

The objective of this tutorial is to get started with Data Viz and Machine Learning on SAS Viya, on small simple cases, using SAS Viya for Learners through SAS® Skill Builder.

After registration, we will start by using the Insight Toy case to discover how to use SAS Visual Analytics.

Then, we will then use Organics case to start Machine Learning.

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Welcome to the SAS® Skill Builder:

To get register, go to

https://www.sas.com/fr_fr/learn/academic-programs/students.html

The screenshot shows the SAS Skill Builder for Students homepage. At the top, there's a navigation bar with the SAS logo, a menu icon, and links for Overview, Educators, and Students. The main content area features a large image of two diverse young professionals, a woman with curly hair and a man with short dark hair, smiling. To the left of the image, a white callout box contains the text: "SAS® SKILL BUILDER FOR STUDENTS" and "Having SAS® skills on your résumé gives you a distinct career advantage." Below this, a smaller text block says: "Our courses, certifications and other resources put the future you've always envisioned within reach." A speech bubble icon is visible in the bottom right corner of the main image area.

Why You Should Learn SAS®

Scroll down

The screenshot shows a section titled "How to Log In to SAS® Skill Builder for Students". It includes three steps: "CLICK" (with a checkmark icon), "LOG IN" (with a checkmark icon), and "REVIEW & ACCESS" (with a checkmark icon). Below these steps is a green button with the text "Log In Now to Get Free Resources". This button is circled in red. On the far left, there's a vertical orange "Live Chat" button with a white phone icon. The URL in the browser address bar is "sas.com/fr_fr/learn/academic-programs/students.html".

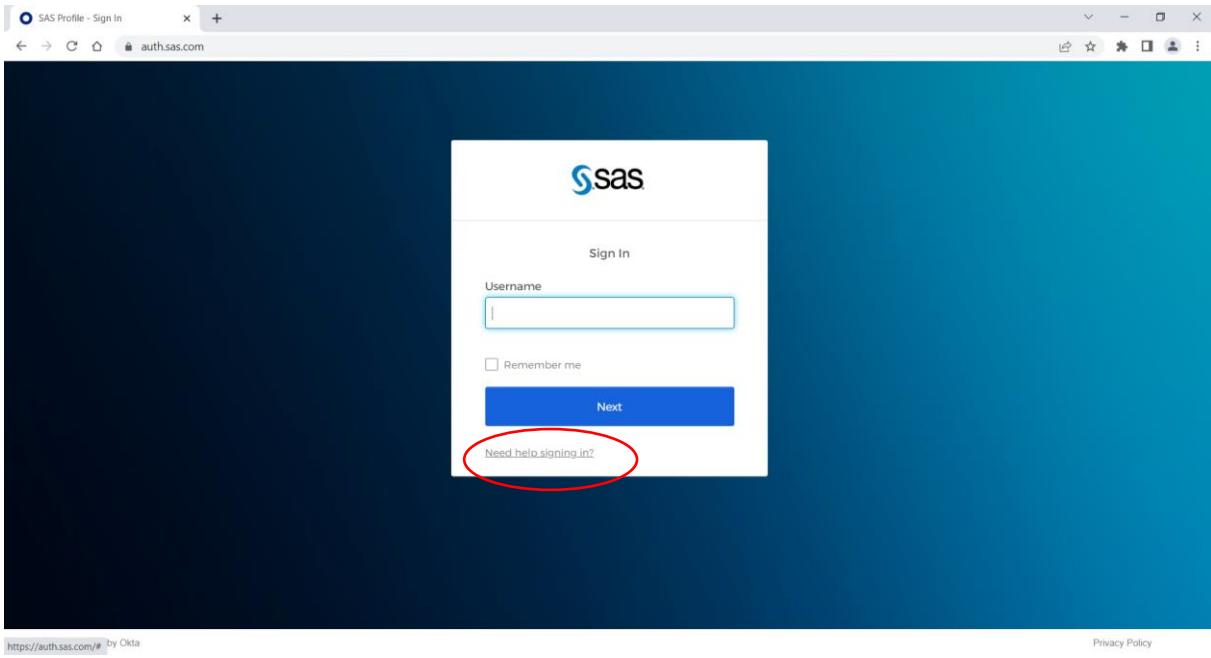
“

SAS certification helped me understand how SAS processes data at a deeper level and opened my eyes to best practices when using the software. SAS certifications clearly demonstrate my understanding of the software to colleagues and clients.

Elaine Kearney • Graduate Student • The University of North Carolina at Chapel Hill
<https://support.sas.com/edu/viewmylearn.html?activationCode=FACLPGP2EM>



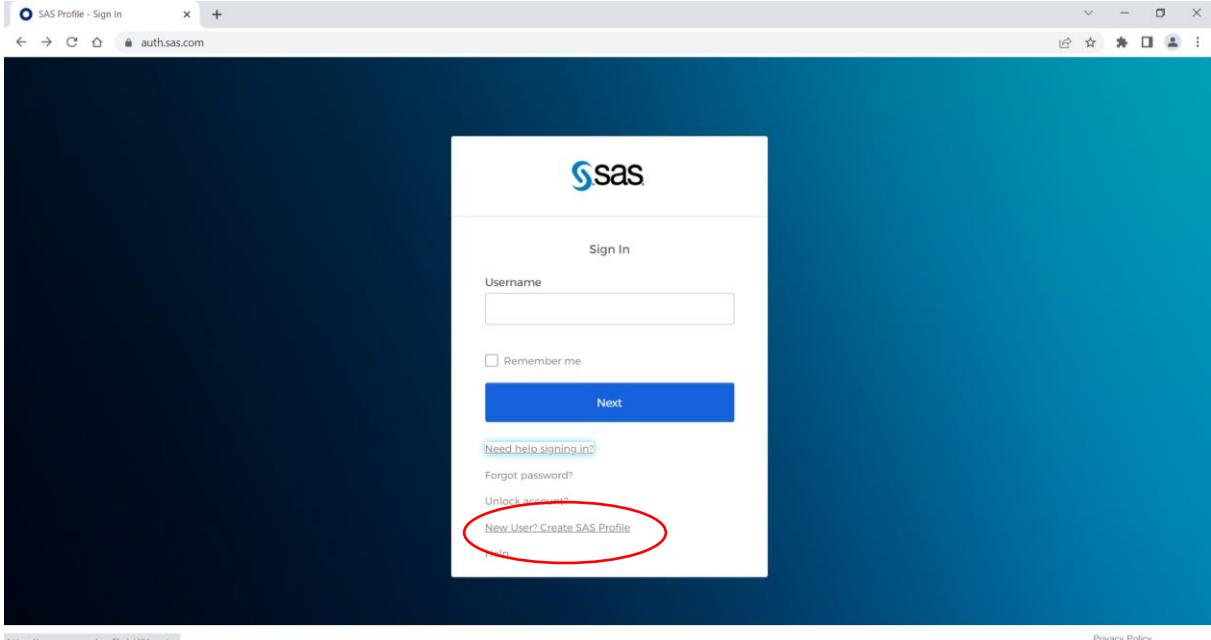
Click on "Log in Now to Get Free Resources"



<https://auth.sas.com/#> by Okta

Privacy Policy

If you don't have a profile with a valid university email address, you need to create one. Click on "Need help signing in?"



<https://www.sas.com/profile/ui/#/create>

Privacy Policy

Click on "New User? Create SAS Profile"

SAS Profile

Step 1 of 2: Tell us about yourself.

Preferred Language

First Name *

Last Name *

Email *

Country/Region *

Affiliation With SAS *

Company/Organization *

Register as a student. Use your e-mail from an academic institution.

Accept the terms and click to on the box to create your profile

Company/Organization *

*Required

Yes, I would like to receive occasional emails from SAS Institute Inc. and its affiliates about SAS products and services. I understand that I can withdraw my consent at any time by clicking the opt-out link in the emails.

I agree to the terms of use and conditions.*

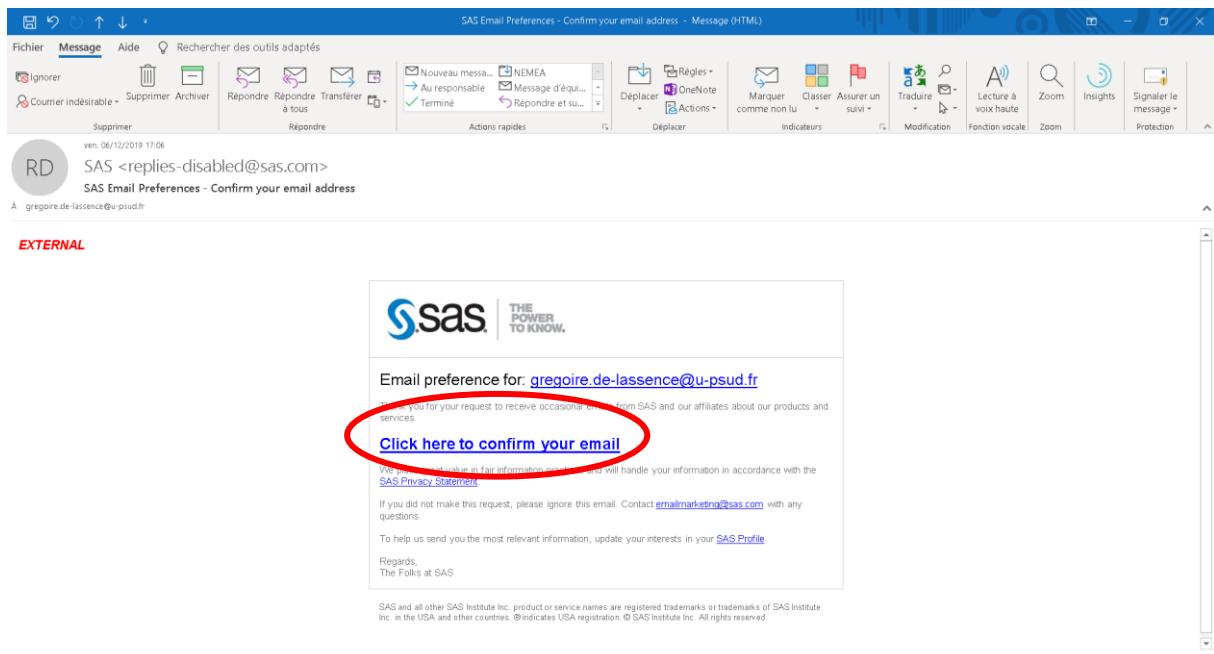
All personal information will be handled in accordance with the SAS Privacy Statement.

Create profile

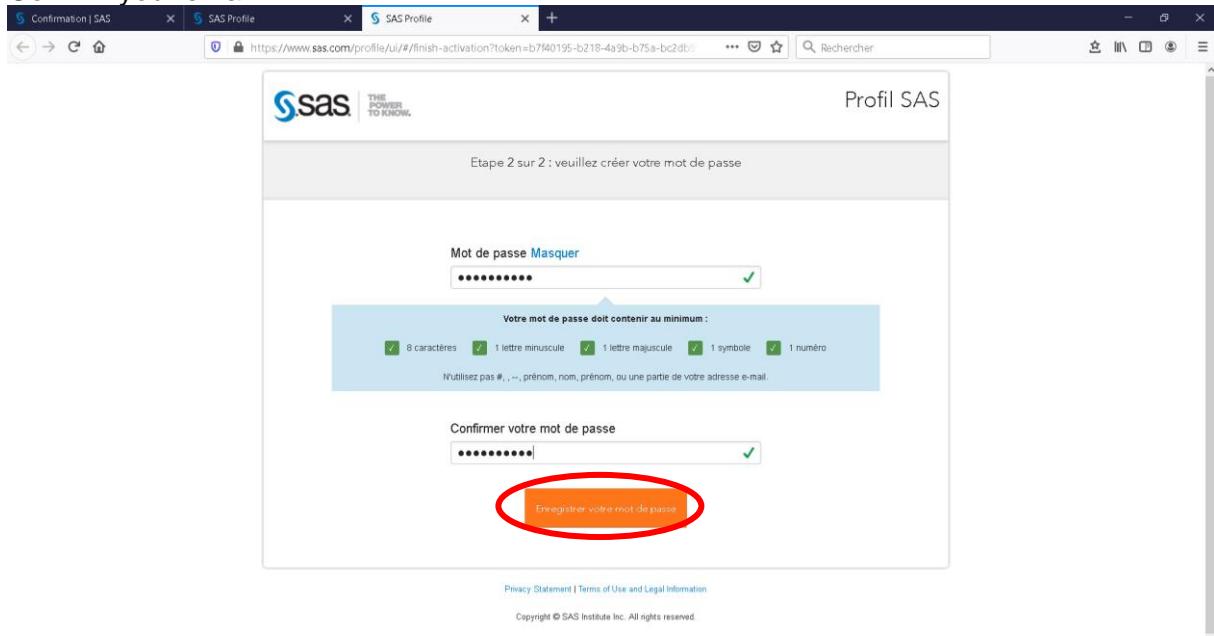
After clicking "Create profile," you will receive a verification email with instructions for setting your password and activating your profile.

Privacy Statement | Terms of Use and Legal Information
Copyright © SAS Institute Inc. All rights reserved.

After clicking "create profile" you must receive an email like the one below, to validate the address.



Confirm your email



Create a password and save it

You must be able to connect to https://www.sas.com/fr_fr/learn/academic-programs/students.html

SAS Skill Builder for Students | SAS

SAS Academic Programs

CLICK

To get started, click the link below and you'll be taken to the SAS Profile page.

LOG IN

Log in or create a SAS profile. To validate your access to SAS Skill Builder for Students, your profile must use an email address associated with your academic domain.

REVIEW & ACCESS

Review and accept the license agreement. You will be taken directly into SAS Skill Builder for Students.

Log In Now to Get Free Resources

“

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Elaine Kearney • Graduate Student • The University of North Carolina at Chapel Hill

https://www.sas.com/fr_fr/learn/academic-programs/students.html#tabcontent_certification-badging

We're here to help. Alors que nous faisons face au COVID-19 ensemble, notre engagement envers vous reste fort. Si vous souhaitez développer des compétences essentielles à votre carrière, nous vous invitons à suivre nos formations en ligne gratuites ou à vous inscrire à des cours en classe connectée. Suivez le cours avec un formateur SAS et des machines virtuelles pour pratiquer en temps réel, comme dans une salle de formation.

