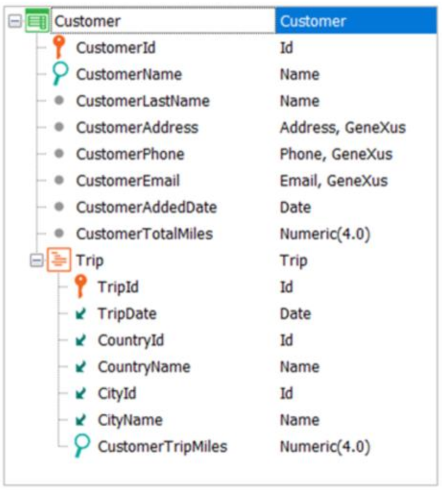
In the chapter on formulas we will study in more detail the difference between the Sum formula and the Add rule.

Subtract Rule

Scenario: Customers can trade their accrued miles for a reward if they have enough miles.



Prize	Prize
PrizeId	Id
PrizeName	Name
PrizeDescription	Description
PrizeMiles	Numeric(4.0)
CustomerId	Id
CustomerName	Name
CustomerLastName	Name
CustomerTotalMiles	Numeric(4.0)



Customer	Customer
CustomerId	Id
CustomerName	Name
CustomerLastName	Name
CustomerAddress	Address, GeneXus
CustomerPhone	Phone, GeneXus
CustomerEmail	Email, GeneXus
CustomerAddedDate	Date
CustomerTotalMiles	Numeric(4.0)
Trip	Trip
TripId	Id
TripDate	Date
CountryId	Id
CountryName	Name
CityId	Id
CityName	Name
CustomerTripMiles	Numeric(4.0)

```
Error("The customer doesn't have enough miles") if
CustomerTotalMiles < 0;

Subtract(PrizeMiles, CustomerTotalMiles);
```

Let's now move on to the Subtract rule, which has a similar behavior to the Add rule.

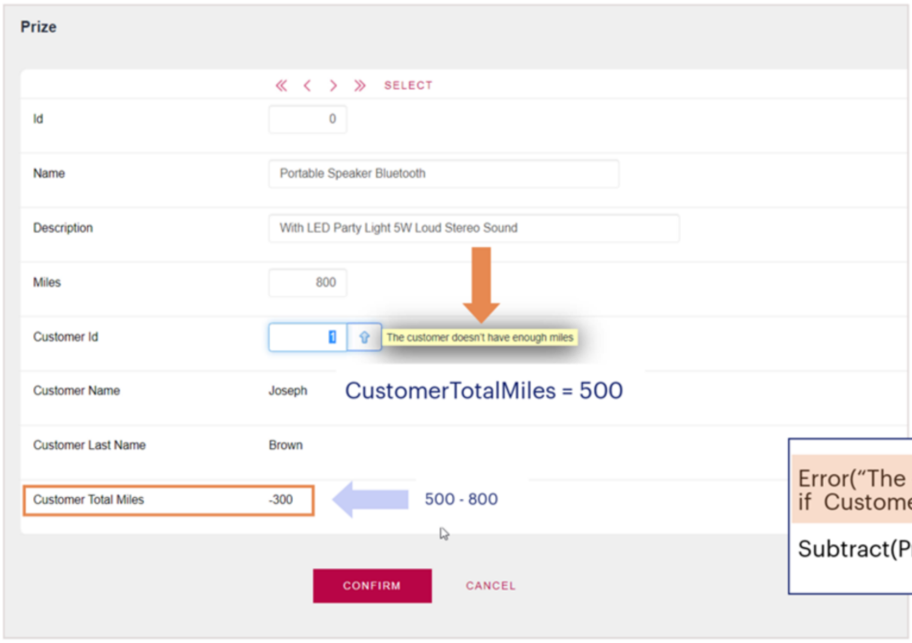
We have a Prize transaction that allows us to define rewards to be redeemed for miles.
Each reward has a number of miles required to make the redemption, so when trying to assign a reward to a customer, you must confirm that the customer's miles are enough for the exchange. If they are enough and the reward is taken, the miles redeemed must be subtracted; otherwise, an error message must be displayed.

