Manipulating Data Values

1. Introduction to SAS Functions
2. Manipulating Numeric Values
3. Manipulating Character Values
4. Converting Data Type

Lesson 3: Manipulating Data Values

1. Introduction to SAS Functions
2. Manipulating Numeric Values
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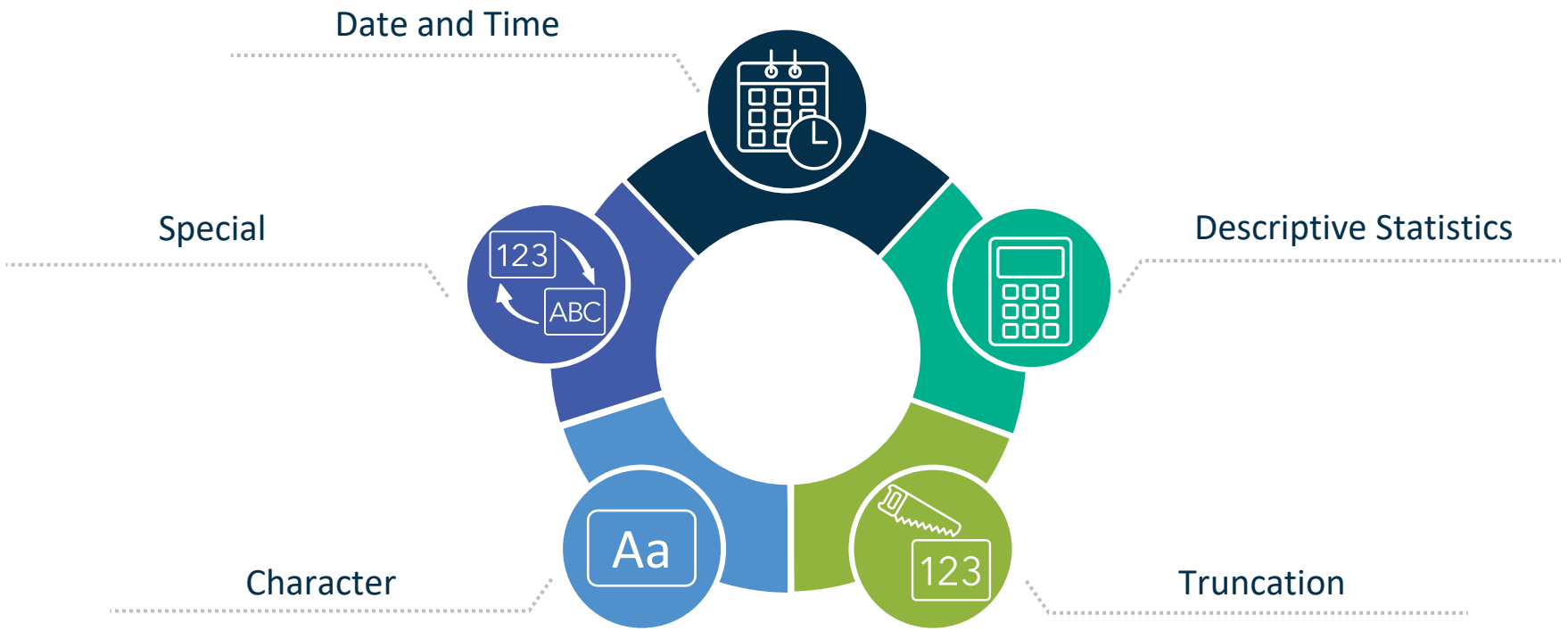
Categories of SAS Functions



Setup for the Question

1. Close all open items and start a new project.
2. In the Servers pane, expand **Servers** ⇨ ***Local*** ⇨ **Libraries** ⇨ **ORION**.
3. Double-click **QUARTERLY_PURCHASES** to open the table.
4. Click **Query Builder** on the data grid toolbar. Explore the tabs of the Query Builder.

3.01 Multiple Answer Question

On which tab (or tabs) of the Query Builder can functions be used? (Select all that apply.)

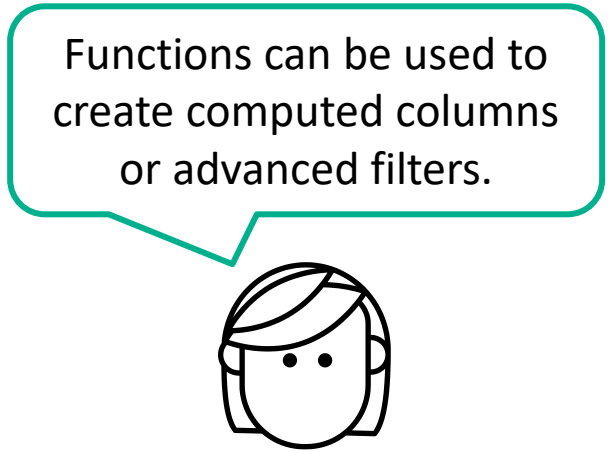
a. Select Data tab
b. Filter Data tab
c. Sort Data tab

3.01 Multiple Answer Question – Correct Answers

On which tab (or tabs) of the Query Builder can functions be used?