Formation Sélectionnez votre formation Rechercher My Training Panier +33 1 60 62 11 00 Contactez-nous

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Activate Your Product(s)

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I accept the License Agreement

I accept the License Agreement

Submit

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I accept the License Agreement

Submit

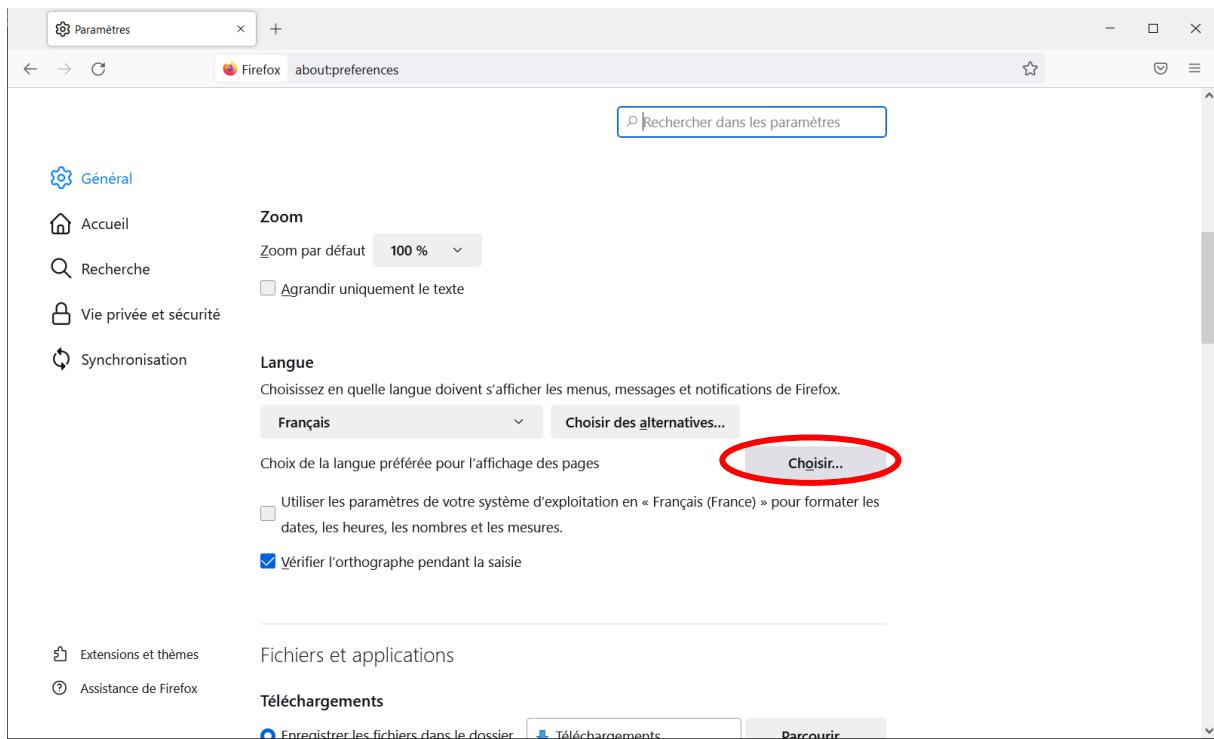
Accept the terms

Welcome to SAS Skill Builder

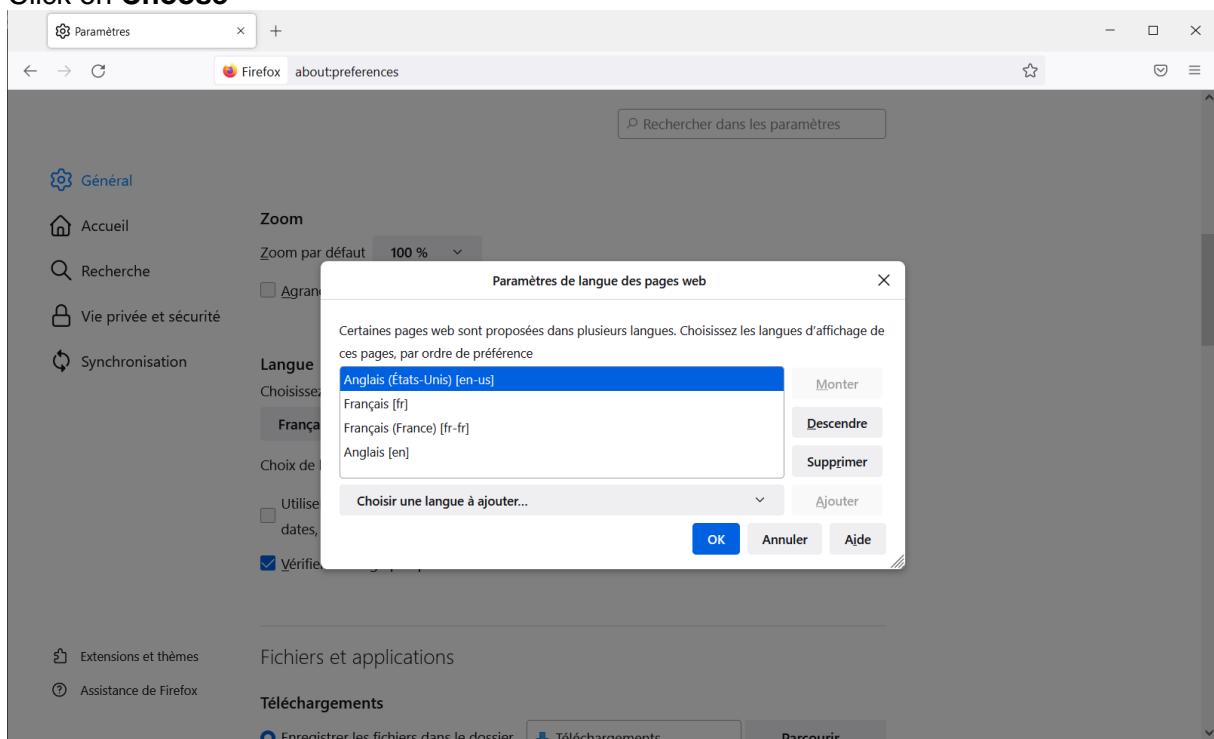
Changing browser language

In order to have the application in English, you can put your browser setting in English.
In Firefox (chrome is presented next page), go to option

In Language

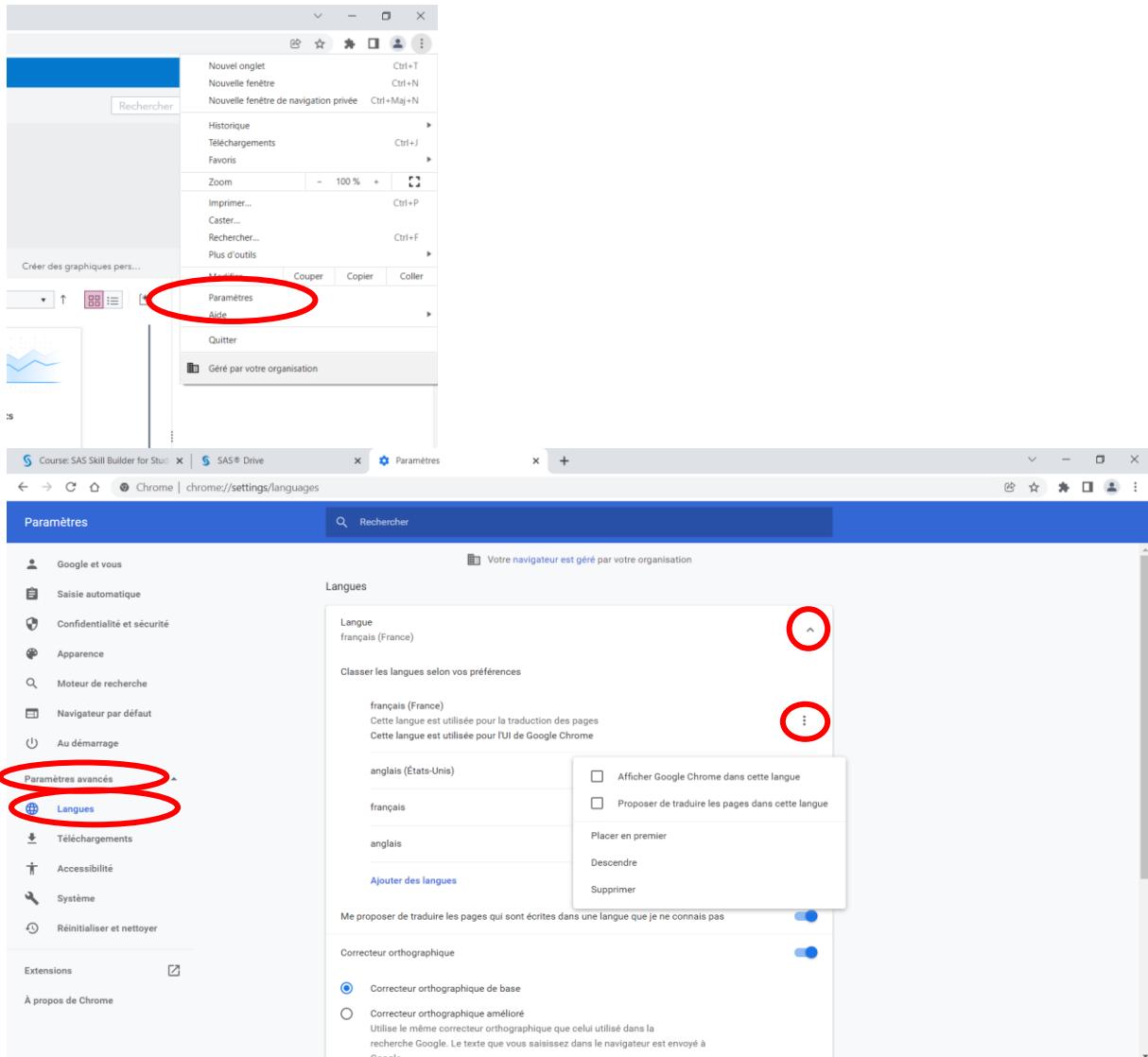


You can choose your preferred language for displaying page, in your browser
Click on **Choose**



Move English (United States) [en-us] up to the top
OK

In Chrome, go to settings (parameters) and advanced settings (advanced parameters)



In Language
Move English (United States) [en-us] up to the top

Data Viz with SAS Visual Analytics Hands-On

Introduction to Insight Toy Company

We will start with a 1.6 million lines and 57 columns (2GB) table, on the fictitious company "Insight Toy".

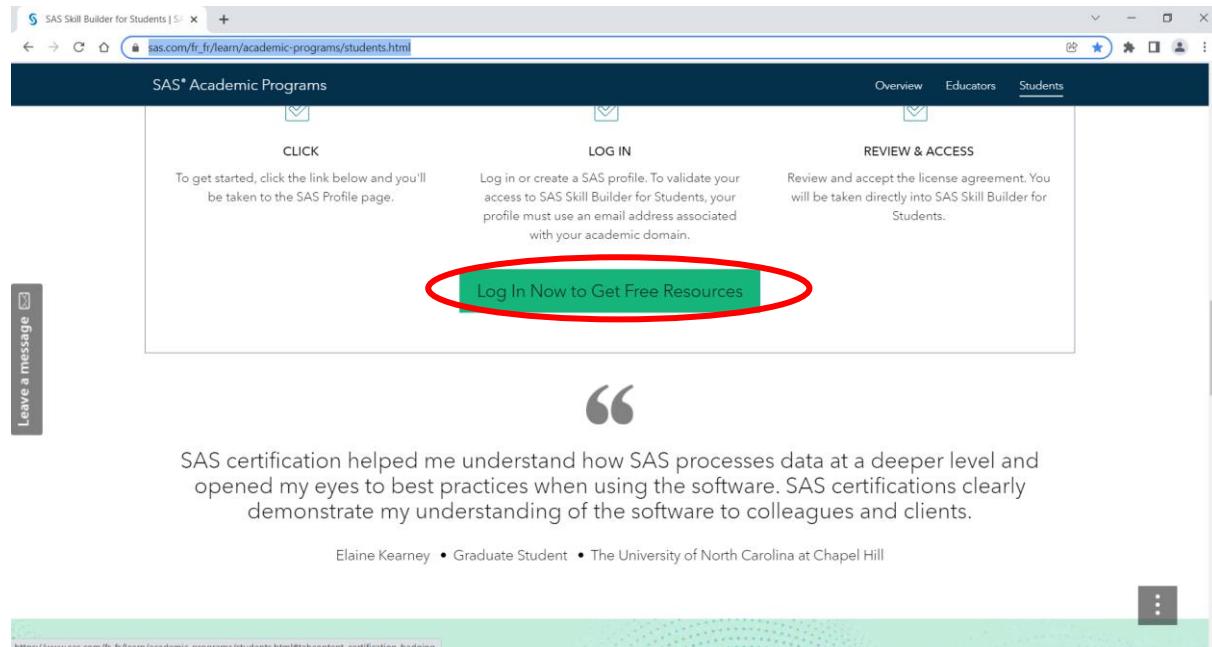
This company produces and sells high-tech toys. We have data on 8 years, from 1998 to the end of 2005, on the financial, production, distribution, sales and marketing aspects.

Field	Description
Customer	Unique customer ID (over 80,000 customers).
Facility	Facility (127) - sales office, or manufacturing location.
Facility City	City where the facility is located.
Facility Continent	Continent where the facility is located.
Facility Country	Country where the facility is located.
Facility Opening Date	Used to calculate the Facility Age
Facility Region	Region (within a country) where the facility is located.
Geography Hierarchy	A hierarchy made up of Continents, Countries, Regions, Cities and Customers
Order	Order ID number for a sales.
Product	Product ID number. A product belongs to one product style (see below).
Product Brand	2 product brands: "Novelty" and "Toy".
Product Line	8 product lines. A line belongs to one product brand (see above)
Product Make	71 product makes. A make belongs to one product line (see above).
Product Style	335 product styles. A style belongs to one product make (see above).
Products Hierarchy	A hierarchy that was created to drill down from product brands to line, make, style and product ID.
Sales Rep	ID of the sales representative that made the sale.
Transaction Date	Date of the sale, from January 1 st , 1998 to December 31 st , 2012.
Transaction Month	Month and year of the sale, from January 1998 to December 2012.
Transaction Weekday	Day of the week when the sale happened ("Monday", "Tuesday", etc).
Transaction Year	Year of the sale, from 1998 to 2012.

Field	Description
Unit	Manufacturing unit that was used to assemble that product. There are 166 units in total.
Unit Status	Status of the manufacturing unit (eg. "Active", "Failure", etc). There are 5 possible status.
% Gross Margin	A percentage of gross margin, calculated by dividing Gross Margin by Product Sale for each transaction.
Customer Distance	Distance from the customer address to the nearest sales facility. Anywhere from 100 meters to 50 kilometers.
Customer Satisfaction	An evaluation of the customer satisfaction, at the time of the sale. Scores vary from about 20% (very low satisfaction) all the way to 100%.
Facility Age	Age of the facility, from 0 (brand new) to about 32 years old.
Facility Efficiency	An evaluation of the efficiency of the facility's operations, based on multiple management factors. Scores vary from 30% to 100%.
Product Cost of Sale	Product Cost of Sale. The purchase and production cost of the product sold.
Product Material Cost	The raw material component of the Cost of Sale.
Product Price (target)	The standard ideal product price – if the product was deemed 100% quality and the market conditions were ideal, this is what the Product Sale price would be set at.
Product Quality	An evaluation of the manufacturing quality of the product. Scores vary from 60% to 100%.
Product Sale	The actual revenue of the sale of that product.
Sales Rep Customer Base	Amount of potential revenue for all possible customers in a given sales representative's region.
Sales Rep Customers	Number of customers a sales representative is responsible for at a given date.
Sales Rep ID	ID of the sales representative who made that sale.
Sales Rep Rating	The internal organization's evaluation of the performance of a sales representative.
Unit Actual	Products produced from a given manufacturing unit at that point in time.
Unit Age	Age of a manufacturing unit.
Unit Capacity	Maximum production capacity of a given unit for a given period.
Unit Discard Rate	A percentage representing the number of products discarded for quality reason, divided by the unit target (see below).
Unit Lifespan	A ratio represented by 100% minus (age of the manufacturing unit divided by its theoretical lifespan).
Unit Lifespan Limit	The Unit Lifespan (see above) point at which a facility replaces manufacturing units.
Unit Reliability	A ratio representing how reliable a manufacturing unit is. It is made up of products discarded for quality reasons, divided by total amount of products assembled by the unit, for a given time period.
Unit Target	Products that should be produced from a given manufacturing unit at that point in time.
Unit Yield Rate	A ratio of products produced ('Unit Actual') vs. that should be produced ('Unit Target')

Connect to Viya for Learners

Go https://www.sas.com/fr_fr/learn/academic-programs/students.html



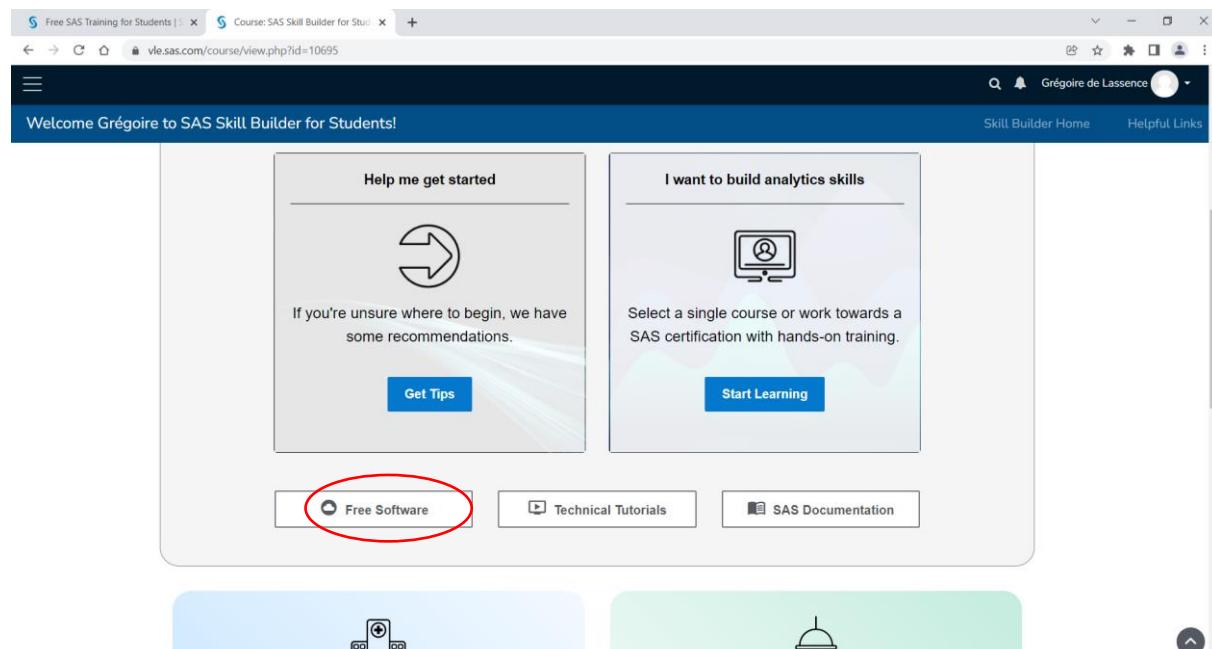
The screenshot shows the SAS Academic Programs page. On the left, there's a sidebar with a 'Leave a message' button. The main content area has three sections: 'CLICK' (with a link to the SAS Profile page), 'LOG IN' (with instructions to log in or create a profile), and 'REVIEW & ACCESS' (with instructions to review the license agreement). A green button labeled 'Log In Now to Get Free Resources' is centered below the 'LOG IN' section and is circled in red.