To this end, we will define these rules (show them) in the Prize transaction:

Error("The customer doesn't have enough miles") if CustomerTotalMiles < 0;
Subtract(PrizeMiles, CustomerTotalMiles);

Since both involve the CustomerTotalMiles attribute, with one rule updating the attribute and the other rule evaluating its value, GeneXus determines that it must first execute the subtraction that updates the CustomerTotalMiles attribute, and then evaluate what happened to its value.

Subtract Rule



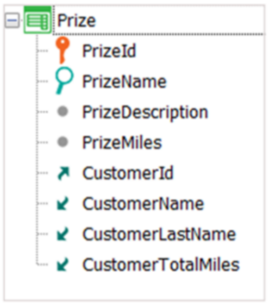
Prize

Id	0
Name	Portable Speaker Bluetooth
Description	With LED Party Light 5W Loud Stereo Sound
Miles	800
Customer Id	1
Customer Name	Joseph
Customer Last Name	Brown
Customer Total Miles	-300

The customer doesn't have enough miles

CustomerTotalMiles = 500

500 - 800



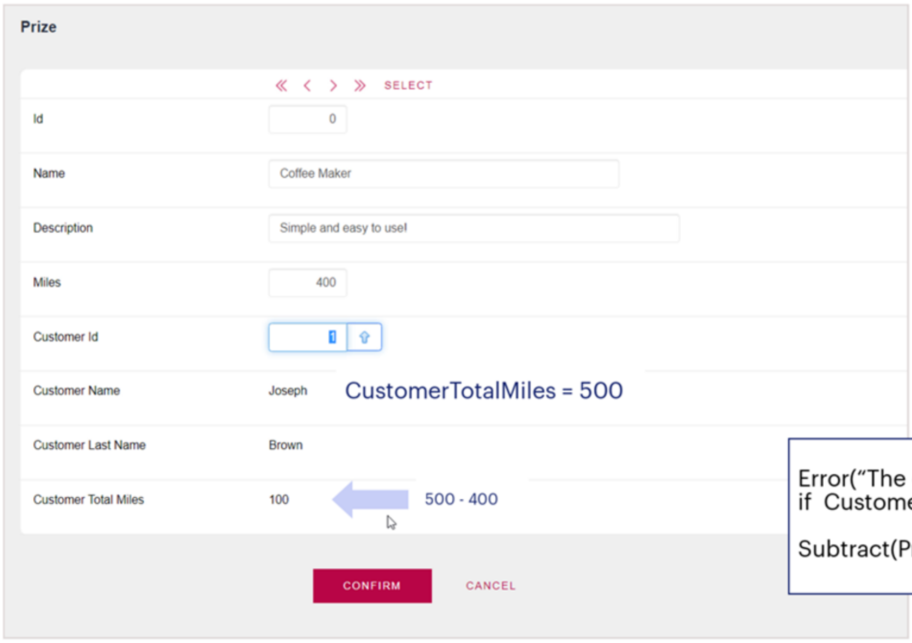
```
Error("The customer doesn't have enough miles")
if  CustomerTotalMiles < 0;

Subtract(PrizeMiles, CustomerTotalMiles);
```

Since the subtraction is made first, if the customer had fewer miles than those required by the reward, the CustomerTotalMiles attribute will end up with a negative value. This is why the error rule evaluates whether CustomerTotalMiles < 0.

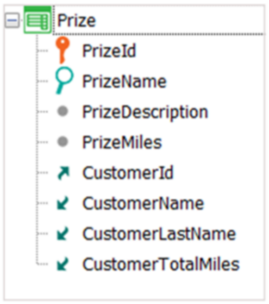
If this happens, the error rule is triggered with the message that indicates it and the Subtract rule operation is undone; that is, its execution is reversed as if it had not been done and the client's total miles remain unchanged.