(Select all that apply.)

a. Select Data tab
b. Filter Data tab
c. Sort Data tab



Manipulating Data Values

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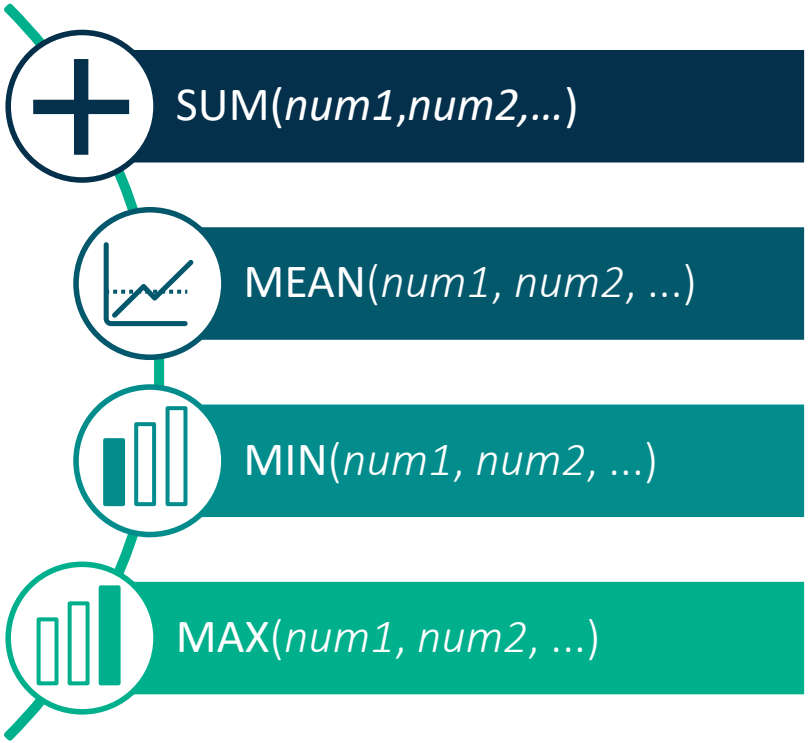
Customer Birthday Promotion

Customers receive a birthday promotion based on quarterly spending averages.

Descriptive Statistics Functions



Descriptive Statistics Functions

N(*num1*, *num2*, ...)

Count of nonmissing numeric arguments

NMISS(*num1*, *num2*, ...)

Count of missing numeric arguments

CMISS(*argument1*, *argument2*, ...)

Count of missing numeric or character arguments

3.02 Activity

What is the value of **AvgQtrPurchases** and **MissQtrCount** given the following expressions?

Qtr1	Qtr2	Qtr3	Qtr4	AvgQtrPurchases	MissQtrCount
12	.	7	5		

```
AvgQtrPurchases=mean(Qtr1,Qtr2,Qtr3,Qtr4)
```

```
MissQtrCount=nmiss(Qtr1,Qtr2,Qtr3,Qtr4)
```

3.02 Activity – Correct Answer

What is the value of **AvgQtrPurchases** and **MissQtrCount** given the following expressions?

Qtr1	Qtr2	Qtr3	Qtr4	AvgQtrPurchases	MissQtrCount
12	.	7	5	8	1

```
AvgQtrPurchases=mean(Qtr1,Qtr2,Qtr3,Qtr4)
```

```
MissQtrCount=nmiss(Qtr1,Qtr2,Qtr3,Qtr4)
```

Truncation Functions

ROUND(*number <,rounding-unit>*)

Rounds to the nearest multiple of the rounding unit

CEIL(*number*)

Smallest integer that is greater than or equal to the argument

FLOOR(*number*)

Largest integer that is less than or equal to the argument

INT(*number*)

Integer portion of the argument

3.03 Multiple Answer Question

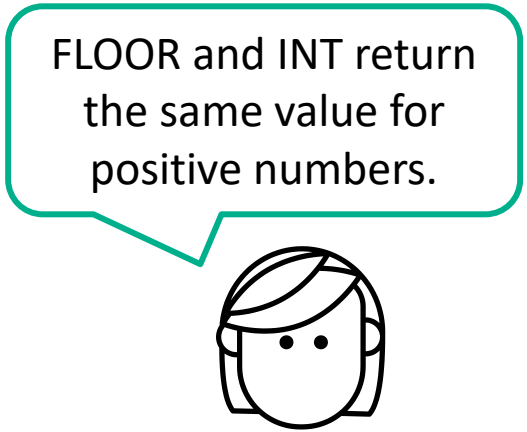
Given a value of 24.735, which of the following functions would return an integer value of 24?

a. ROUND
b. CEIL
c. FLOOR
d. INT

3.03 Multiple Answer Question – Correct Answers

Given a value of 24.735, which of the following functions would return an integer value of 24?

a. ROUND
b. CEIL
c. FLOOR
d. INT

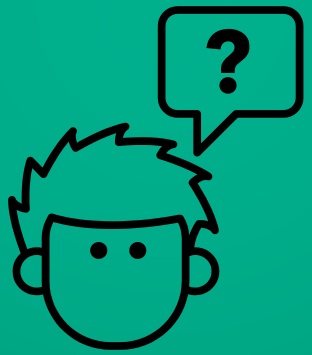


Manipulating Numeric Values

Use **Quarterly_Purchases** table to give customers promotion based on quarterly spending averages.