“

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Sign-up



The screenshot shows the SAS Skill Builder for Students sign-up page. At the top, it says 'Welcome Grégoire to SAS Skill Builder for Students!'. Below that are two main sections: 'Help me get started' (with a 'Get Tips' button) and 'I want to build analytics skills' (with a 'Start Learning' button). At the bottom, there are three buttons: 'Free Software' (circled in red), 'Technical Tutorials', and 'SAS Documentation'.

Click on “Free Software”

The screenshot shows a comparison between two SAS software offerings:

- SAS OnDemand for Academics** (left):
 - Quickly launch a browser-based programming environment using SAS Studio.
 - Learn SAS programming from basic to advanced techniques using coding or point-and-click tasks.
 - Sharpen your analytics skills in data preparation, descriptive analyses and advanced statistical methods.
 - Access the technology via the cloud and get up to 5GB of data storage.[Visit SAS OnDemand for Academics](#)
- SAS Viya for Learners** (right):
 - Use an integrated suite of interactive visual interfaces for learning data science.
 - Build proficiency in artificial intelligence, text analytics and machine learning modeling on a computing environment built to analyze big data.
 - Access a preconfigured JupyterLab interface for R and Python integration with SAS.
 - Get course materials to help educators build cutting-edge analytics curricula.[Visit SAS Viya for Learners](#)

A red oval highlights the "Visit SAS Viya for Learners" button.

“
SAS keeps me current in a field that changes every day.
And it gives my students a leg up when they go into the
workforce because they can make decisions from a data



Go to “SAS Viya for Learners 3.5”

The screenshot shows the SAS Viya for Learners landing page:

SAS® VIYA® FOR LEARNERS

Teach and learn leading-edge data science skills.

Two buttons are visible:

- Access for educators** (with a graduation cap icon)
- Access for students** (with a graduation cap icon, highlighted with a red oval)

To access this product, please sign in with your university email.

<https://support.sas.com/edu/viewmylearn.html?activationCode=FASVFLVLST> You can sign up for free access to advanced analytics software for teaching and learning

Access for Students

Launch SAS Viya for Learners using the button below. Bookmark this page and return here each time you launch SAS Viya for Learners.

[Launch SAS Viya
for Learners 3.5](#)

[More Information](#)

Reminder about using Viya for Learners

- o Use Chrome, Firefox, or Safari to access SAS Viya For Learners.
- o SAS Viya for Learners may be unavailable every 3rd weekend of the month from Friday at 8pm ET to Sunday at 2pm ET while we apply enhancements.

If you are enrolled in an academic course, follow the curriculum provided by your instructor. Not enrolled in an academic course? Click the button below to register for SAS Skill Builder for Students and get access to free e-learning courses and certification preparation materials:

User License Agreement

Important: Please carefully read the terms and conditions of this License Agreement for the SAS® Viya® for Learners ("Agreement") before clicking on the "Accept" button. By clicking on the "Accept" button, you ("You"), are agreeing to the terms and conditions of this Agreement, and SAS Institute Inc. ("SAS") will grant you access to the hosted environment to use SAS® Viya® for Learners hosted environment (collectively, the "Service"). Your access to and use of the Service is expressly conditioned upon your acceptance of the Agreement. In the event You have received access to the Service through your academic institution or employer, Your use of the Service means You are agreeing to the terms and conditions of the Agreement. If You do not agree to all of the terms of this Agreement, click on the "Decline" button and/or do not use the Service.

1. License Grant. Pursuant to this Agreement, SAS grants You a nonexclusive, nonassignable, nontransferrable, fee waived, and royalty-free license to use the Service and any related documentation available at the link provided by SAS ("Documentation"). This Agreement become in effect as of the date You accept it or begin using the Service, whichever occurs first ("Effective Date").

If You are a student or an independent learner, You may use the Service solely in conjunction with Your participation in courses developed and taught by a degree-granting institution or course delivered by SAS and offered via an on-line learning platform. If You are an educator employed by a degree-granting institution, You may use the Service solely to create and/or teach courses for such degree-granting institution. You may not use the Service or Documentation or allow any other person or entity to use the Service or Documentation for the purpose of investigating, supporting, threatening or filing any intellectual property infringement claim against SAS or its affiliates or for the purpose of developing an offering or product directly or indirectly competing with an offering or product from SAS.

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Your use of SAS' online area to access the Service includes the ability to enter into agreements and/or to make transactions electronically. You acknowledge that Your online activities in this area, including proceeding to access the Service, constitute Your agreement and intent to be bound by such agreements and transactions.

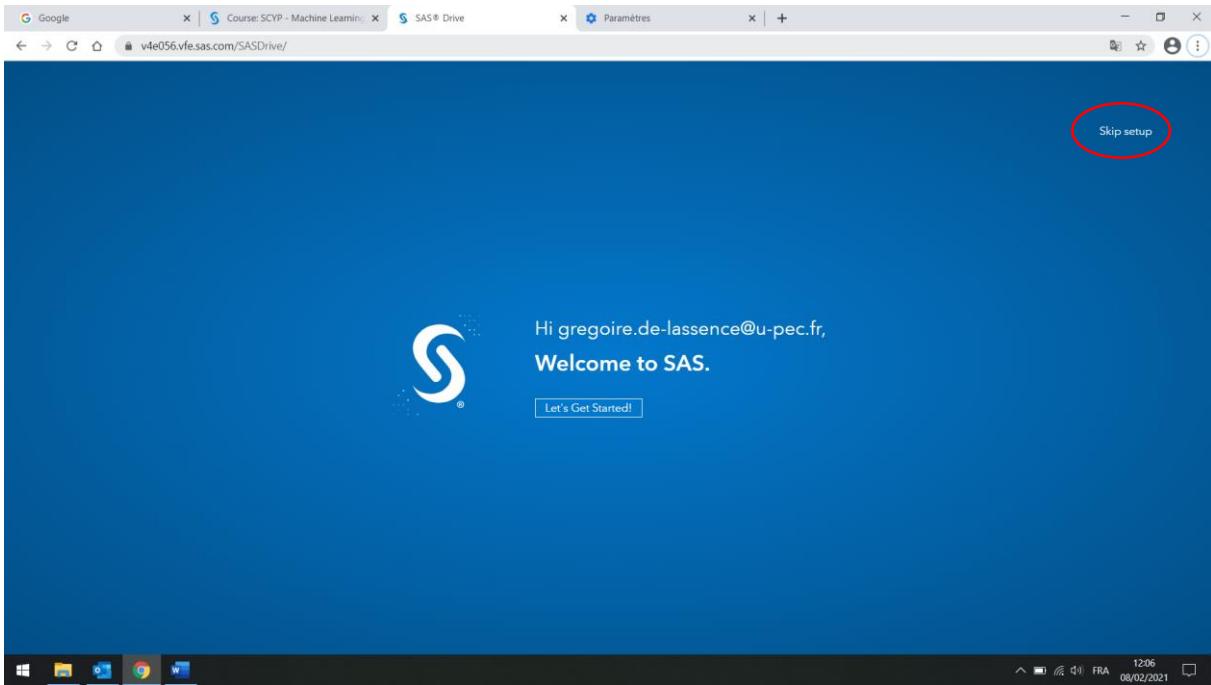
2. Your Responsibilities. You agree to bear Your own costs in connection with this Agreement, including, but not limited to, establishing an appropriate electronic connection between computers located at SAS' facility and Your computer, if needed. You shall take reasonable precautions to secure any such connection and Your computer facilities including, but not limited to, networks, extranets and web sites, in order to protect them from unauthorized access and use.

3. Access and Security. You acknowledge that SAS permits access to the Service via unique User ID(s) and password(s) ("Access Credentials"). You acknowledge and agree that Access Credentials are SAS' confidential and proprietary information. SAS may require that You register for a profile on SAS' website in order to obtain Access Credentials. You will provide current, accurate and complete information as requested in connection with the profile registration process. You are solely responsible for maintaining the confidentiality of Your Access Credentials. You will take all steps necessary to protect the Service from unauthorized use, disclosure or third party access, including, but not limited to, not disclosing the URL supplied by SAS or Your Access Credentials to anyone else. You will notify SAS immediately of any unauthorized use of Your Access Credentials.

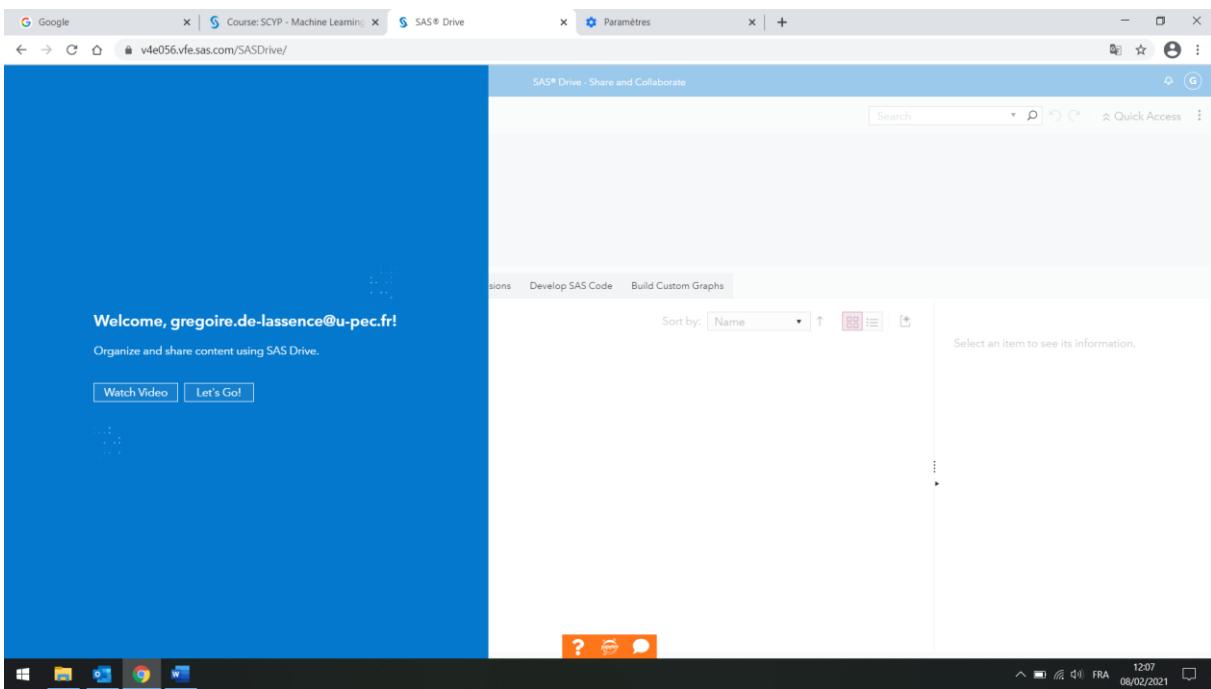
4. Your Materials. Any materials You provide, store, collect, transmit or receive for use with the Service and any materials You direct SAS to provide, store, collect, transmit or receive via the Service are defined herein as "Your Materials". You will transmit Your Materials to SAS using only methods that have been designated by SAS for that purpose.

[Accept](#) [Decline](#)

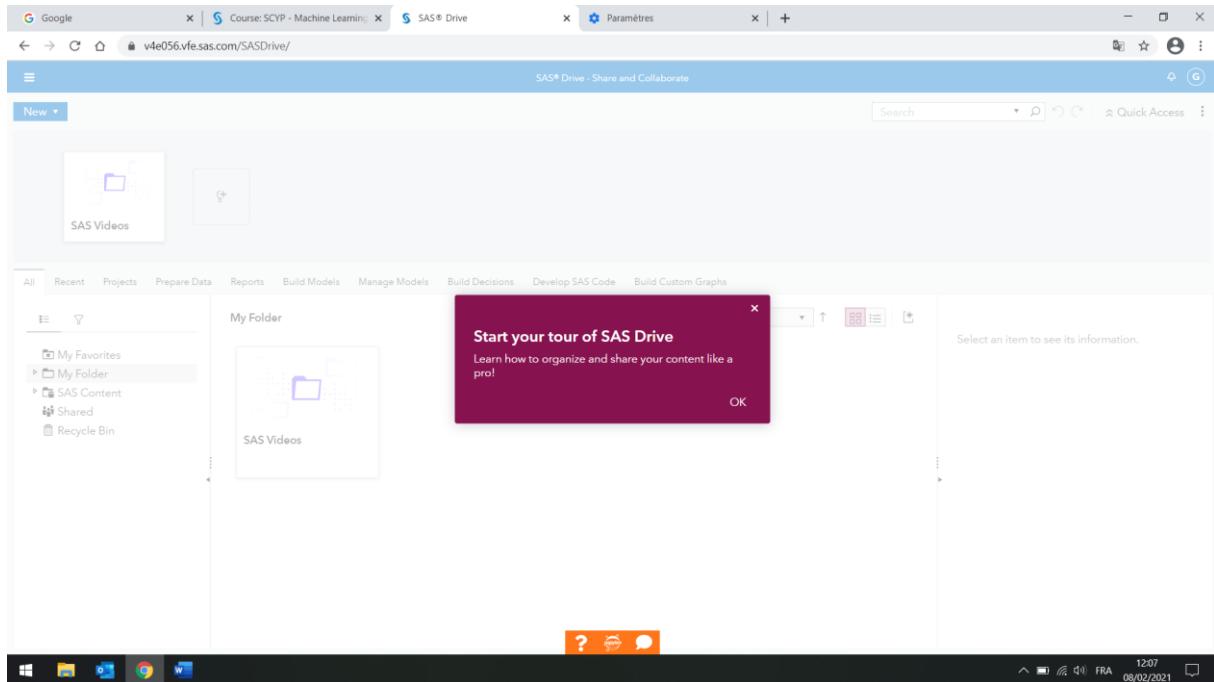
Accept



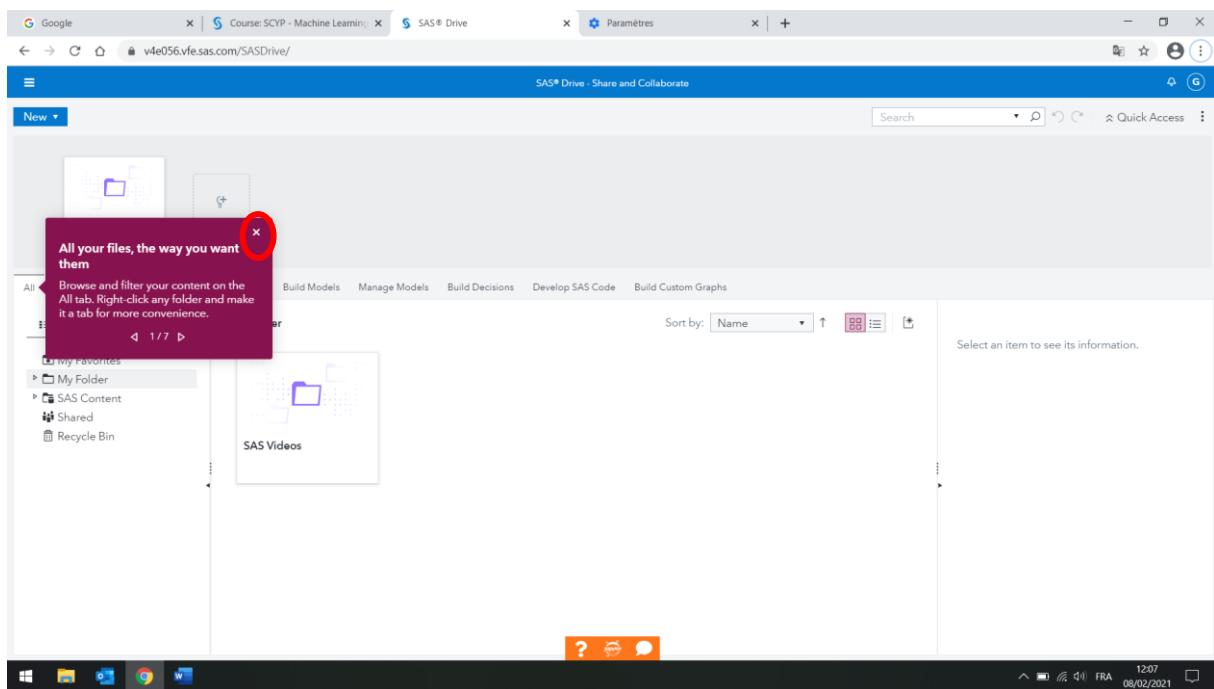
You can ignore the configuration: Skip setup