Subtract Rule



Prize

Id	0
Name	Coffee Maker
Description	Simple and easy to use!
Miles	400
Customer Id	1
Customer Name	Joseph
Customer Last Name	Brown
Customer Total Miles	100

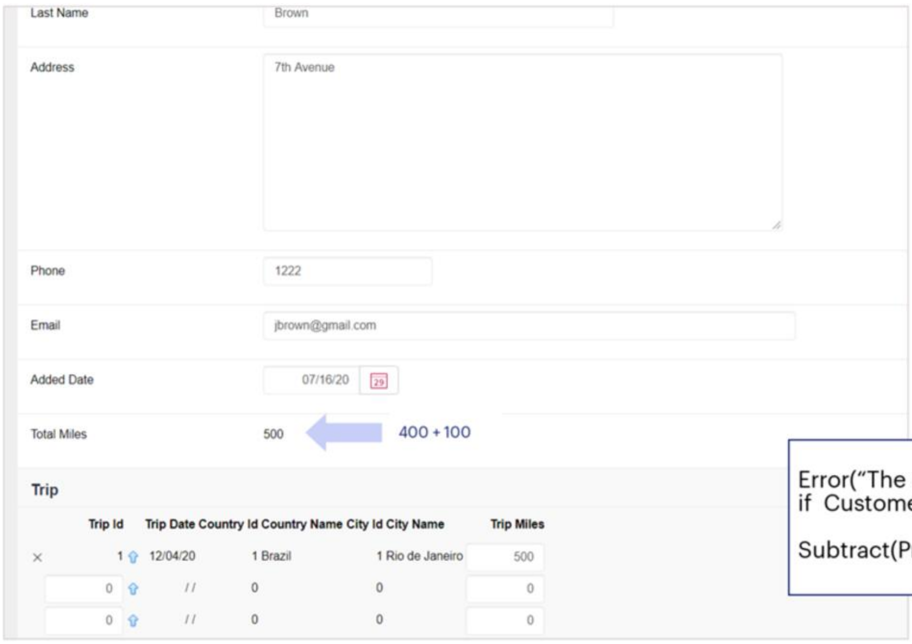


```
Error("The customer doesn't have enough miles")
if  CustomerTotalMiles < 0;

Subtract(PrizeMiles, CustomerTotalMiles);
```

If, on the other hand, CustomerTotalMiles did not end up with a negative value, the Subtract operation was carried out and the reward was associated with the customer, whose total number of miles decreased. All this provided, of course, that the user confirms it on the screen. Otherwise, this will only have been done in memory and nothing will be saved in the database.

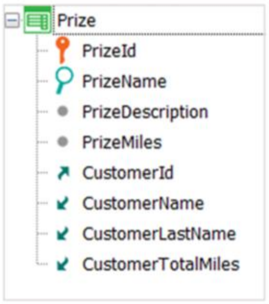
Subtract Rule



Last Name	Brown
Address	7th Avenue
Phone	1222
Email	jbrown@gmail.com
Added Date	07/16/20
Total Miles	500

Trip

	Trip Id	Trip Date	Country Id	Country Name	City Id	City Name	Trip Miles
×	1	12/04/20	1	Brazil	1	Rio de Janeiro	500
	0	/ /	0		0		0
	0	/ /	0		0		0



- Prize
  - PrizeId
  - PrizeName
  - PrizeDescription
  - PrizeMiles
  - CustomerId
  - CustomerName
  - CustomerLastName
  - CustomerTotalMiles