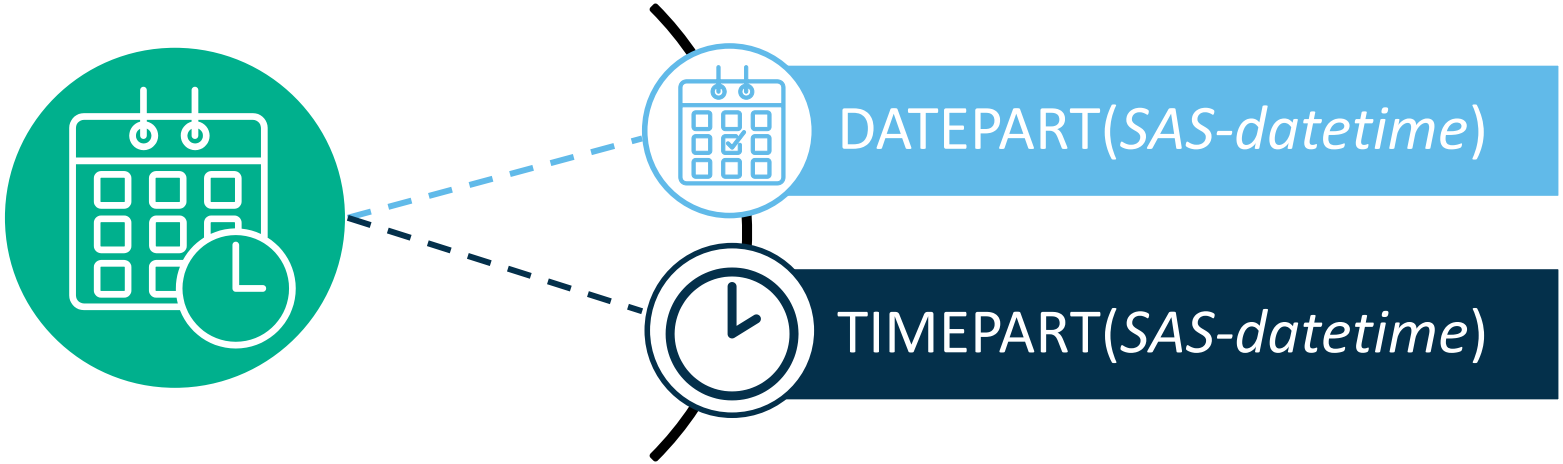
This demonstration illustrates using numeric and truncation functions to create a new column.

Questions?