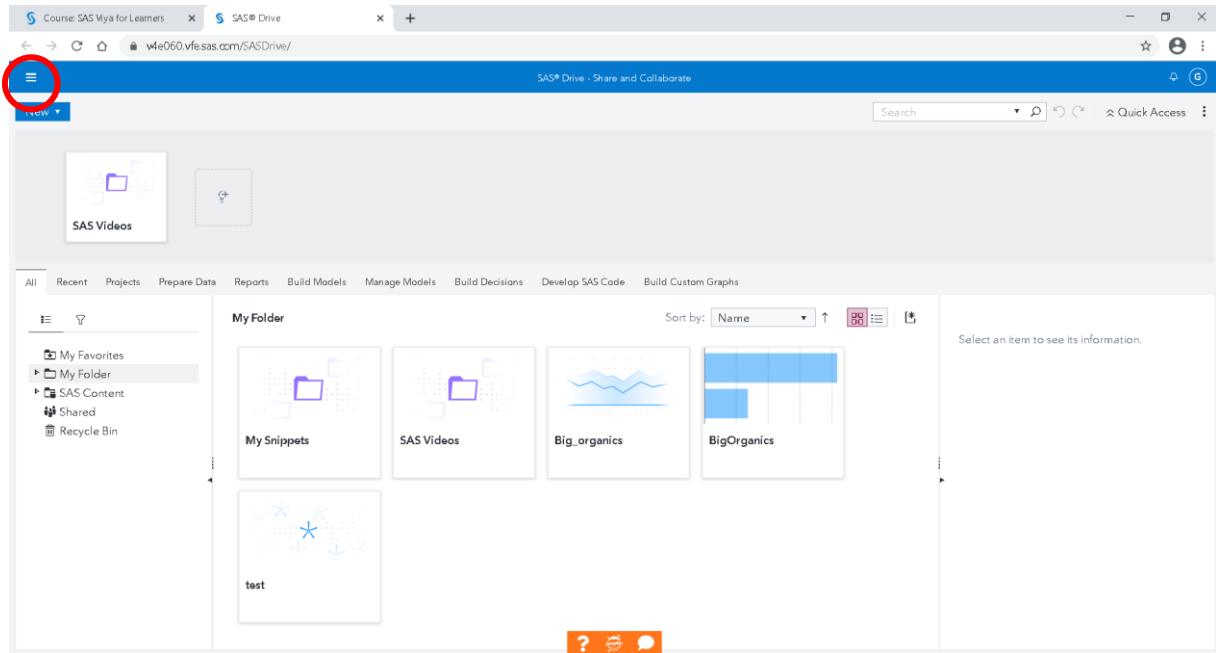
Let's go!



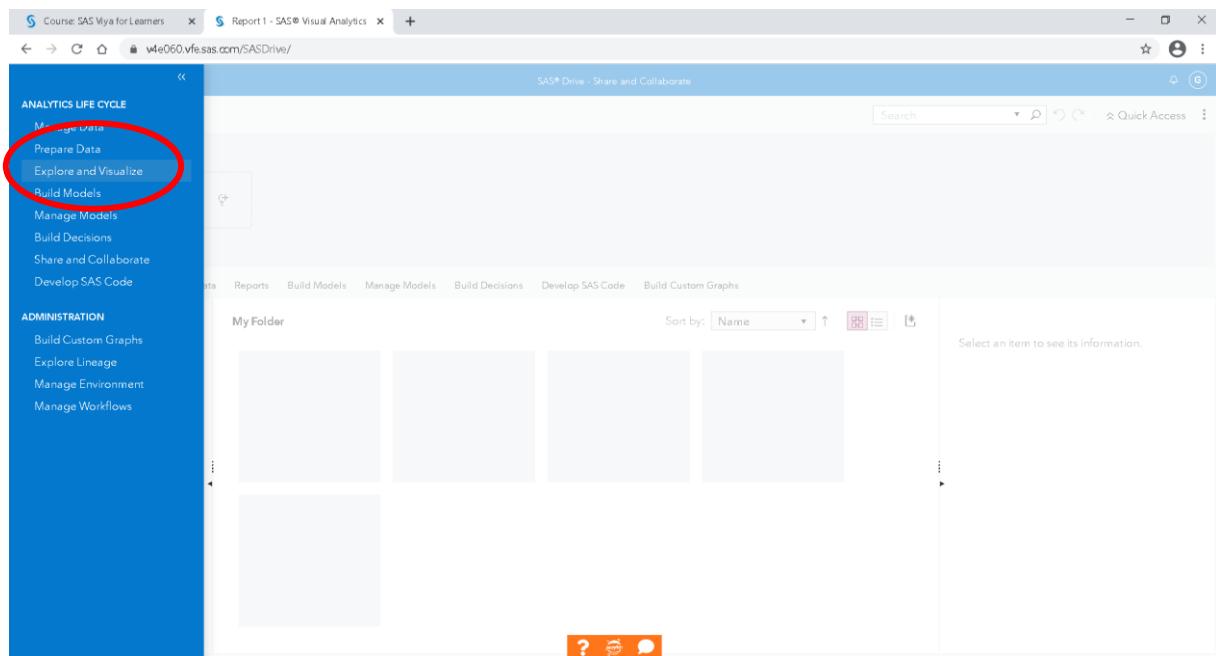
OK



Close



Once in the SAS Viya for Learners - Drive, on the three small lines at the top left, select "Explore and Visualize Data"



The screenshot shows the SAS Visual Analytics interface. At the top, there are two tabs: 'Course: SAS Mya for Learners' and 'Report 1 - SAS® Visual Analytics'. The main area is titled 'Explore and Visualize' with the subtitle 'Explore data, apply predictive analytics, and build interactive reports with SAS Visual Analytics.' Below this, there is a search bar and a sorting dropdown set to 'Last opened'. On the left, a sidebar lists 'Recent' items like 'My Favorites', 'My Folder', 'Shared with Me', and 'All Reports'. On the right, there are two visualizations: a map and a bar chart. A red circle highlights the 'New Report' button at the top center of the interface.

New report

The screenshot shows the SAS Visual Analytics interface in 'Editing' mode, specifically for 'Report 1'. The left sidebar has a red circle around the 'Data' icon. The main workspace is titled 'Report 1' and contains a placeholder message 'Drag data items or objects here.' Below this, there is a section titled 'Start from a Page Template' featuring several pre-made visualization templates. A red circle highlights the 'Data' icon in the left sidebar.

Data

The screenshot shows the 'Choose Data' dialog box in SAS Visual Analytics. The 'Data' tab is active, displaying a list of available objects. One object, 'INSIGHT_TOY_DEMO', is highlighted and circled in red. The table details pane on the right shows the following information:

#	Name	Label	Type	R...	Fo...	Fo...	T...
1	TransactionDate	Trans...	d...	8	8	M...	◇
2	TransactionYear	Trans...	d...	8	4	Y...	◇
3	TransactionMonth	Trans...	d...	8	5	M...	◇
4	TransactionWeekday	Trans...	d...	8	3	D...	◇
5	SalesRepID	Sale...	d...	8	12	B...	◇
6	Order	Order	c...	21	21		◇
7	Customer	Customer	c...	26	26		◇
8	CustomerLat	xyCu...	d...	8	12		◇
9	CustomerLon	xyCu...	d...	8	12		◇

Date profiled: (none)

Columns: 57 Rows: 1.6 M

Size: --

Label: (not available)

Location: cas-v4e060-default/TUNDATA

Date created: Dec 8, 2020 08:07 PM Date modified: Dec 8, 2020 08:07 PM

OK Cancel

Select the table Insight_Toy_Demo.

OK

The screenshot shows the SAS Visual Analytics reporting interface. The left sidebar has the 'Data' section selected, with 'INSIGHT_TOY_DEMO' highlighted and circled in red. The main workspace displays a dashboard with several data visualizations:

- A pie chart at the top left.
- A large central area with the text "Drag data items or objects here."
- A section titled "Start from a Page Template" featuring four preview cards:
 - "Measure by Time Axis" (line chart)
 - "Circular Gauge" (donut chart)
 - "Regional Revenue" (bar chart)
 - "Sales by Product Category" (bar chart)

This is the reporting interface.

On the left are data, objects and report content management.

On the right are the parameters of the selected item.

If you don't drop an object, but just a data item, the default most suitable graph will be created.

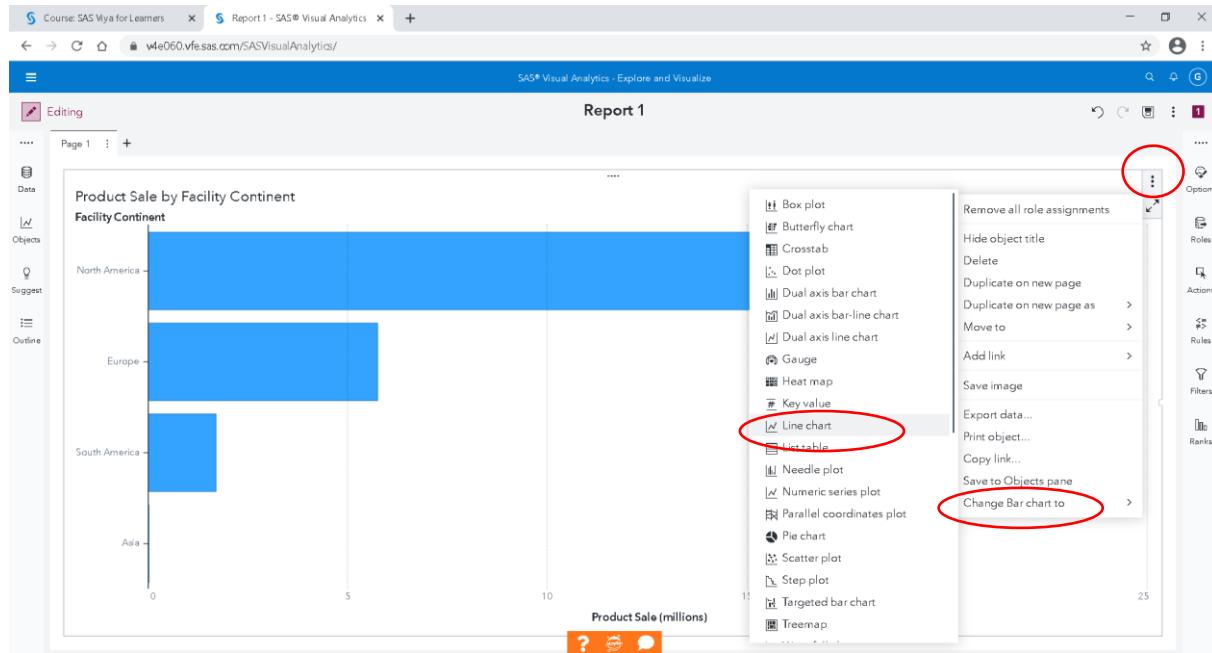
The screenshot shows the SAS Visual Analytics interface with the 'Report 1' tab selected. In the 'Data' panel, 'INSIGHT_TOY_DEMO' is chosen as the data source. The 'Category' section of the outline is expanded, showing items like 'Customer - 39K', 'Facility - 99', and 'Facility Continent - 4'. A red arrow points to the 'Facility Continent' item. To the right, a preview area displays a bar chart with the title 'Frequency of Facility Continent', where 'Facility Continent' is listed under 'Category'.

Double-click on Facility Continent

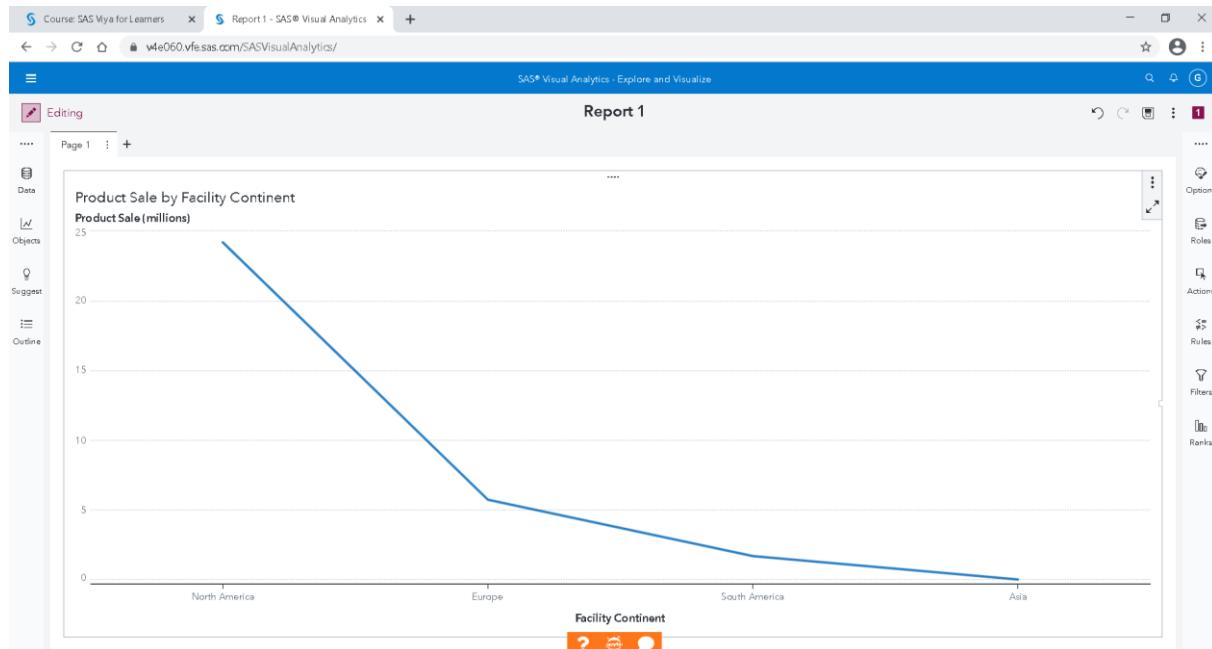
If there is no measurement selected, by default, the frequency will be used. In our case, it is the number of transactions per continent.

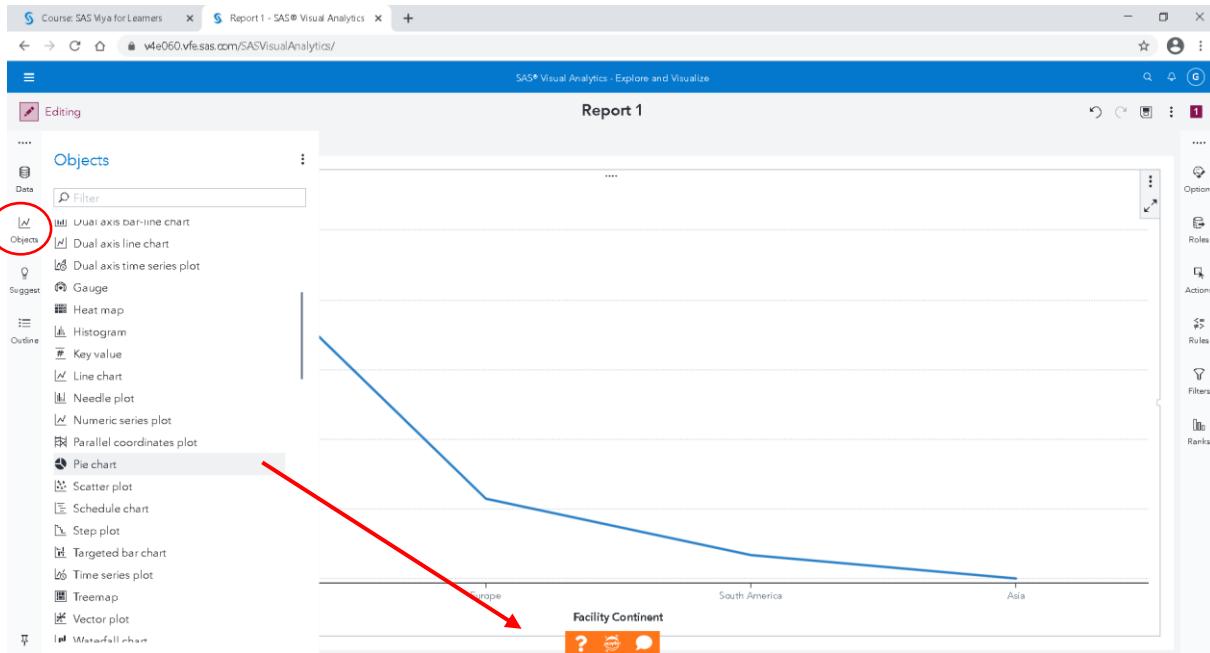
The screenshot shows the SAS Visual Analytics interface with a bar chart titled 'Frequency of Facility Continent' on the left. The chart has 'Facility Continent' as the category and 'Frequency (millions)' as the measure. On the right, a 'Replace Data Item' dialog box is open, showing a list of measures including 'Frequency', 'Product Sale', and 'Sales Rep Customer Base'. A red circle highlights the 'Frequency' option in the 'Measure' section of the dialog. The 'Replace Data Item' dialog also includes sections for 'Category', 'Group', and 'Lattice columns'.