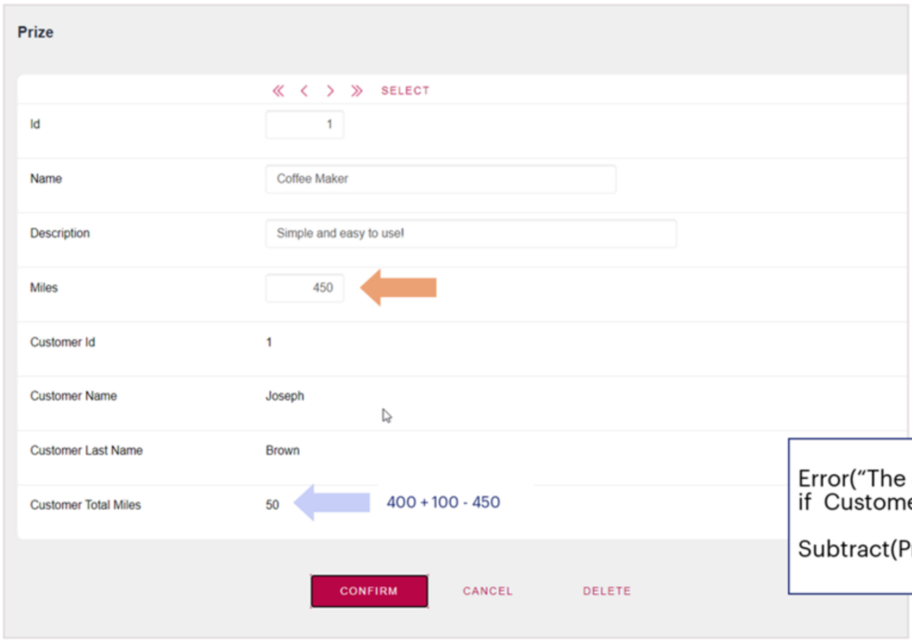
```
Error(“The customer doesn’t have enough miles”)
if  CustomerTotalMiles < 0;

Subtract(PrizeMiles, CustomerTotalMiles);
```

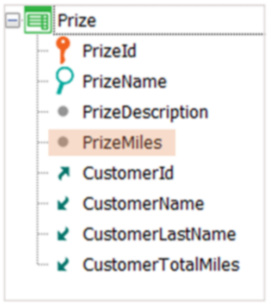
What happens if after redeeming a reward, the customer changes his mind and wants to return it?

In this case, the Subtract rule adds the number of miles redeemed for the reward to the customer's total number of miles.

Subtract Rule


Prize

Id	1
Name	Coffee Maker
Description	Simple and easy to use!
Miles	450
Customer Id	1
Customer Name	Joseph
Customer Last Name	Brown
Customer Total Miles	50



```
Error("The customer doesn't have enough miles")
if  CustomerTotalMiles < 0;

Subtract(PrizeMiles, CustomerTotalMiles);
```

What if the value associated with the number of miles corresponding to a reward is modified, that is, the PrizeMiles attribute?

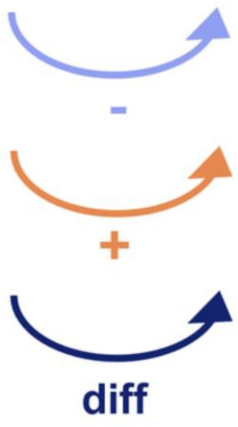
Its previous value is automatically added to the customer's total miles, and then the new value is subtracted.

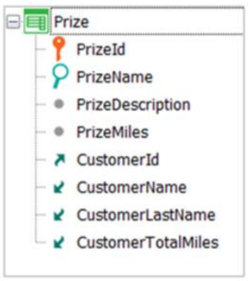
GeneXus

Subtract Rule behavior

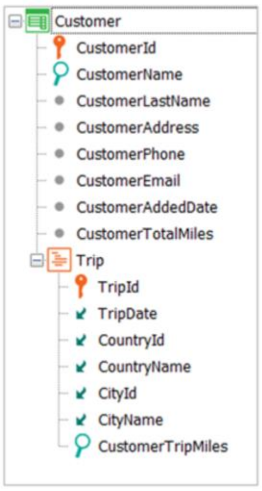
```
Subtract(PrizeMiles, CustomerTotalMiles);
```

- If a new prize is entered for the Customer
- If a prize is deleted for the Customer
- If a prize is changed for a Customer