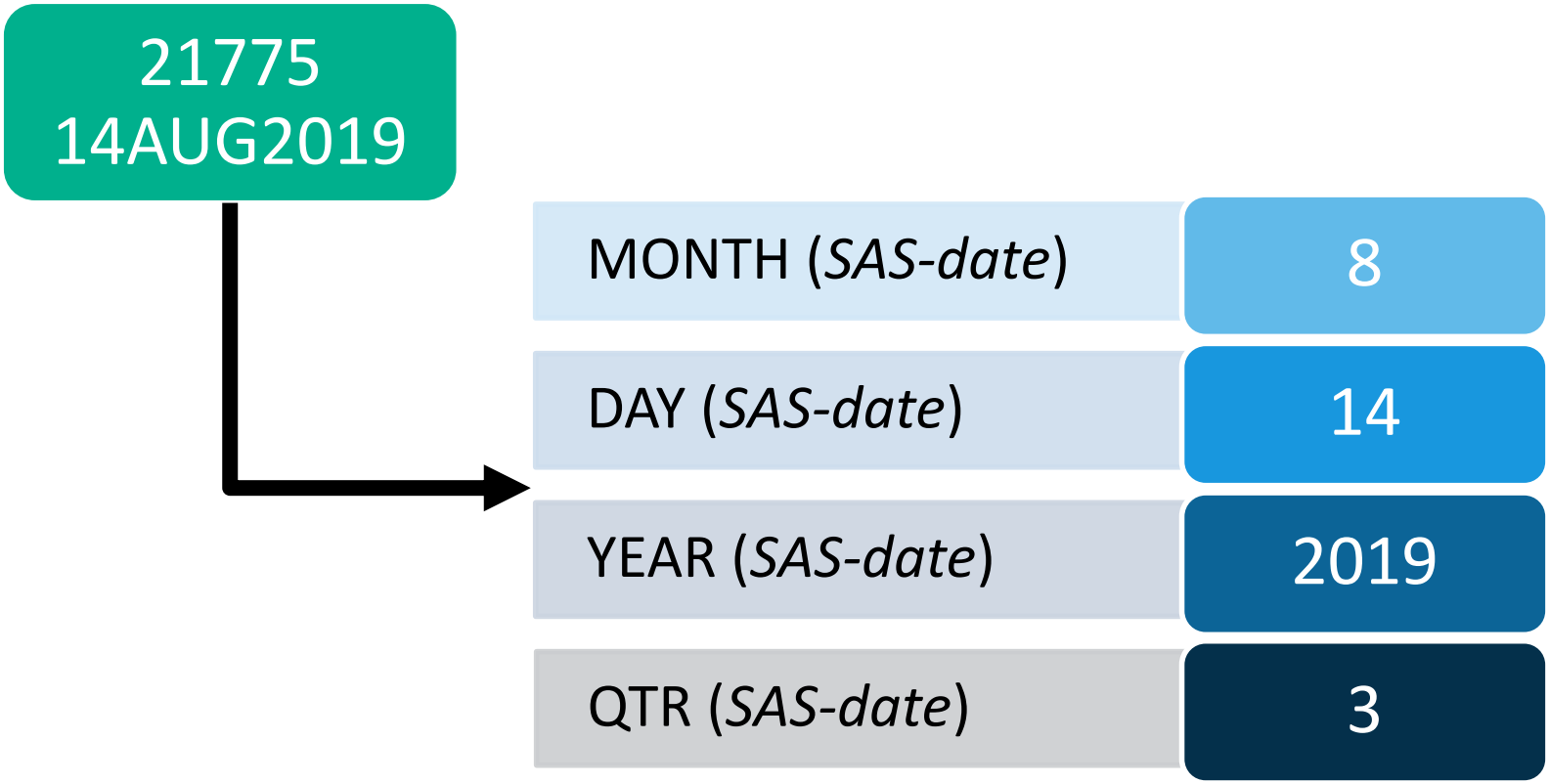


SAS Date and Time Values

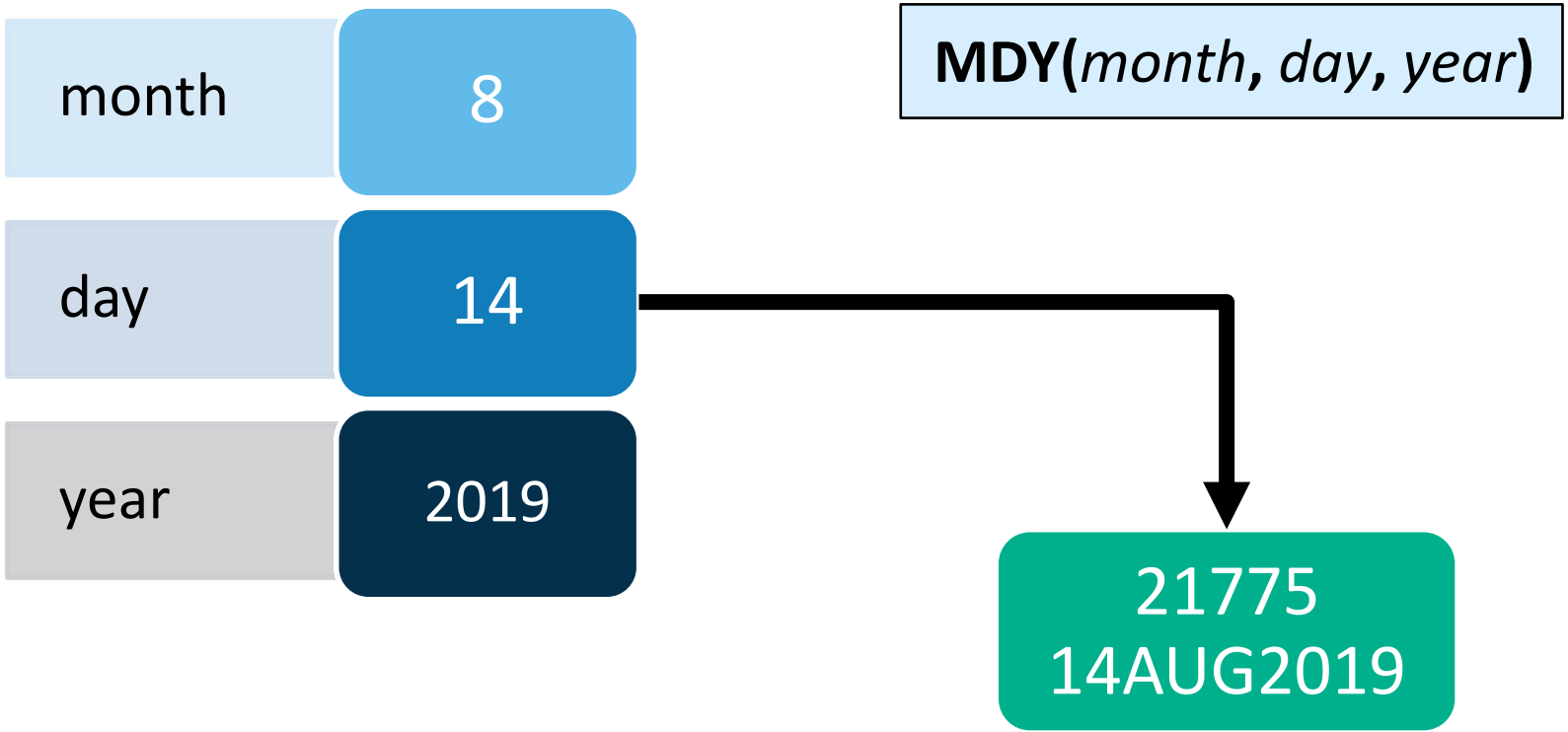
Extracting Information from SAS Datetime Values



Extracting Information from SAS Date Values



Creating SAS Date Values



Some Numeric Functions

YEAR(*SAS-date*)	Extracts the year from a SAS date and returns a four-digit value for year.
QTR(*SAS-date*)	Extracts the quarter from a SAS date and returns a number from 1 to 4.
MONTH(*SAS-date*)	Extracts the month from a SAS date and returns a number from 1 to 12.
DAY(*SAS-date*)	Extracts the day of the month from a SAS date and returns a number from 1 to 31.
WEEKDAY(*SAS-date*)	Extracts the day of the week from a SAS date and returns a number from 1 (Sunday) to 7.