You can replace the frequency by "Product Sale"

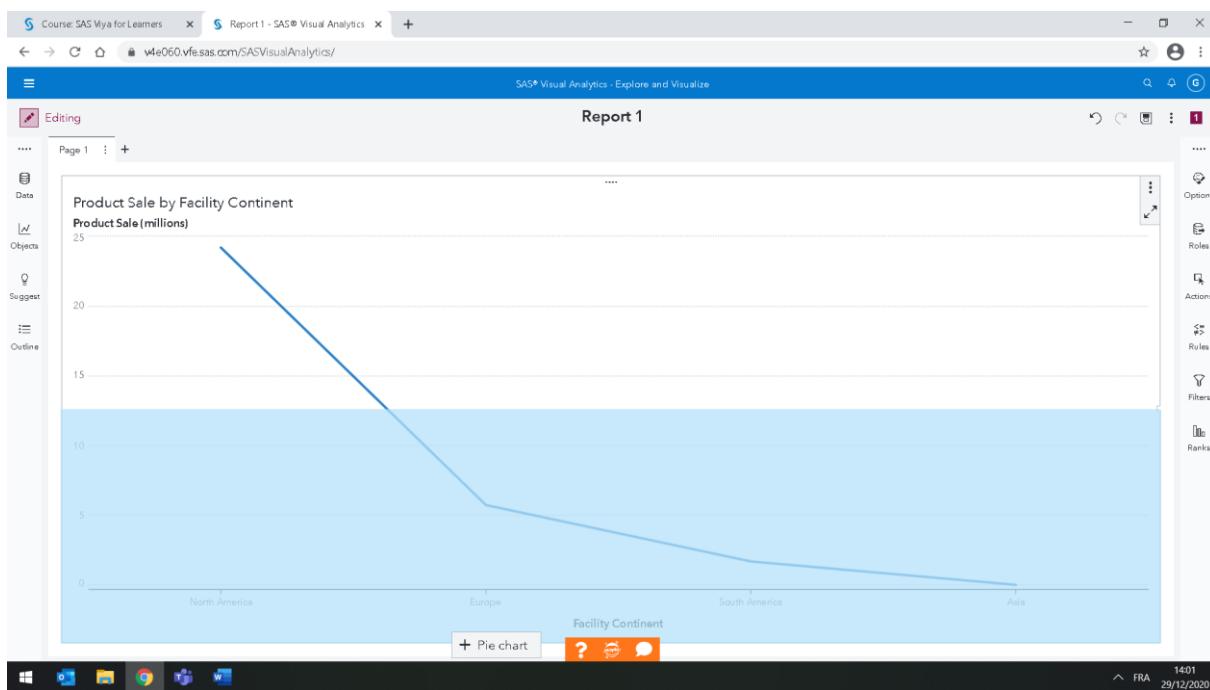


By clicking on the three small dots at the top right of the graph, you can change the representation and select the line chart





If you want a Pie Chart below the curve, just click the object button, then select this Object and drag and drop it.



SAS Visual Analytics - Explore and Visualize

Report 1

Product Sale by Facility Continent

Facility Continent

Measure by Category

Category

Assign Data

Category 1 Category 2 Category 3

Add Data Item

Customer - 39K
Facility - 99
Facility City - 99
Facility Continent - 4
Facility Country - 18
Facility Opening Date - 14
Facility Region - 68
Order - 180K
Product - 1.6M
Product Brand - 2
Product Line - 8
Product Make - 71
Product Style - 335
Sales Rep - 874
Transaction Date - 2K
Transaction Month - 93
Transaction Weekday - 5
Transaction Year - 8
Unit - 154
Unit Status - 1

Cancel

SAS Visual Analytics - Explore and Visualize

Report 1

Product Sale by Facility Continent

Facility Continent

Frequency of Facility Continent

Frequency

1.6M

Facility Continent

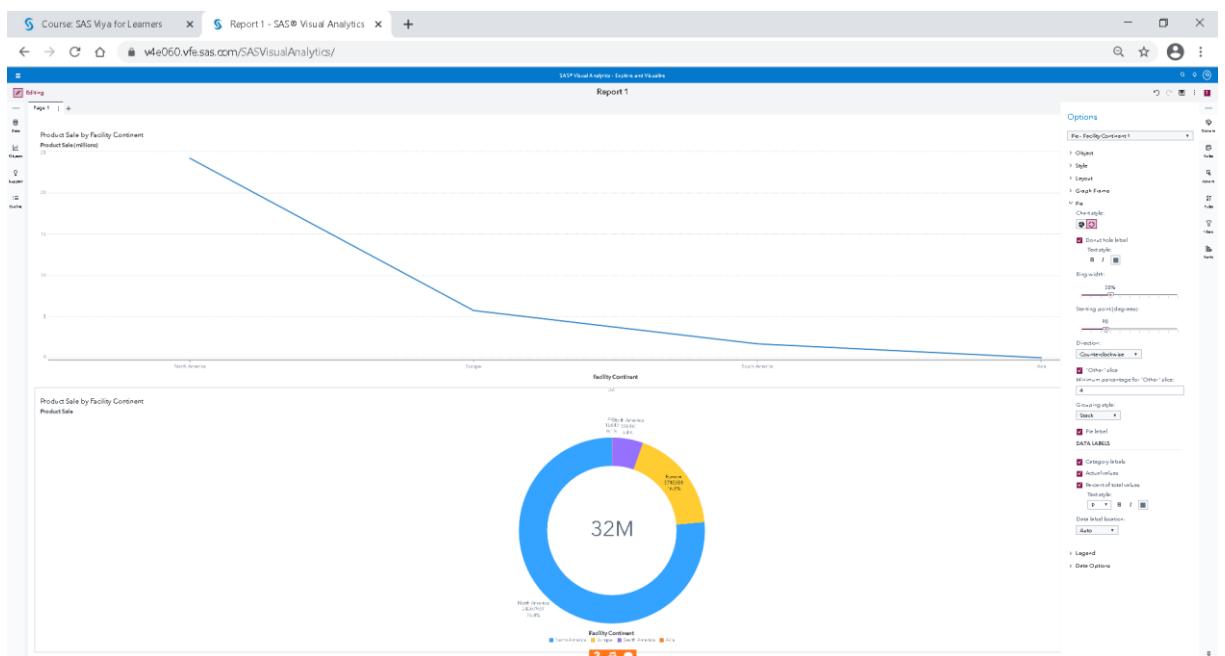
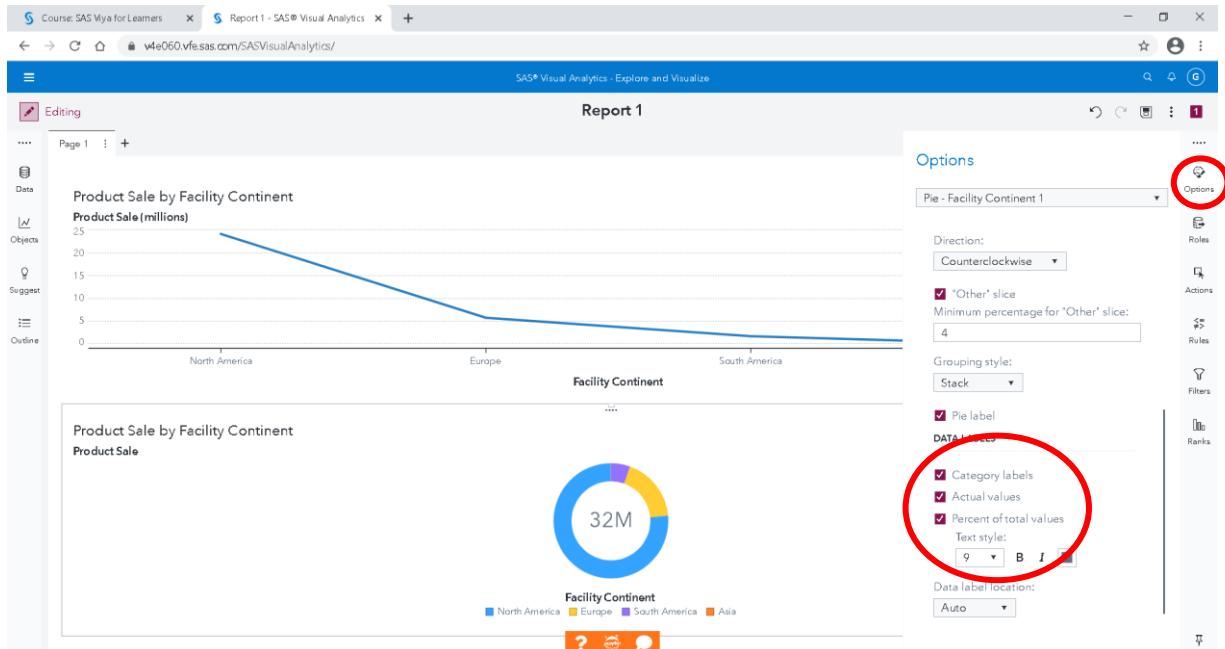
North America Europe Other

Replace Data Item

Customer Distance
Customer Satisfaction
Facility Age
Facility Efficiency
Facility Employees
Frequency Percent
Product Cost of Sale
Product Material Cost
Product Price (target)
Product Quality
Product Sale
Sales Rep Customer Base
Sales Rep Customers
Sales Rep ID
Sales Rep Rating
Unit Actual
Unit Age
Unit Capacity
Unit Discard Rate
Unit Discards

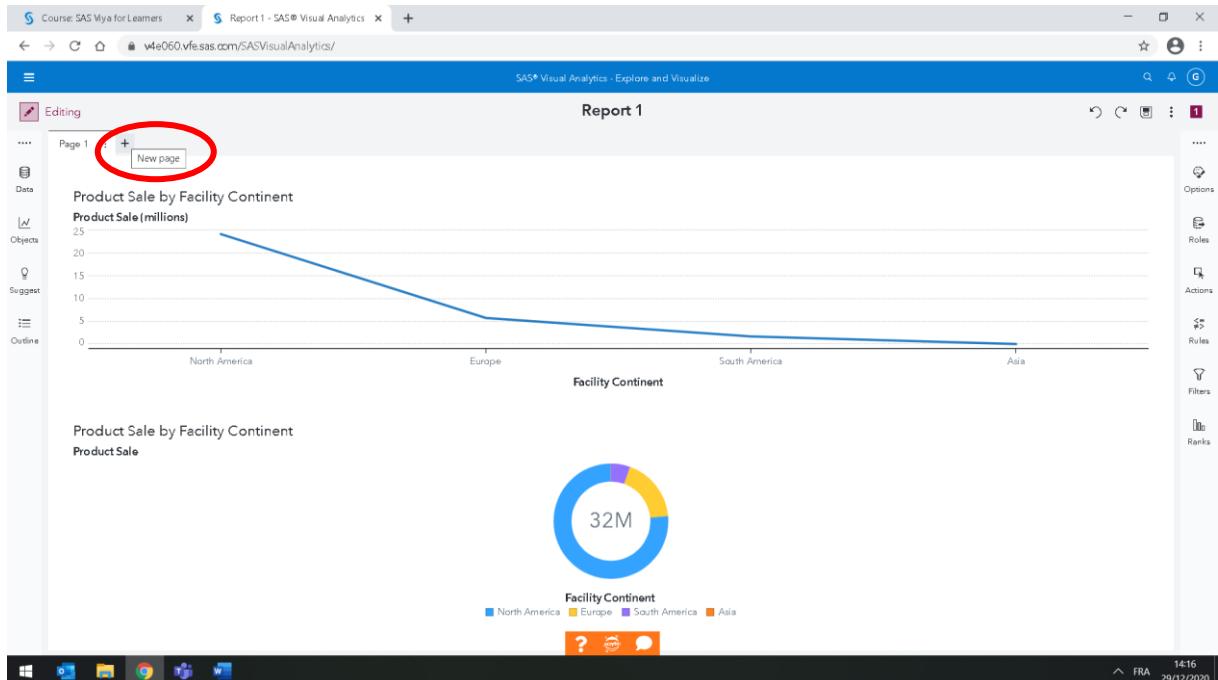
Cancel

On the right, on the role of data, the "continent" is selected as a category and the frequency is replaced by "Product Sale" as a measure.



If the resolution is not sufficient, it may be necessary to uncheck the label or enlarge the size of the window.

To add a page to your report, click on **+** next to page 1.



Creating hierarchy and Crosstab

The screenshot shows the SAS Visual Analytics interface. On the left, the 'Data' menu is open, displaying a list of objects from the 'INSIGHT_TOY_DEMO' dataset. A red circle highlights the '+ New data item' option under the 'Category' section. The main workspace shows a drag-and-drop area with placeholder icons like a pie chart and a bar chart, and a 'Start from a Page Template' section with four preview cards.

Go to data menu → select a new data item → hierarchy

The screenshot shows the 'NewHierarchy' dialog box. In the 'Name:' field, the text 'HP' is entered. The 'Available items (20):' list contains various objects from the dataset, including Customer, Facility, Product, and Sales Rep. The 'Selected items (0):' list is currently empty. At the bottom right of the dialog are 'OK' and 'Cancel' buttons.