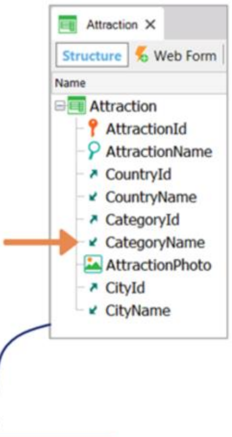
Prize
- PrizeId
- PrizeName
- PrizeDescription
- PrizeMiles
- CustomerId
- CustomerName
- CustomerLastName
- CustomerTotalMiles



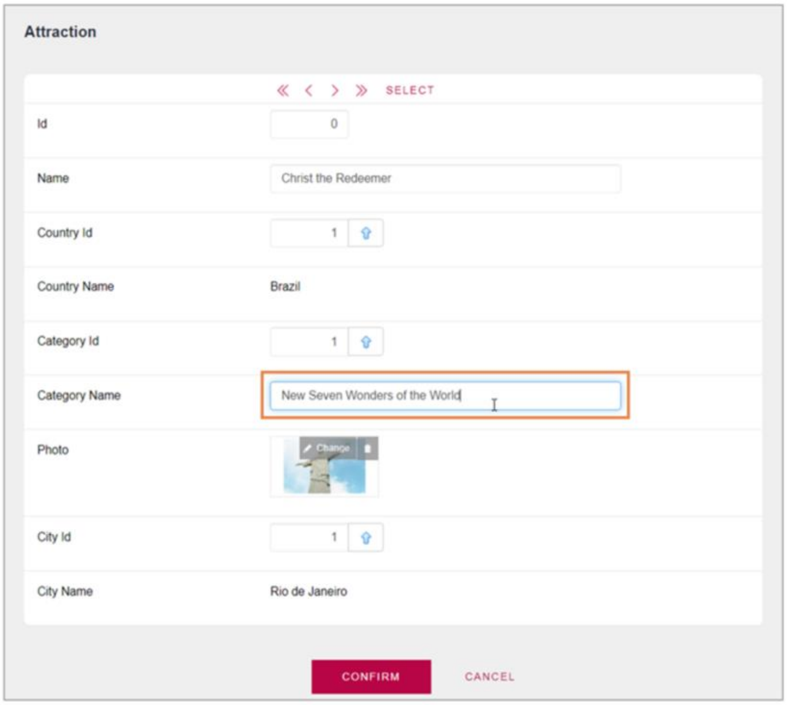
Customer
- CustomerId
- CustomerName
- CustomerLastName
- CustomerAddress
- CustomerPhone
- CustomerEmail
- CustomerAddedDate
- CustomerTotalMiles
- Trip
  - TripId
  - TripDate
  - CountryId
  - CountryName
  - CityId
  - CityName
  - CustomerTripMiles

In short, the Subtract rule works in the opposite way to the Add rule: when inserting data, the value of the first attribute is subtracted from the second one.
When deleting data, the value of the first attribute is added to the second one.
And when making changes, the difference between the new value and the old value of the first attribute is subtracted from the value of the second one.

Update Rule



Update(CategoryName)

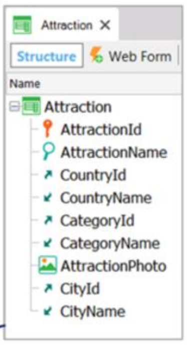


Attraction

Id	0
Name	Christ the Redeemer
Country Id	1
Country Name	Brazil
Category Id	1
Category Name	New Seven Wonders of the World
Photo	
City Id	1
City Name	Rio de Janeiro

There are other very interesting rules that you can explore; for example, the Update rule, which allows you to modify the values of the attributes inferred from a transaction, updating them in their corresponding tables;