TODAY()	Returns the current date as a SAS date value.
MDY(*month*,*day*,*year*)	Returns a SAS date value from numeric month, day, and year values.

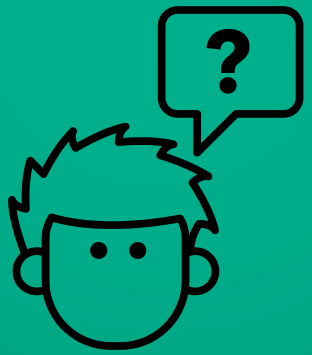
Expression	Result
ROUND(12.12)	12
ROUND(42.65, .1)	42.7
ROUND(-6.478)	-6
ROUND(96.47,10)	100

Manipulating SAS Date Values

Continue with the previous exercise, this time give promotion on their birthdays.

This demonstration illustrates using date functions to create and extract information from SAS date values.

Questions?



Lesson 3: Manipulating Data Values

3.1 Introduction to SAS Functions
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3.3 Manipulating Character Values
3.4 Converting Data Type

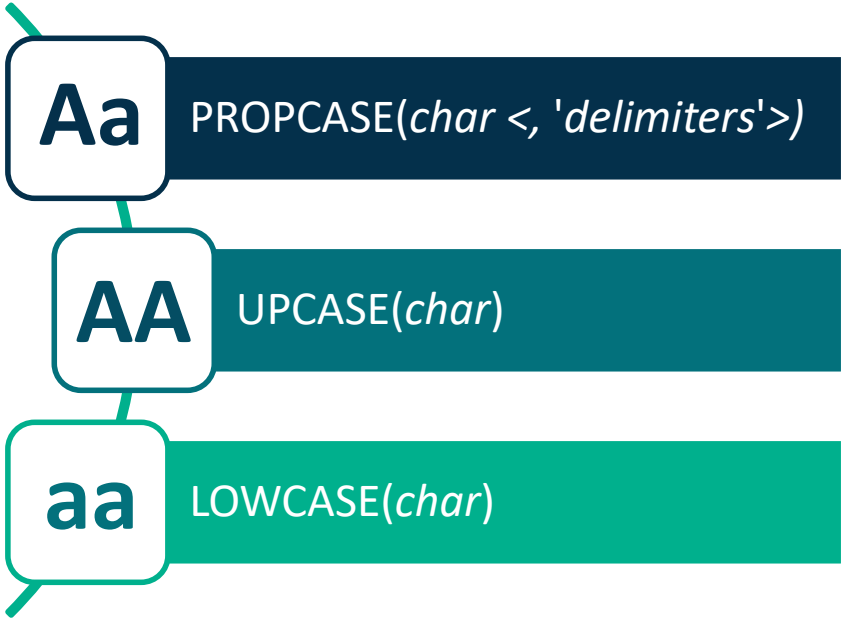
Standardizing Character Values

product_orders

Customer_Name	Product_Name
Pollins, Alan	CASUAL V-NECK MEN'S SWEATSHIRT
Doherty, Alley	INSTYLE PULLOVER MID

Customer_Name	Product_Name
Alan Pollins	Casual V-Neck Men's Sweatshirt
Alley Doherty	Instyle Pullover Mid

Casing Functions

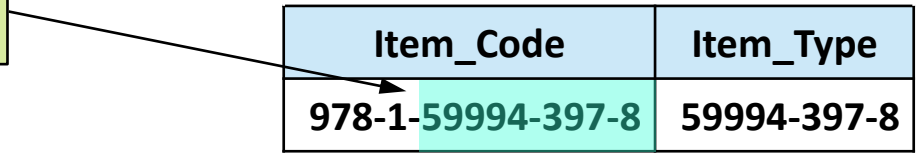


Extracting Substrings

SUBSTR(*char***,** *position* **<,***length***>)**

```
substr(Item_Code,7)
```

Starting at position 7, extract the remainder of the string



Item_Code	Item_Type
978-1-59994-397-8	59994-397-8

3.05 Activity

Given **Item_Code** and the following expression, what is the extracted substring?

Item_Code
978-1-59994-397-8

```
substr(Item_Code,5,4)
```

3.05 Activity – Correct Answer

Given **Item_Code** and the following expression, what is the extracted substring?

1-59

Item_Code
978-1-59994-397-8

```
substr(Item_Code,5,4)
```

3.06 Question

Can the SUBSTR function be used to extract the first and last name?