You can name it: « HP »

Name: HP

Available items (15):

- Customer - 39K
- Facility - 99
- Facility City - 99
- Facility Continent - 4
- Facility Country - 18
- Facility Opening Date - 14
- Facility Region - 68
- Order - 180K
- Product - 1.6M
- Product Brand - 2
- Product Line - 8
- Product Make - 71
- Product Style - 335
- Product - 1.6M
- Sales Rep - 874
- Transaction Date - 2K
- Transaction Month - 93
- Transaction Weekday - 5
- Transaction Year - 8
- Unit - 154

Selected items (5):

- Product Brand - 2
- Product Line - 8
- Product Make - 71
- Product Style - 335
- Product - 1.6M

OK Cancel

Select in order:

Product Brand

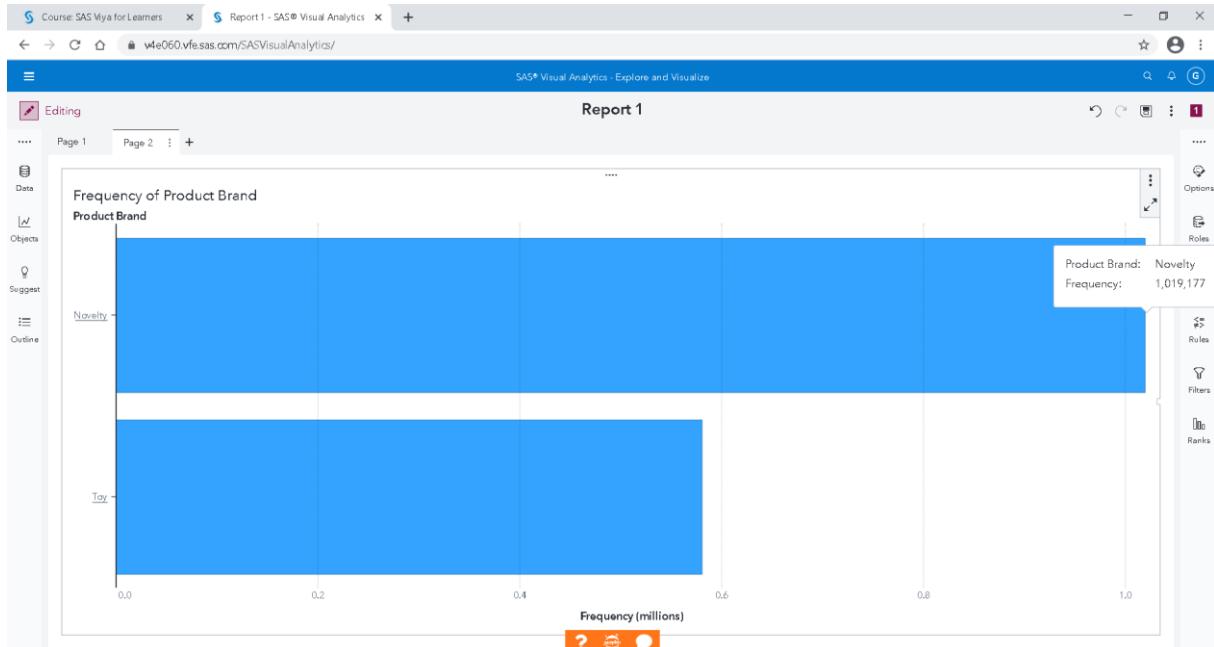
Product Line

Product Make

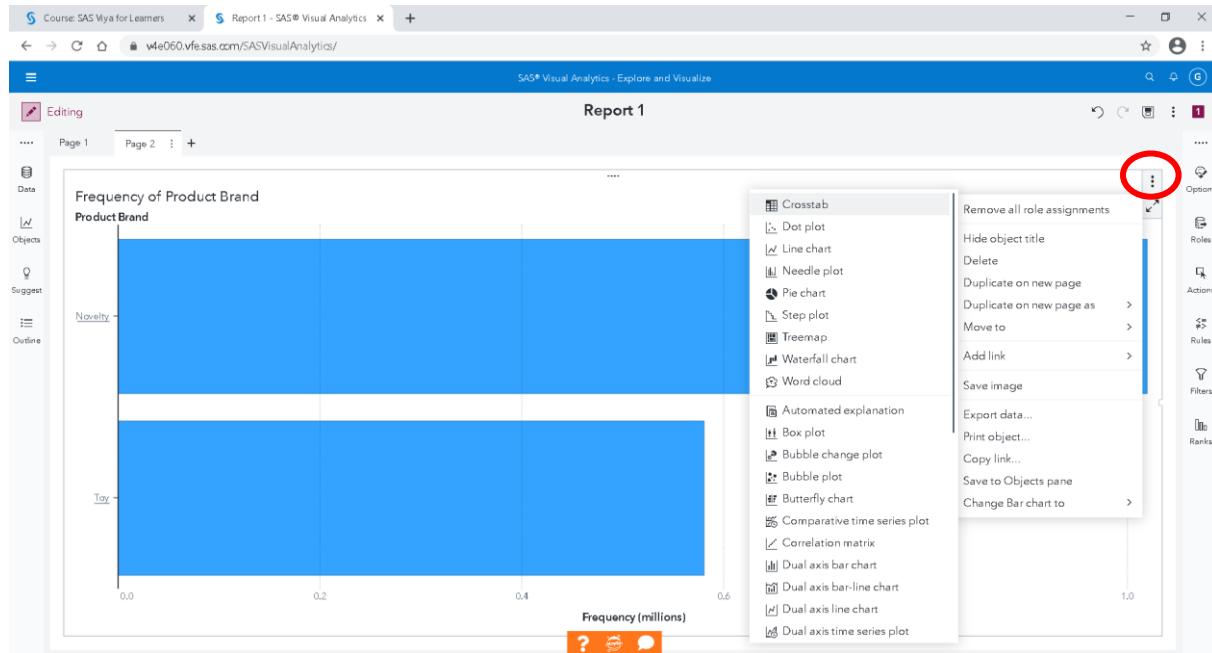
Product Style

Product

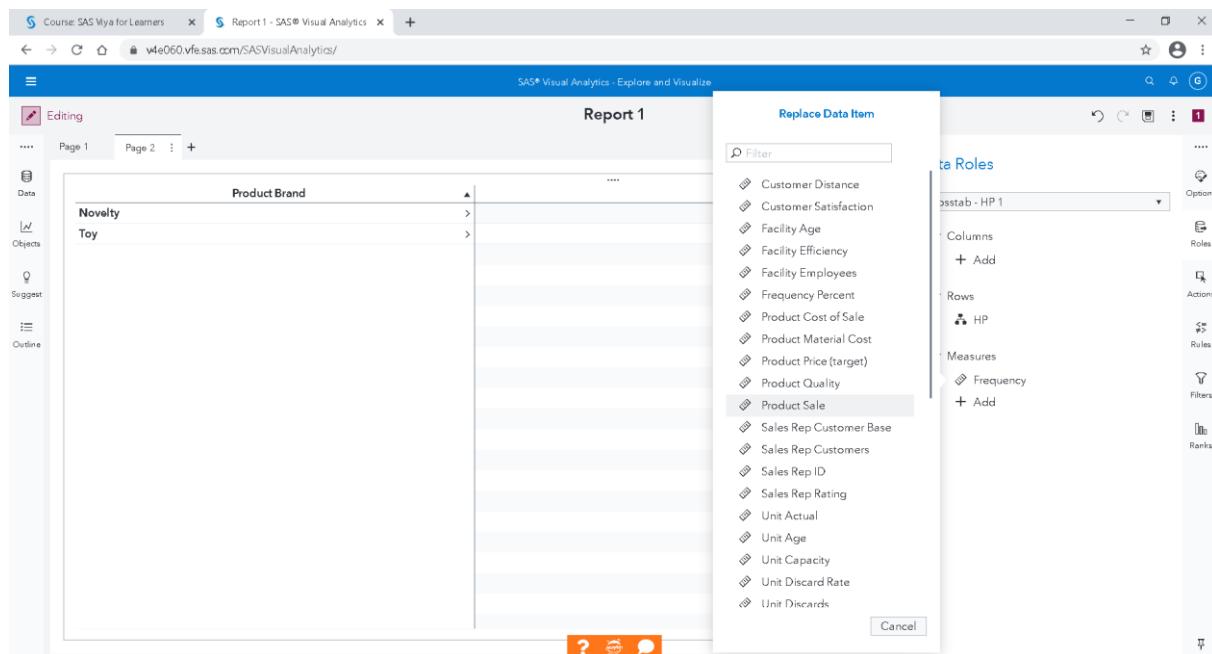
OK



By adding the product hierarchy, the default graph is a bar chart.



This representation can be replaced by a crosstab.



We can add "Product Sale" to replace the Frequency.

If you click on the name of the hierarchy level, you select it.

If you click on the arrow after the name, you expand it.

S Course: SAS Mya for Learners Report 1 - SAS® Visual Analytics

SAS® Visual Analytics - Explore and Visualize

Report 1

Editing

Page 1 Page 2 +

Data Objects Suggest Outline

Product Brand	Product Line	Product Make	Product Sale
Novelty		>	12421675
	Figurine	>	6389029
	Game	>	6384145
		Bear (l)	536276
		Bear (m)	279426
		Bear (s)	111377
		Big Cats (l)	569150
		Big Cats (m)	272389
		Big Cats (s)	109844
		Cat (l)	546590
		Cat (m)	270568
		Cat (s)	115243
< Toy		Dog (l)	526318
		Dog (m)	270132
		Dog (s)	108451
		Elephant (l)	535871
		Elephant (m)	275354
		Elephant (s)	111307
		Horse (l)	550081
		Horse (m)	270375
		Horse (s)	106427

?

Add a third page to your report.

Create a geographical hierarchy

To represent the data on a world map, we will here create a geographical hierarchy « Continent → Country → Region → City → Facility » using coordinates World Geodetic System (WGS84) coordinates.

In data:

The screenshot shows the SAS Visual Analytics Data Editor interface. On the left, the 'Data' pane displays a tree view of data items under 'INSIGHT_TOY_DEMO'. A red circle highlights the 'Facility Continent - 4' node. The main workspace is titled 'Report 1' and contains a placeholder area for dragging data items and a section titled 'Start from a Page Template' with four preview cards: 'Measure by Time Axis', 'Regional Revenue', 'Sales of Product Lines by Region Type', and 'Facility Region'.

Click on the double arrow to modify the properties of "Facility Continent"

Instead of category, select Geography

The screenshot shows the 'Edit Geography Item' dialog box overlaid on the Data Editor. The 'Name:' field is set to 'Facility Continent'. Under 'Based on:', the 'Facility Continent' item is selected. In the 'Geography data:' dropdown, 'Latitude and longitude in data' is selected, which is also highlighted with a red circle. Other fields include 'Latitude (y):' set to 'xyFacility Continent Lat' and 'Longitude (x):' set to 'xyFacility Continent Lon'. The 'Coordinate Space:' dropdown is set to 'World Geodetic System (WGS84)'. The background shows the same SAS Visual Analytics interface as the previous screenshot.

Select Latitude and longitude in data

Select "xyFacility Continent Lat" for Latitude
And select "xyFacility Continent Lon" for Longitude

OK

Repeat the same steps to Country, Region, City and Facility

The screenshot shows the SAS Visual Analytics interface. On the left, the 'Data' pane is open, displaying 'INSIGHT_TOY_DEMO' as the selected data source. Below it, under 'Geography', are listed 'Facility - 99', 'Facility City - 99', 'Facility Continent - 4', 'Facility Country - 18', and 'Facility Region - 68'. The main workspace contains several charts: a treemap, a bar chart, a line chart, and a map. A sidebar on the right provides navigation and management options like 'Actions', 'Rules', 'Filters', and 'Ranks'.

We get five geographical elements.

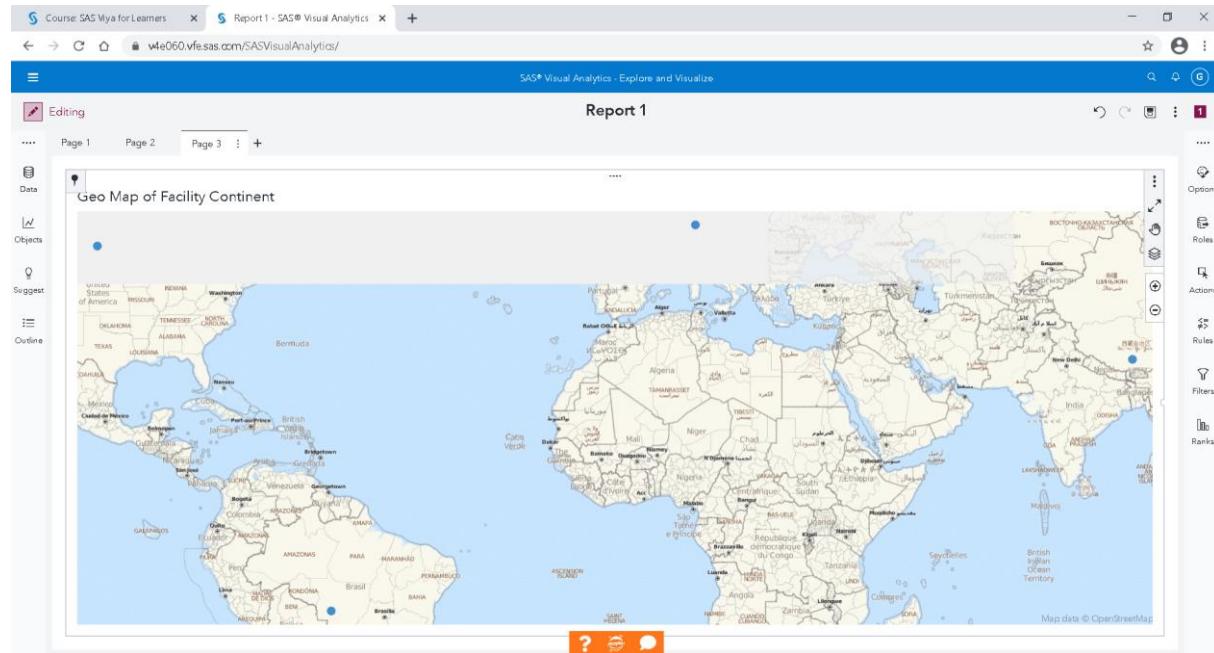
A hierarchy can then be created: New data item → to add a new hierarchy.

This screenshot shows the 'New Hierarchy' dialog box. In the 'Name:' field, 'H Facility' is entered. The 'Available items (15):' list includes 'Customer - 39K', 'Facility Opening Date - 14', 'Order - 180K', 'Product - 1.6M', 'Product Brand - 2', 'Product Line - 8', 'Product Make - 71', 'Product Style - 335', 'Sales Rep - 874', 'Transaction Date - 2K', 'Transaction Month - 93', 'Transaction Weekday - 5', 'Transaction Year - 8', and 'Unit - 154'. The 'Selected items (5):' list contains 'Facility Continent - 4', 'Facility Country - 18', 'Facility Region - 68', 'Facility City - 99', and 'Facility - 99'. At the bottom are 'OK' and 'Cancel' buttons.

Select items in the right order: Continent, Country, Region, City and Facility.

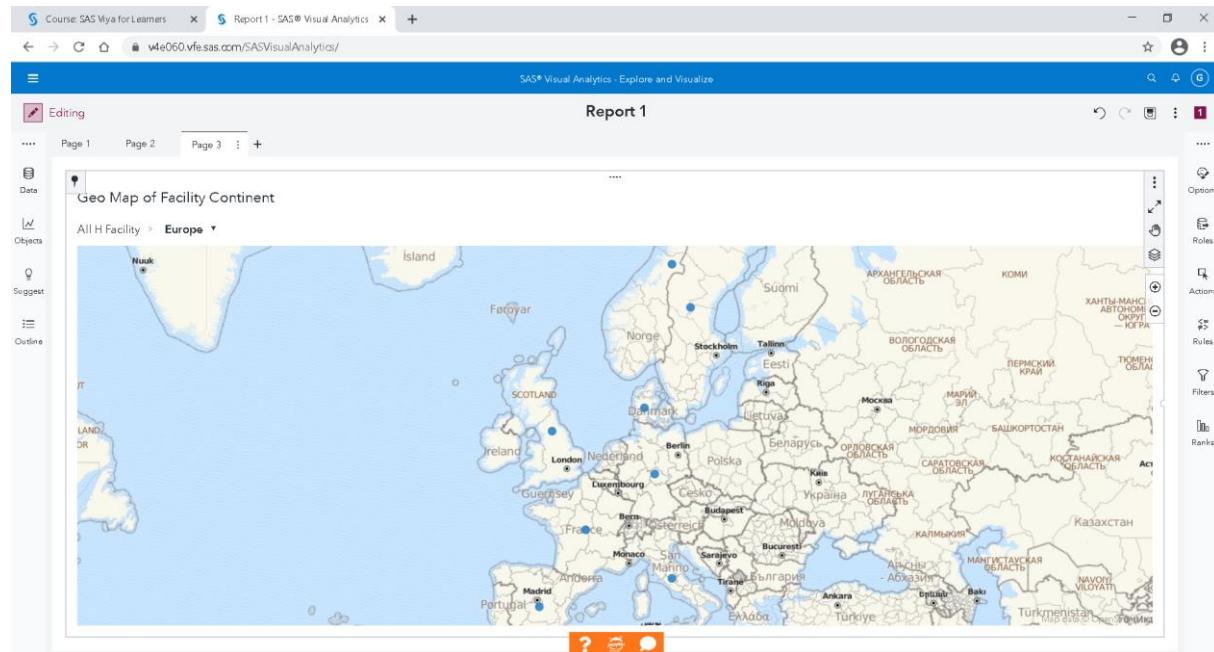
Rename this hierarchy Geo.