RefMsg Rule

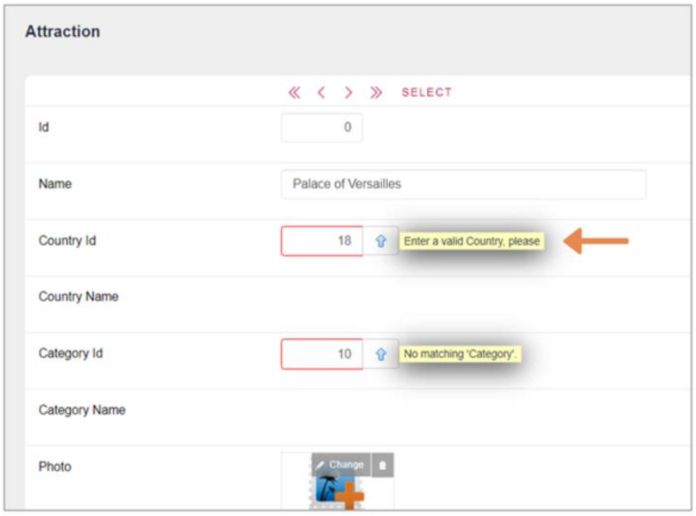

Attraction

Structure | Web Form

Name

- Attraction
  - AttractionId
  - AttractionName
  - CountryId
  - CountryName
  - CategoryId
  - CategoryName
  - AttractionPhoto
  - CityId
  - CityName

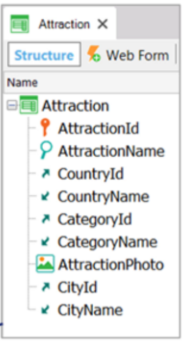
RefMsg("Enter a valid Country, please", CountryId);


Attraction

Id	0
Name	Palace of Versailles
Country Id	18 — Enter a valid Country, please
Country Name	
Category Id	10 — No matching 'Category'.
Category Name	
Photo	

the RefMsg rule, which allows changing the default messages displayed by GeneXus when a certain referential integrity check fails;

Prompt Rule



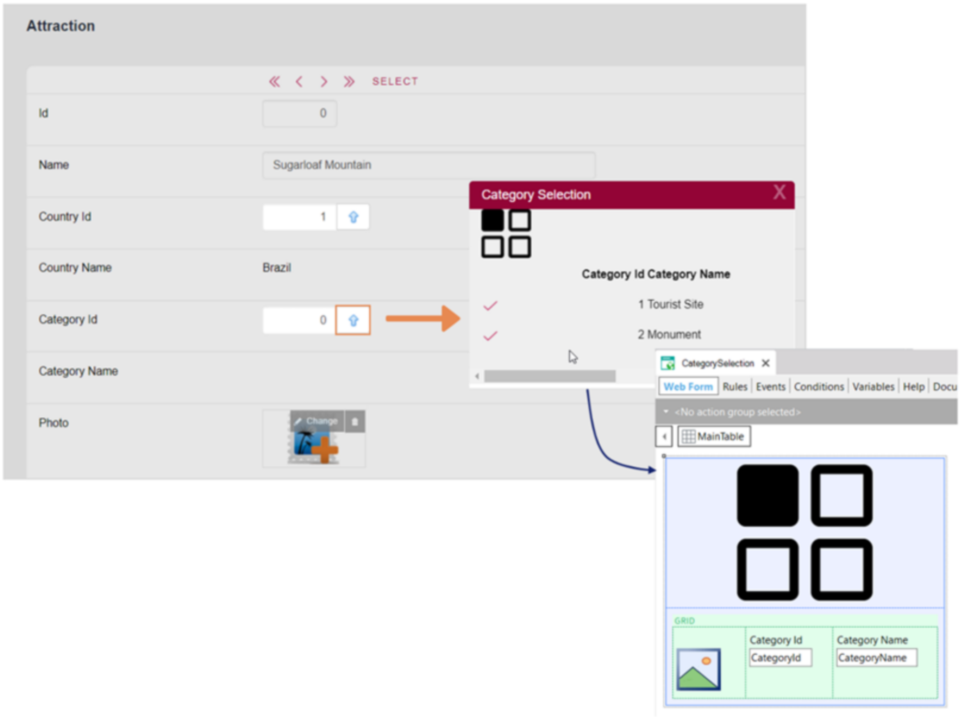
Attraction ✕

Structure | Web Form

Name

- Attraction
  - AttractionId
  - AttractionName
  - CountryId
  - CountryName
  - CategoryId
  - CategoryName
  - AttractionPhoto
  - CityId
  - CityName