- ❍ Yes
- ❍ No

product_orders

Customer_Name
Pollins, Alan
Doherty, Alley
Dean, John

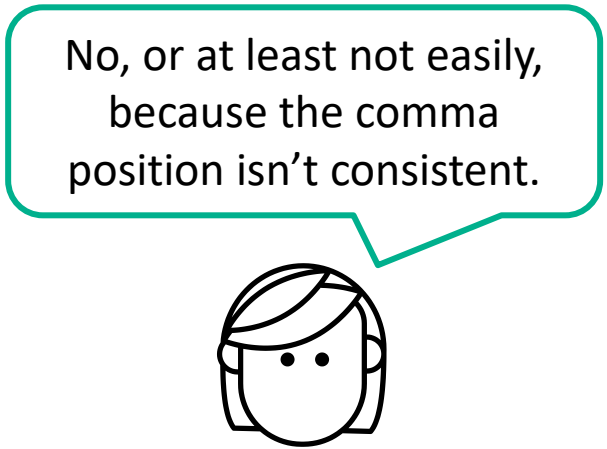
3.06 Question – Correct Answer

Can the SUBSTR function be used to extract the first and last name?

- Yes
- **No**

product_orders

Customer_Name
Pollins, Alan
Doherty, Alley
Dean, John



Extracting Words from a String

SCAN(*char*, *n* <, '*delimiters*'>**)**

Default delimiters include
blank ! $ % & ( ) * + , - . / ; < ^ |

```
scan(Customer_Name, 1)
```

product_orders

Customer_Name	Last_Name
Pollins, Alan	Pollins
Doherty, Alley	Doherty
Dean, John	Dean

SCAN Function

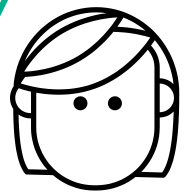
Use the SCAN function to extract the first name.

```
SCAN(Name, 2, ',')
```

scanned_names

Name	First_Name
Maxwell, Bernard	Bernard
Huntington, Mary Elizabeth	Mary Elizabeth
Voorheis-Smith, Jacqueline	Jacqueline

Specify a comma as the delimiter to correctly extract the first name.



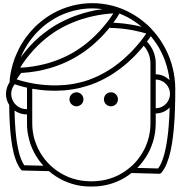
STRIP Function - Removes leading and trailing blanks

```
STRIP(First_Name)
```

scanned_names

Name	First_Name	First_STRIP
Maxwell, Bernard	Bernard	Bernard
Huntington, Mary Elizabeth	Mary Elizabeth	Mary Elizabeth
Voorheis-Smith, Jacqueline	Jacqueline	Jacqueline

Use the STRIP function to remove leading and trailing blanks from **First_Name.**



Concatenation Functions

CAT(*argument1*, *argument2*, ...)

Does not remove leading or trailing blanks

CATS(*argument1*, *argument2*, ...)

Removes leading and trailing blanks

CATX('*delimiter*', *argument1*, *argument2*, ...)

Removes leading and trailing blanks and inserts delimiters

Manipulating Character Values (Part 1)

Continue the previous exercise, create a new column for Customer First Name to be used in the promotional email.

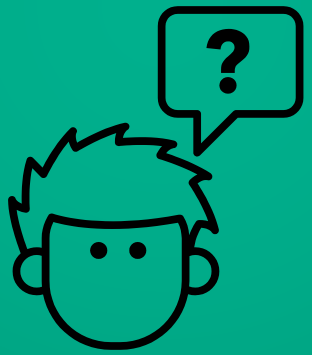
This demonstration illustrates using the SCAN and UPCASE functions to modify **Customer_Name**.

Manipulating Character Values (Part 2)

Use Product_Orders dataset to show the Product Name and Customer Names (as First Name Last Name) who purchased the product group =007.

This demonstration illustrates using the PROPCASE, SUBSTR, SCAN, and CATX functions to filter Customer Names who purchased from Product Group XXX.

Questions?