OK

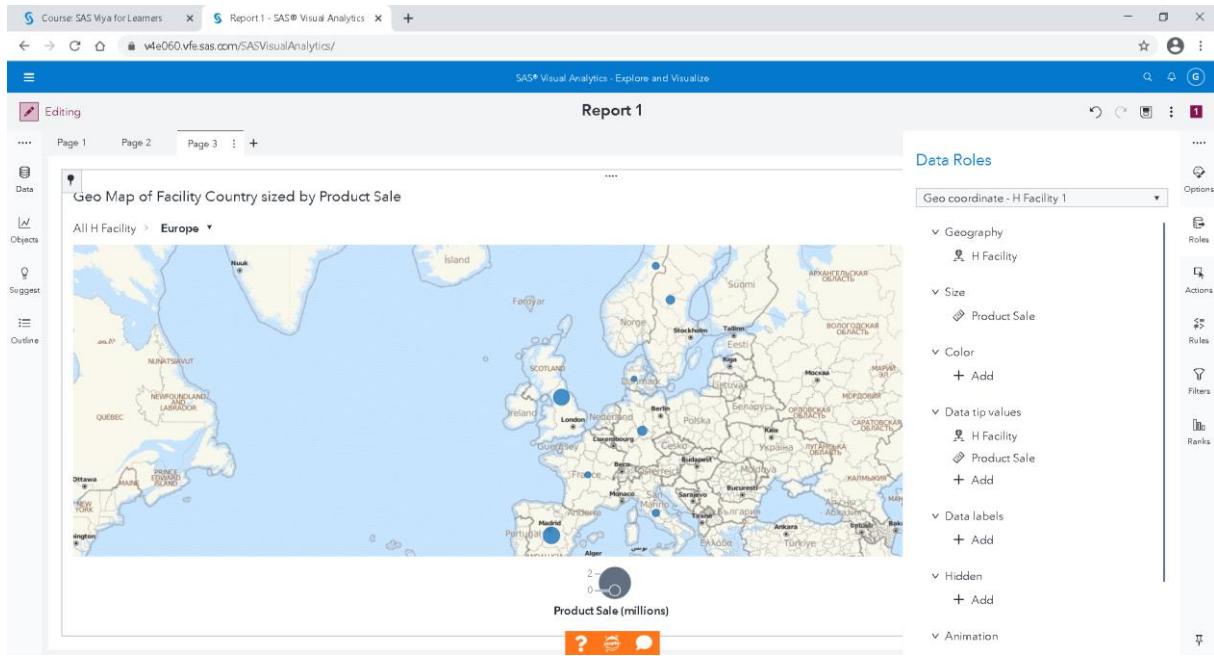


Add this hierarchy to the third page of your Report.

By double-clicking on the point of Europe, we get:

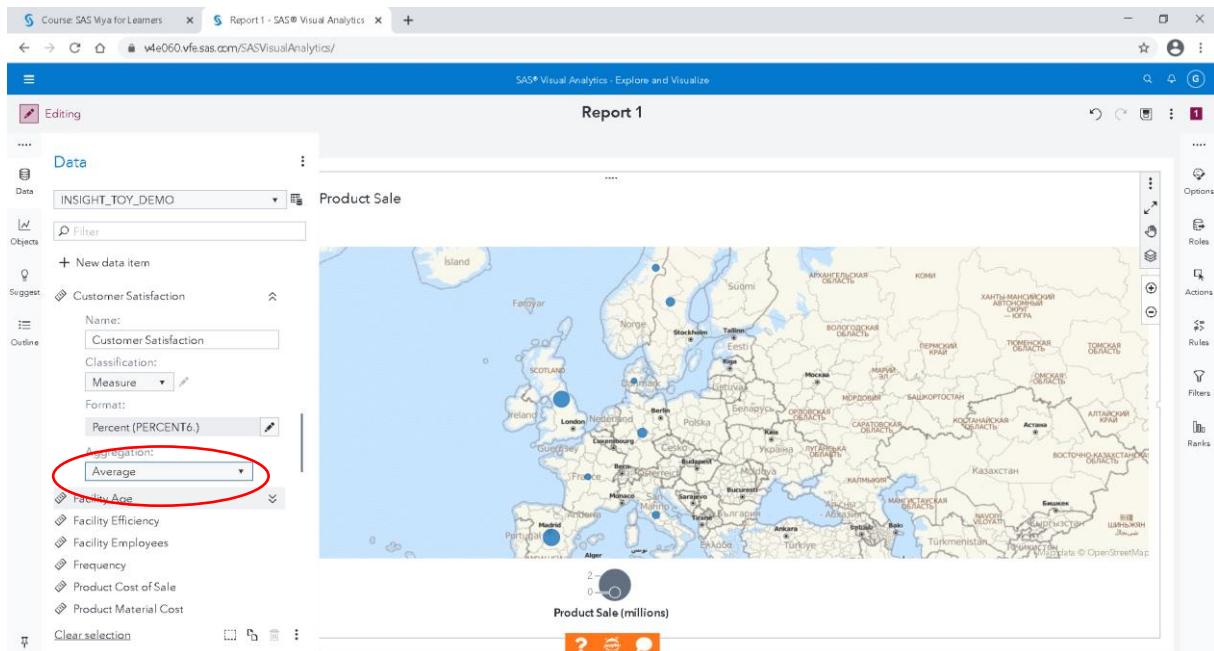


Sizes of dots are frequency. If you want the turnover, you must change it by " Product sale"
At the top left of the graph, you can go up in hierarchy.

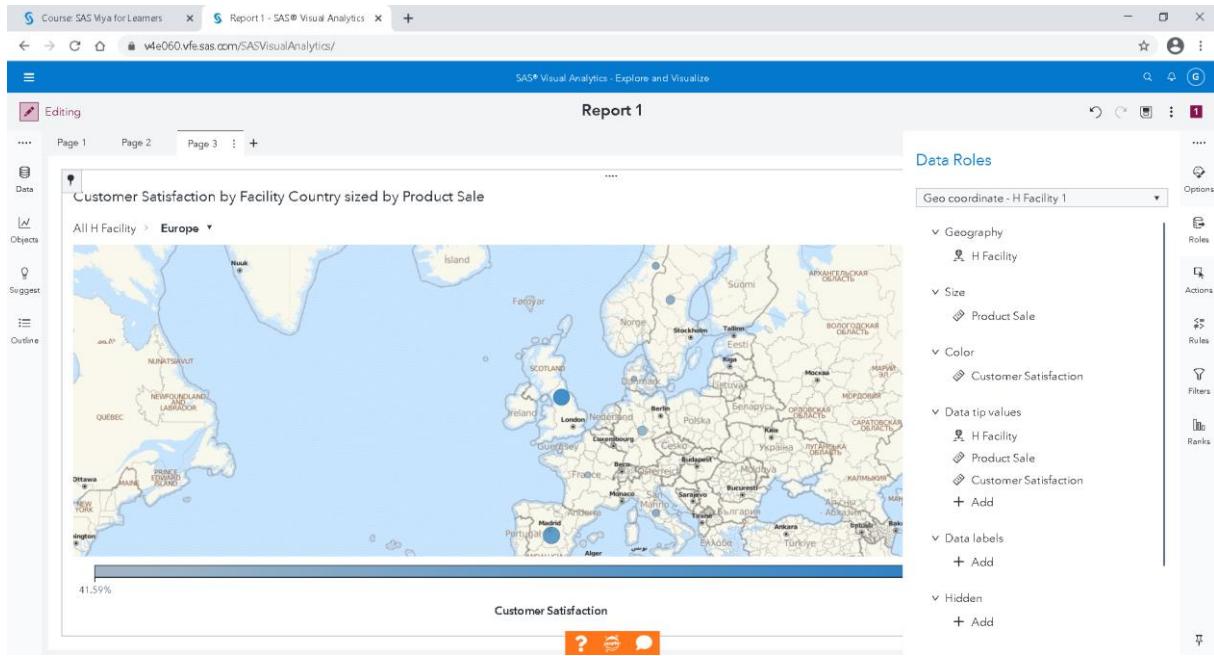


If you also add customer satisfaction, you get the following graph with the color depending on customer satisfaction.

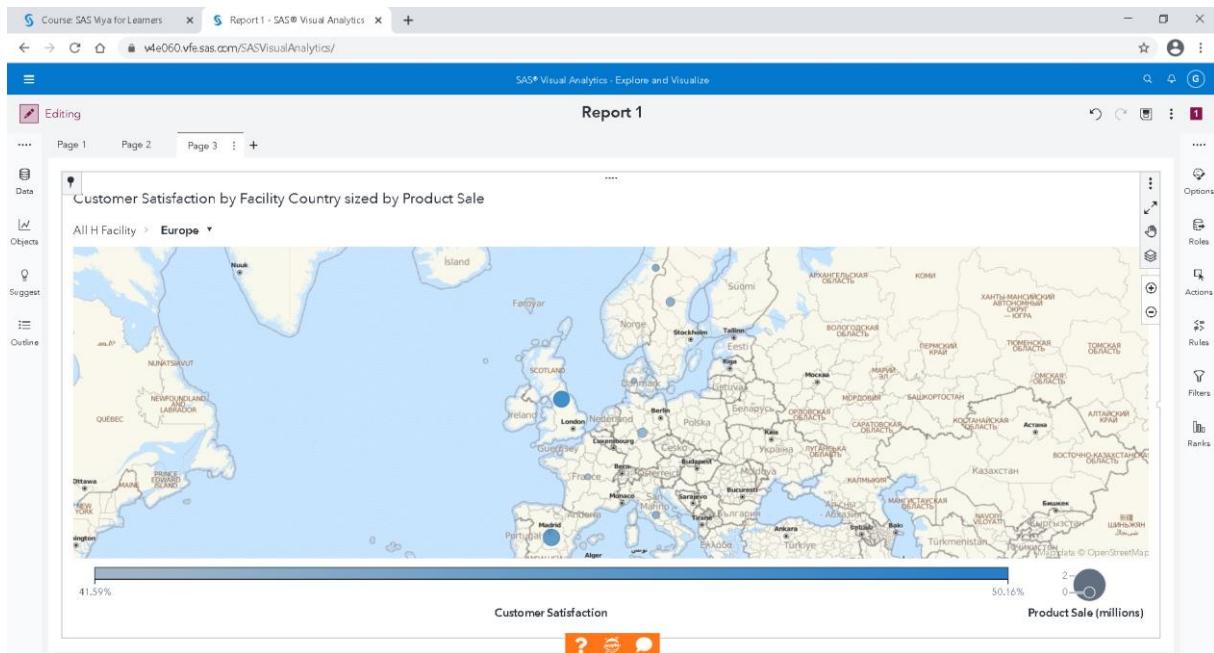
Customer satisfaction is a percentage. The sum of a percentage does not make sense but the average yes.



For customer satisfaction, select aggregation by average.



Add customer satisfaction as color points on your card.



Add a fourth page to your report.

Create dashboards

The screenshot shows the SAS Visual Analytics interface in editing mode. On the left, there's a sidebar with 'Editing' selected, followed by tabs for Page 1, Page 2, Page 3, and Page 4, with Page 4 currently active. The main area is titled 'Report 1' and contains a placeholder message 'Drag data items or objects here.' Below this, there's a section titled 'Start from a Page Template' featuring five preview cards: '2018 Company Revenue' (a bar chart), 'Measure by Time Axis' (a line chart), 'Measure by Category' (a bar chart), 'Heat map' (a treemap), and 'Regional Revenue' (a bar chart). The right side of the interface includes various toolbars for Data, Objects, Suggest, Outline, Options, Roles, Actions, Rules, Filters, and Ranks.

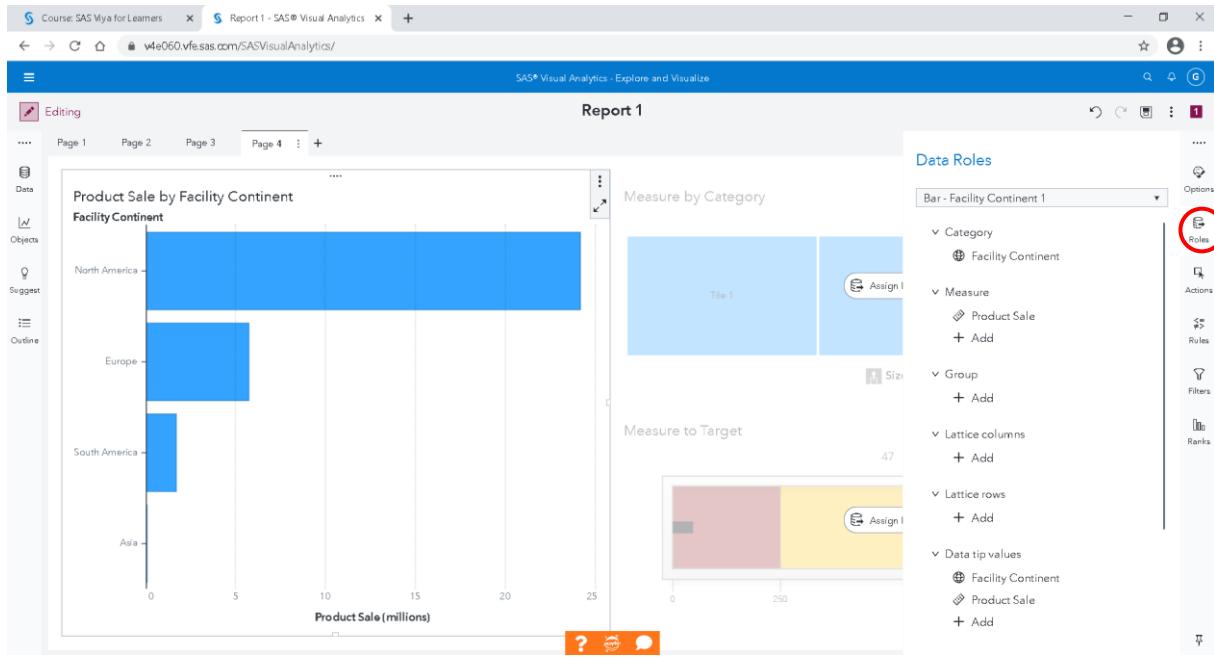
In your 4th page, from objects, select and drop then

The Bar Chart in the middle,

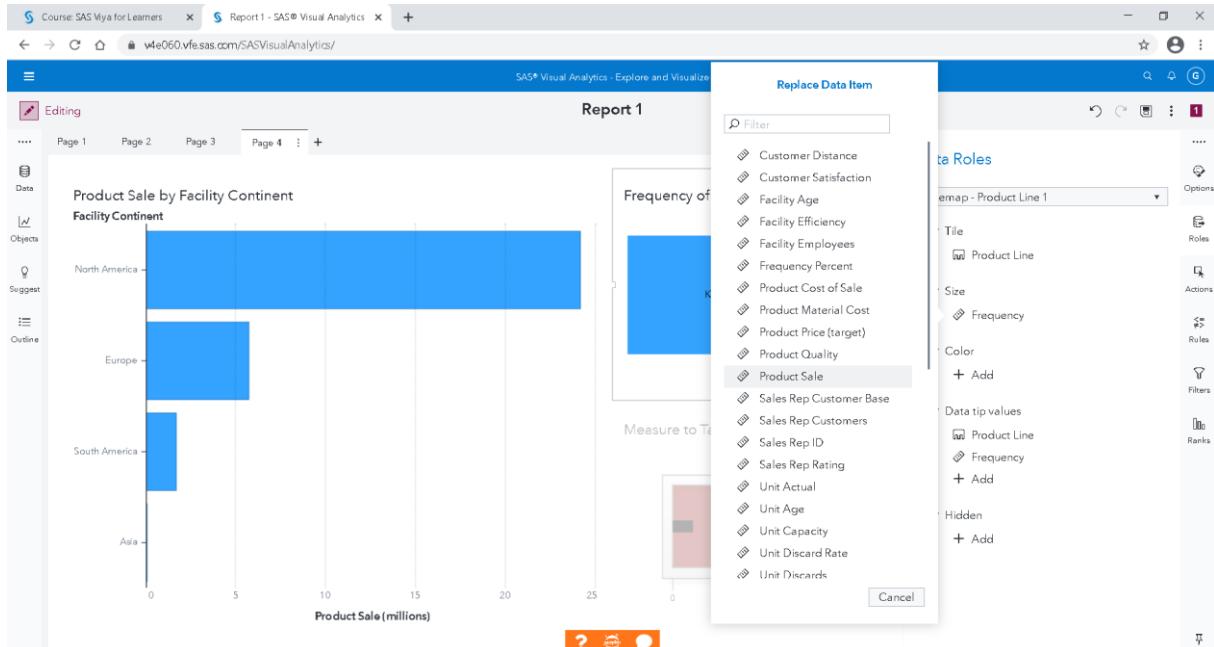
The Tree Map on the right,

And the Gauge at the bottom right.