Prompt(CategorySelection, CategoryId);



Attraction

Id	0
Name	Sugarloaf Mountain
Country Id	1
Country Name	Brazil
Category Id	0
Category Name	
Photo	

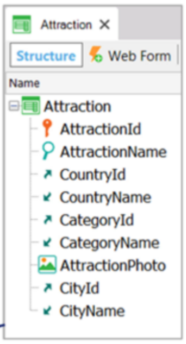
Category Selection

Category Id	Category Name
1	Tourist Site
2	Monument

SELECT
Change
CategorySelection
Web Form | Rules | Events | Conditions | Variables | Help | Docu
<No action group selected>
MainTable
GRID
Category Id
CategoryId
Category Name
CategoryName

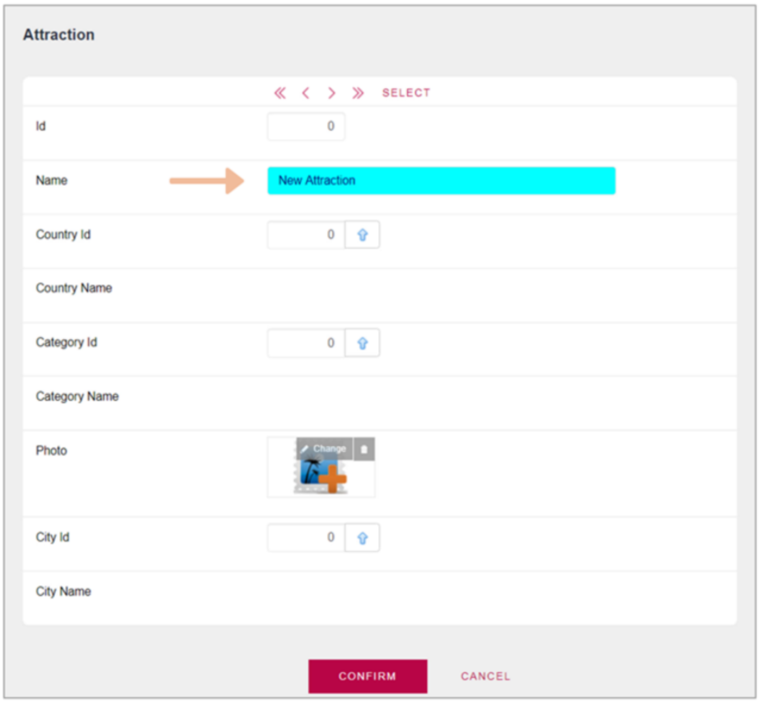
the **Prompt** rule, which allows changing the prompt or default selection list for each foreign key;

Color Rule



Attraction
- AttractionId
- AttractionName
- CountryId
- CountryName
- CategoryId
- CategoryName
- AttractionPhoto
- CityId
- CityName