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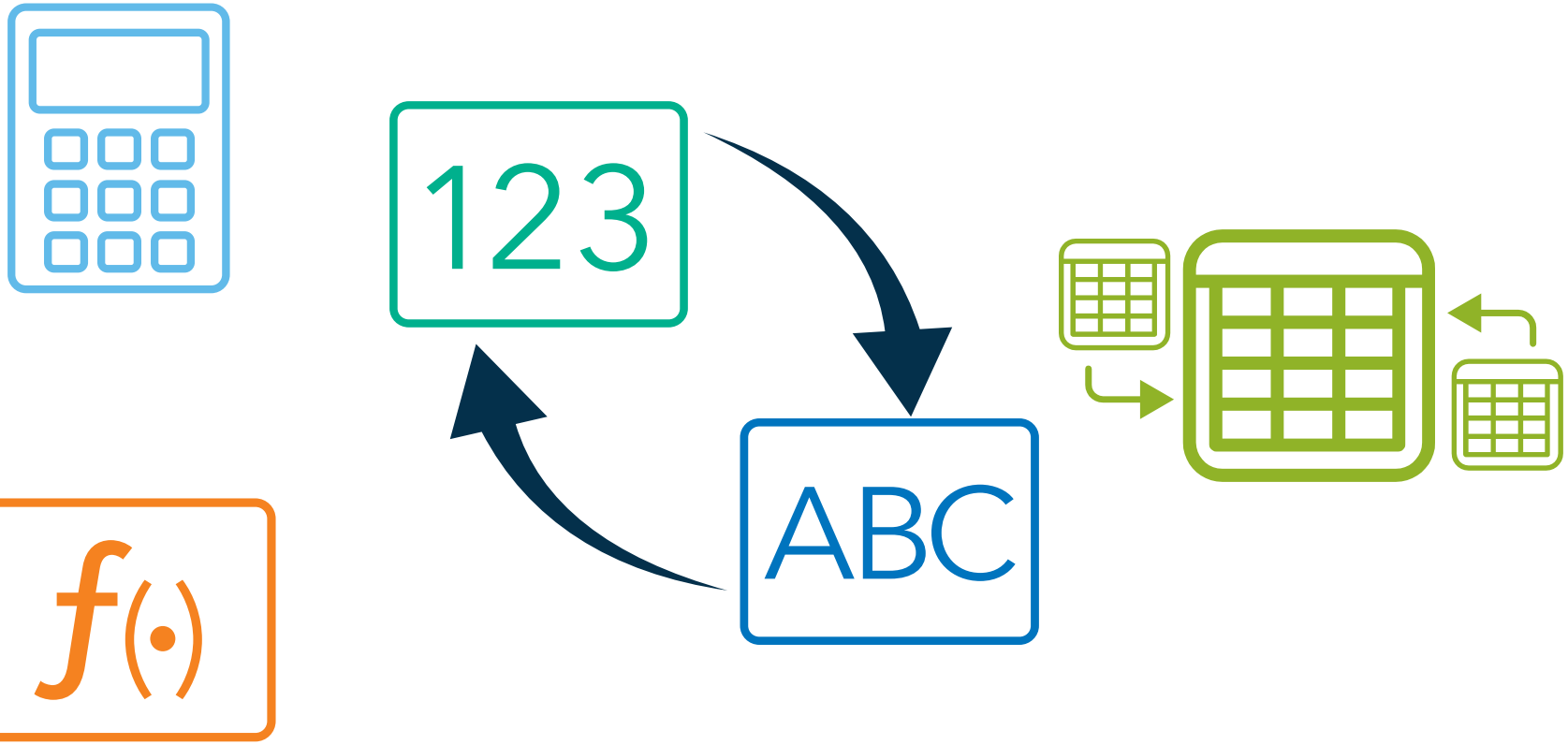
Converting Column Type



3.08 Activity

1. In the Servers pane, expand **Servers** ⇨ ***Local*** ⇨ **Libraries** ⇨ **ORION**.
2. Double-click **CHARACTERDATA** to open the table.
3. Click **Query Builder** on the data grid toolbar.
4. Create a new computed column named **New_Salary** that sums the **Salary** and **Bonus** values.

Is **New_Salary** created successfully?

3.08 Activity – Correct Answer

Is **New_Salary** created successfully?

No

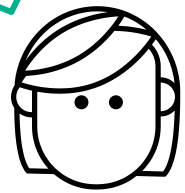
```
Salary+Bonus
```

```
ERROR: Expression using addition
(+) requires numeric types.
```

```
sum(Salary, Bonus)
```

```
ERROR: Function SUM requires a
numeric expression as argument 1.
```

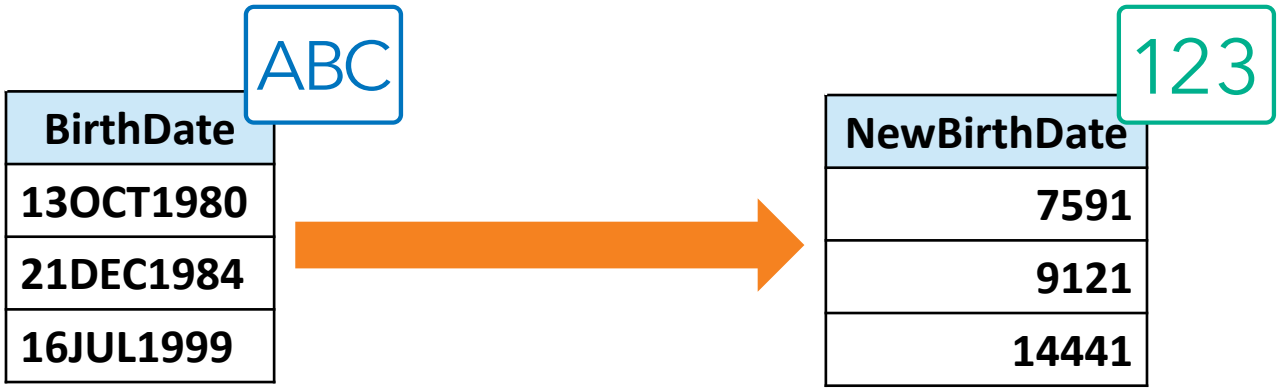
The Query Builder syntax is invalid if a character column is used in a numeric context.



Character to Numeric Conversion

INPUT(*source*, *informat*)

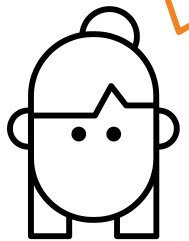
```
input(BirthDate,date9.)
```



Informats for Converting Character to Numeric

Character	Informat	Numeric
123456	6.	123456
123,456.78 $123,456.78	COMMA12. DOLLAR12.	123456.78
€123.456,78	EUROX12.	123456.78
15OCT2019	DATE9.	21837
10/15/2019	MMDDYY10.	21837
15/10/2019	DDMMYY10.	21837

An informat specifies how the character value looks so that it can be converted to a numeric value.