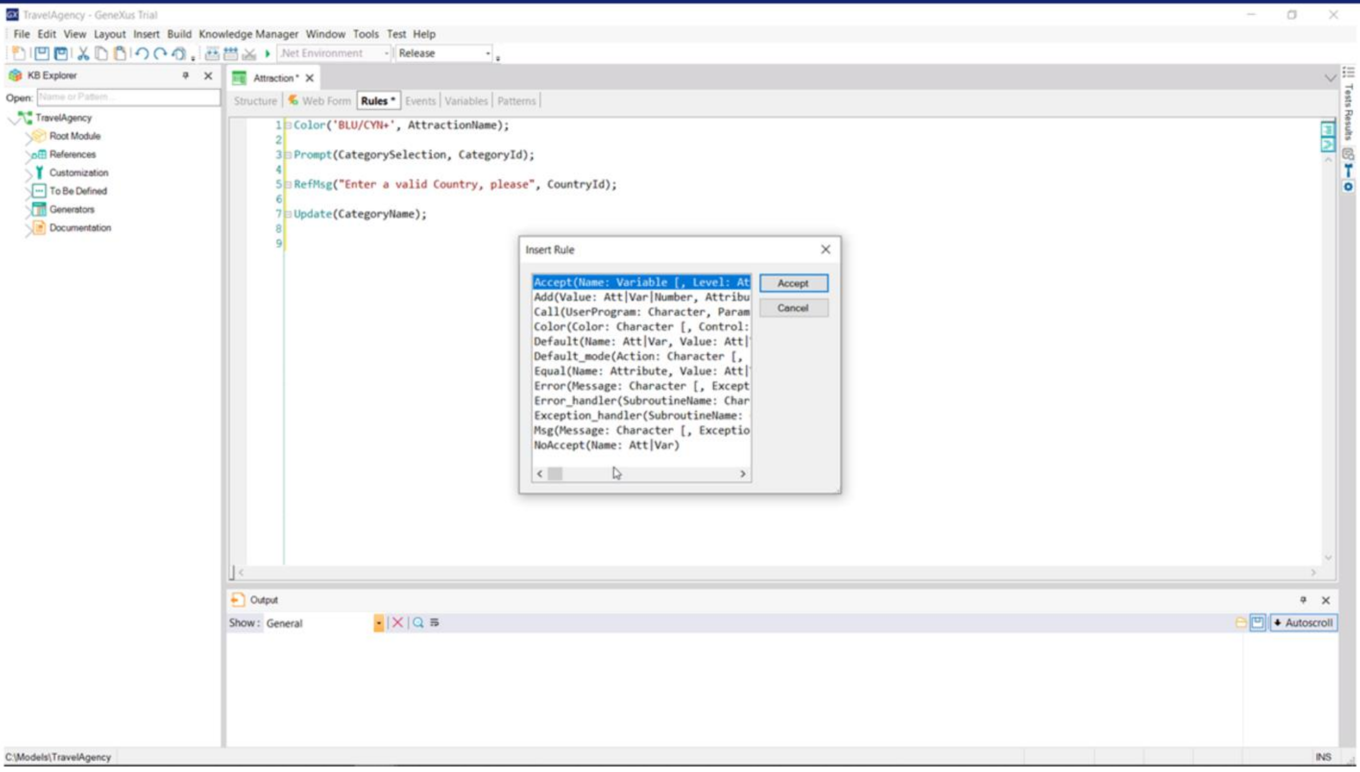
```
Color('BLU/CYN+', AttractionName);
```



Attraction

Id	0
Name	New Attraction
Country Id	0
Country Name	
Category Id	0
Category Name	
Photo	
City Id	0
City Name	

the Color rule, which allows using colors to quickly improve the application's appearance;



```
Color('BLU/CYN+', AttractionName);

Prompt(CategorySelection, CategoryId);

RefMsg("Enter a valid Country, please", CountryId);

Update(CategoryName);
```

```
Accept(Name: Variable [, Level: At
Add(Value: Att|Var|Number, Attribu
Call(UserProgram: Character, Param
Color(Color: Character [, Control:
Default(Name: Att|Var, Value: Att|
Default_mode(Action: Character [,
Equal(Name: Attribute, Value: Att|
Error(Message: Character [, Except
Error_handler(SubroutineName: Char
Exception_handler(SubroutineName:
Msg(Message: Character [, Exceptio
NoAccept(Name: Att|Var)
```

and many others that you can get to know through the Insert → Rule dialog…

We encourage you to discover its uses in the GeneXus Wiki.

GeneXus™

training.genexus.com
wiki.genexus.com
training.genexus.com/certifications