3.09 Multiple Answer Question

Which informats can be used to correctly convert the character column **Dollars** to a numeric type? (Select all that apply.)

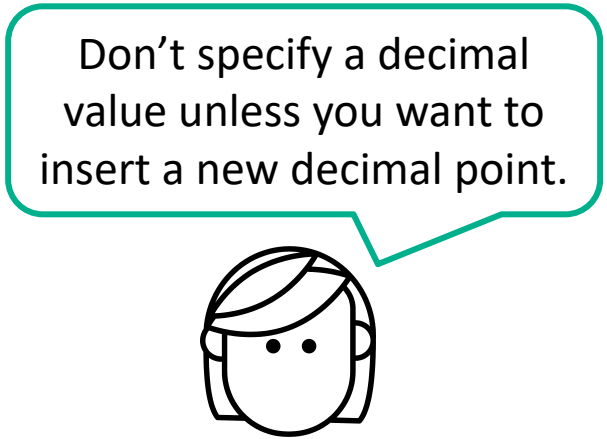
a. 10.
b. COMMA10.
c. DOLLAR10.
d. DOLLAR10.2

Dollars
$10
$50.50
$250.25
$1,000
$50,000.50

3.09 Multiple Answer Question – Correct Answers

Which informats can be used to correctly convert the character column **Dollars** to a numeric type? (Select all that apply.)

a. 10.
b. COMMA10.
c. DOLLAR10.
d. DOLLAR10.2



Dollars
$10
$50.50
$250.25
$1,000
$50,000.50

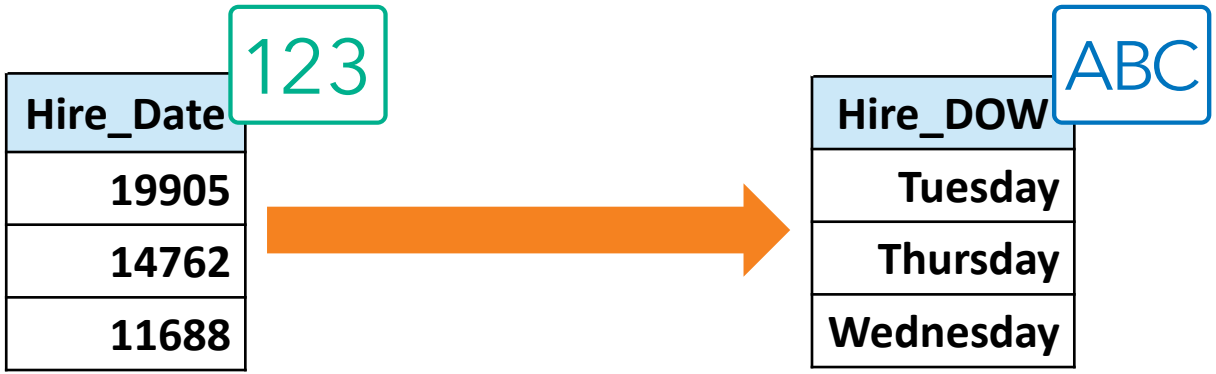
Converting Values from Character to Numeric

This demonstration illustrates the use of the INPUT function to convert character values to numeric values.

Numeric to Character Conversion

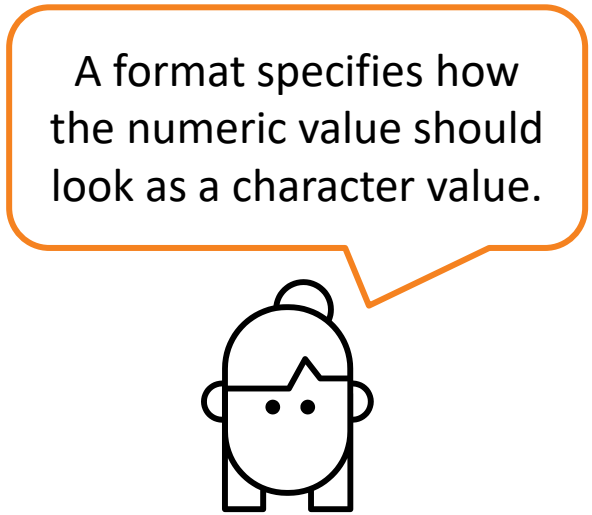
PUT(*source*, *format*)

```
put(Hire_Date,downname.)
```



Formats for Converting Numeric to Character

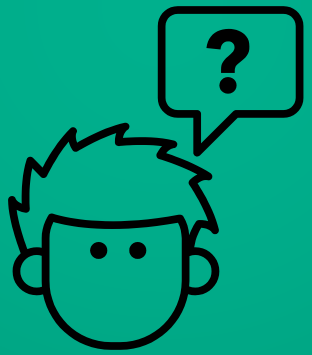
Numeric	Format	Character
123.456	6.2	123.46
1234	Z8.	00001234
21837	DOWNAME3.	Tue



Converting Values from Numeric to Character

This demonstration illustrates the use of the PUT function to convert numeric values to character values.

Questions?



Practice

This exercise reinforces the concepts discussed previously.