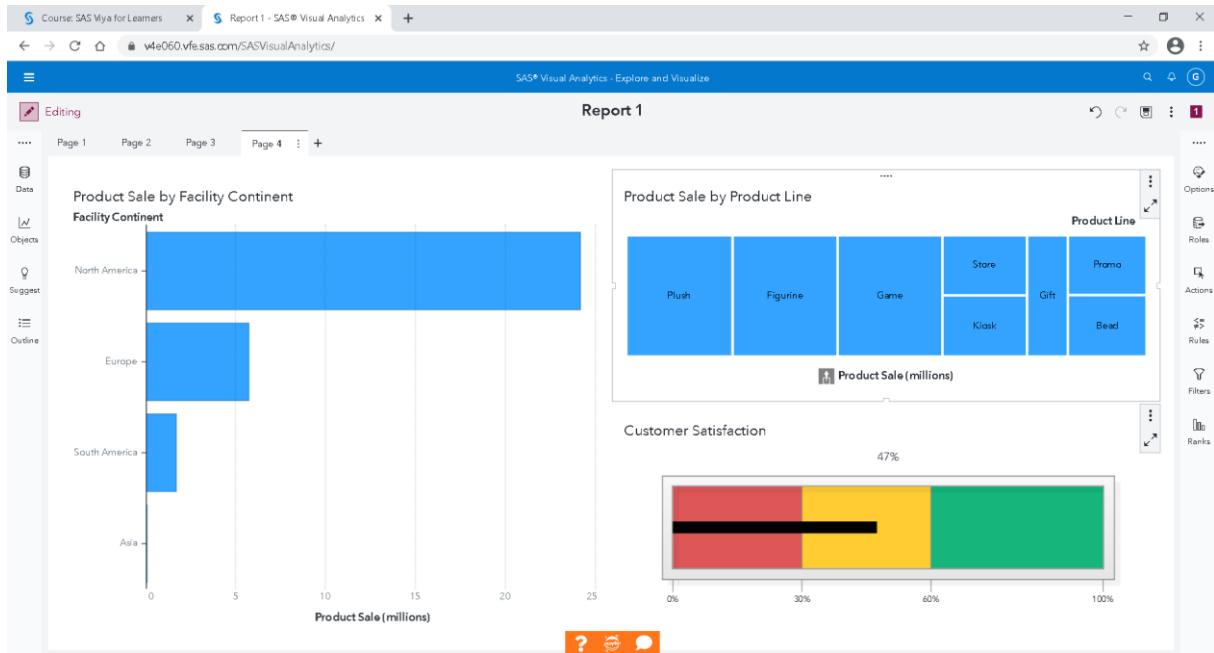
This screenshot shows the SAS Visual Analytics interface after selecting objects from the sidebar. A red arrow points from the 'Objects' sidebar (which has 'Histogram' selected) towards the 'Measure by Category' bar chart on the dashboard. Another red arrow points from the 'Treemap' object in the sidebar towards the 'Heat map' treemap on the dashboard. The dashboard itself is titled 'Report 1' and contains three main visualizations: a bar chart labeled 'Measure by Category', a treemap labeled 'Heat map', and a bar chart labeled 'Measure to Target'. The sidebar on the left remains the same as in the previous screenshot, showing various chart types like Dual axis bar-line chart, Dual axis line chart, etc.



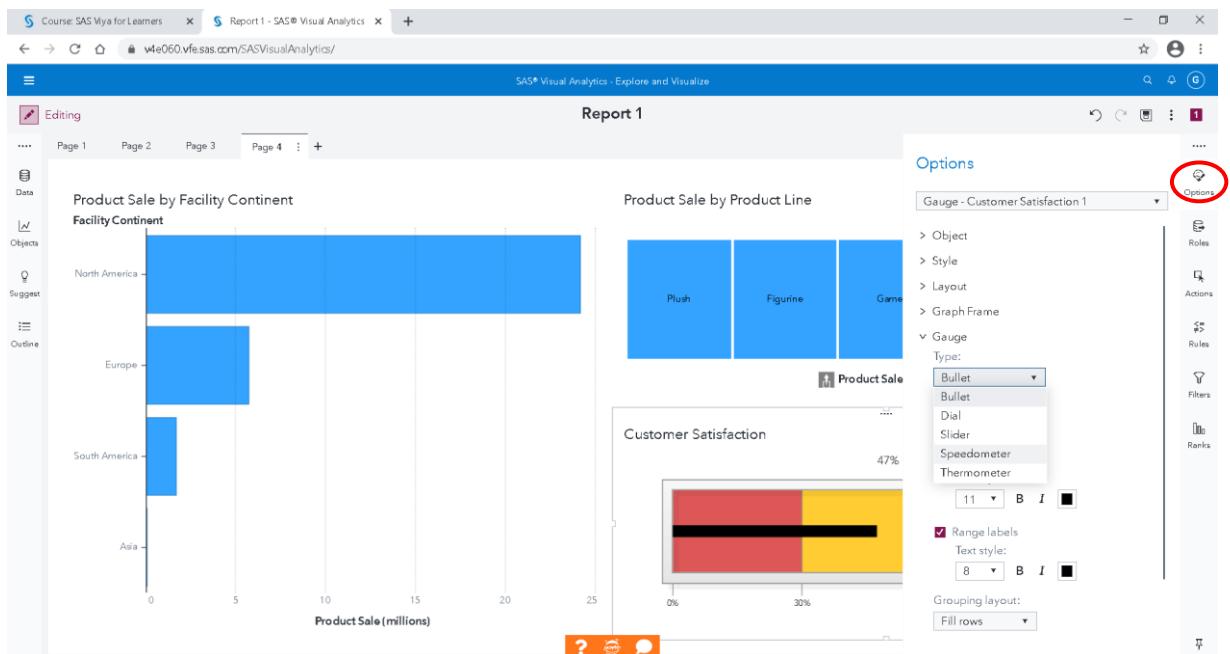
When the Bar Chart is selected, select Facility Continent as a Category and replace the Frequency by Product sale



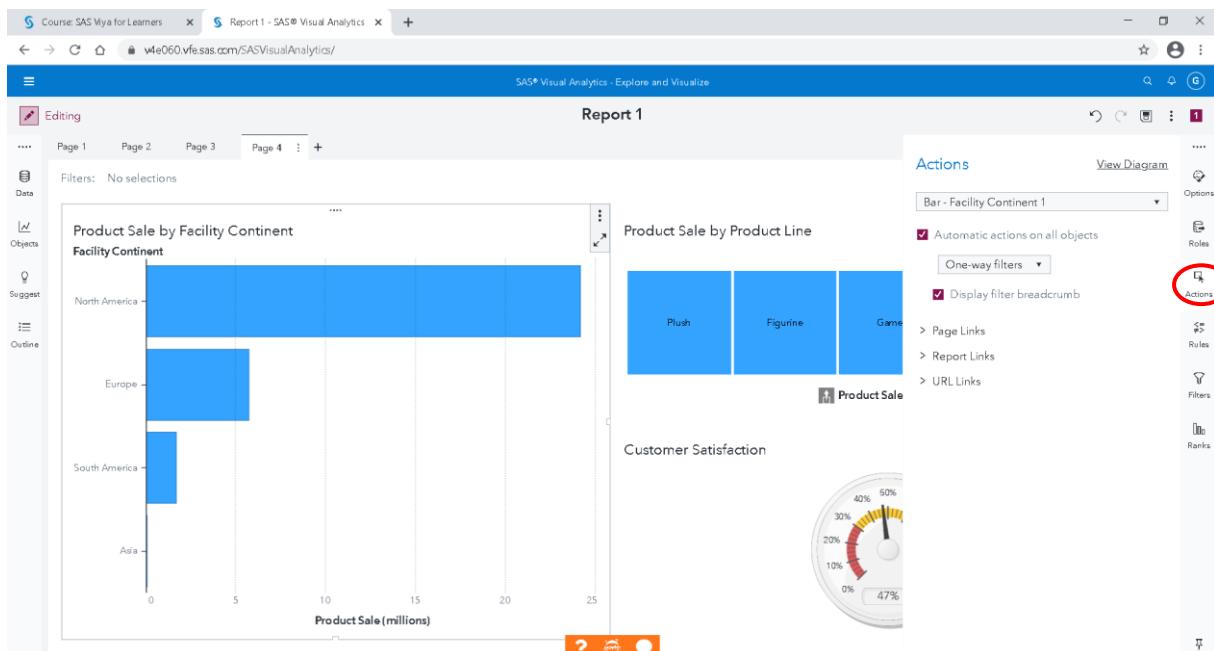
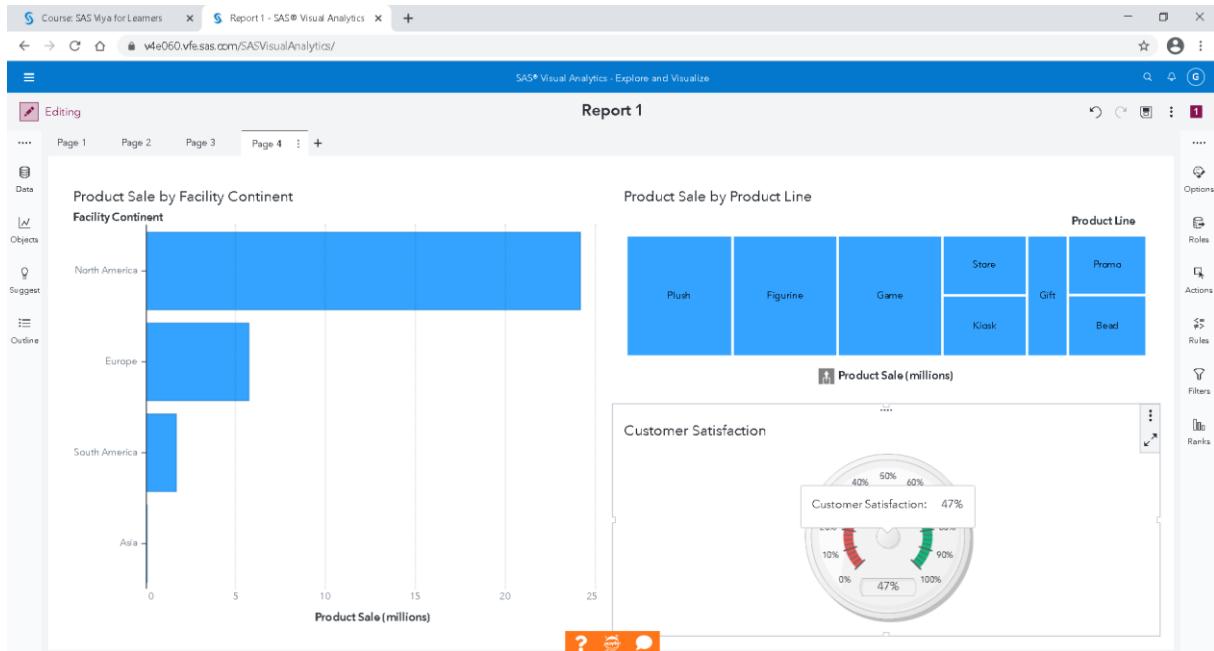
When the Tree Map is selected, select Product Line as a Category and replace the Frequency by Product sale



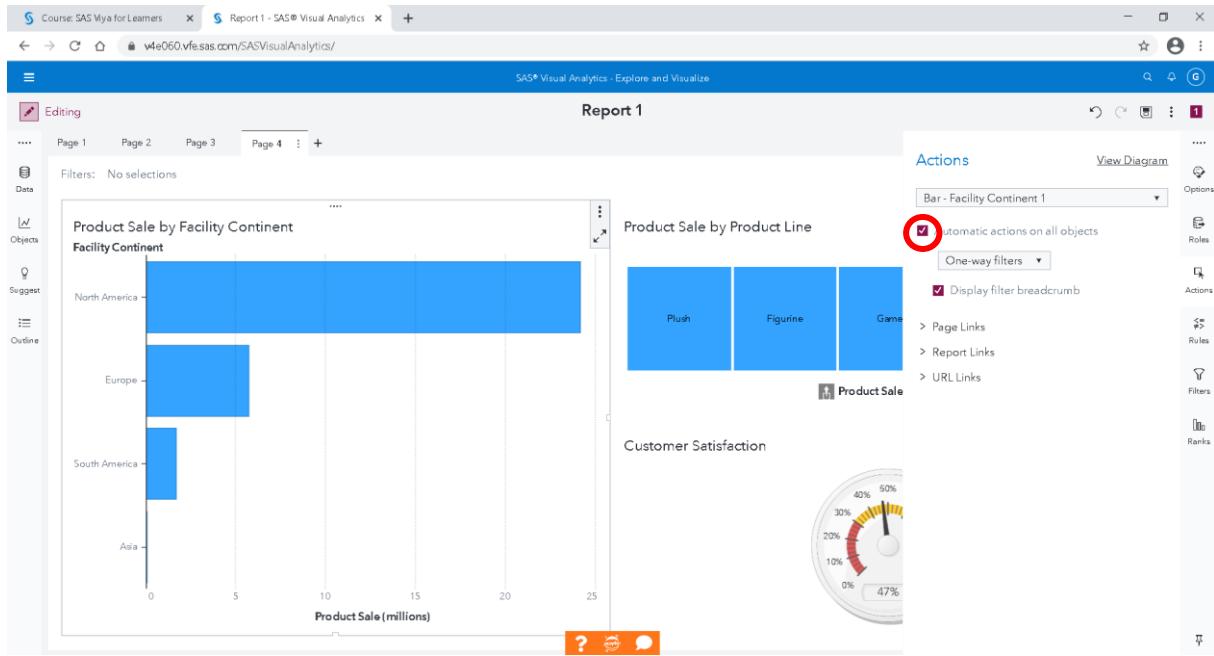
When the Gauge is selected, select Customer Satisfaction as a Measure



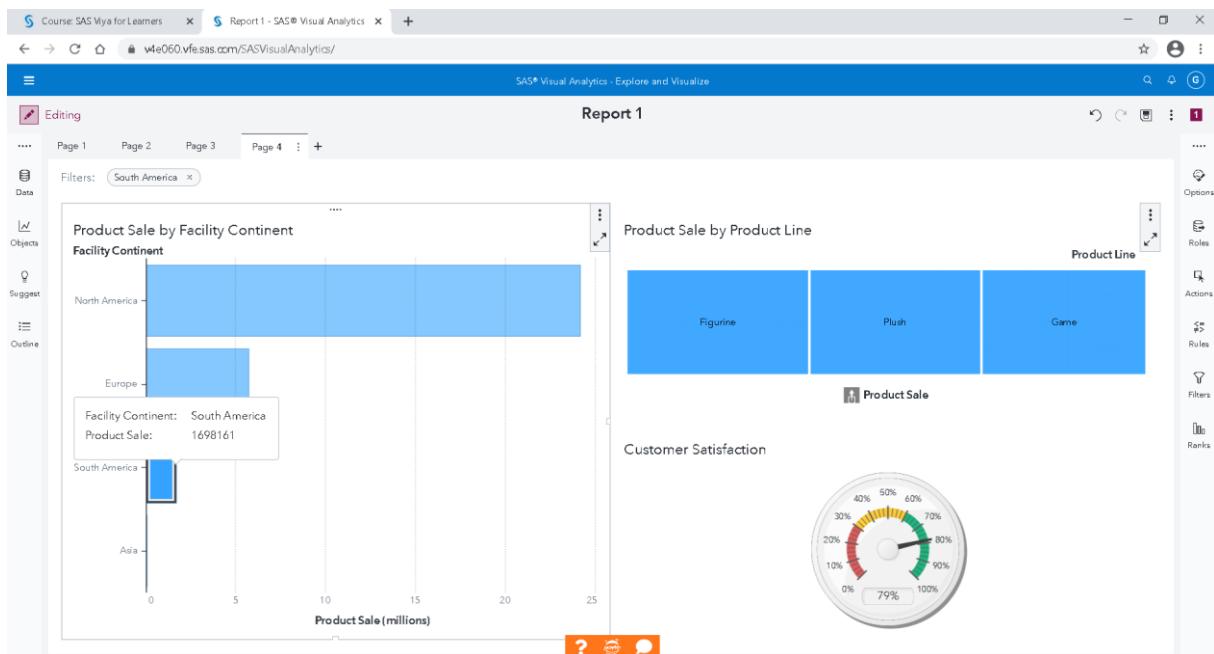
When the Gauge is selected, in the right, in Options, change the Bullet Gauge type by Speedometer



When the Bar Chart is selected, in the right, in Actions, select Automatic actions on all objects



If you click on a stick in Bar Chart, it filters elements in other two objects.



For example, in South America, customer satisfaction is excellent.

Save your work

The screenshot shows the SAS Visual Analytics interface with a report titled "Report 1". The report contains three main visualizations: a bar chart titled "Product Sale by Facility Continent" showing sales for North America (~25 million), Europe (~6 million), South America (~1 million), and Asia (~0.5 million); a treemap visualization titled "Product Sale by Product Line" showing segments for Figurine and Plush; and a gauge chart titled "Customer Satisfaction" showing a value of 79%. A context menu is open in the top right corner, with the "Save as" option highlighted and circled in red. The URL in the browser is <http://vde060.vf.sas.com/SASVisualAnalytics/>.

The screenshot shows the "Save As" dialog box. It displays a tree view of folders: "Folders > My Folder > My Snippets > SAS Content > BigOrganics". The "Name:" field contains "Insight_Toy_enr" and the "Type:" dropdown is set to "Report". At the bottom are "Save" and "Cancel" buttons. The URL in the browser is <http://vde060.vf.sas.com/SASVisualAnalytics/>.

You can save it in your folder

Save

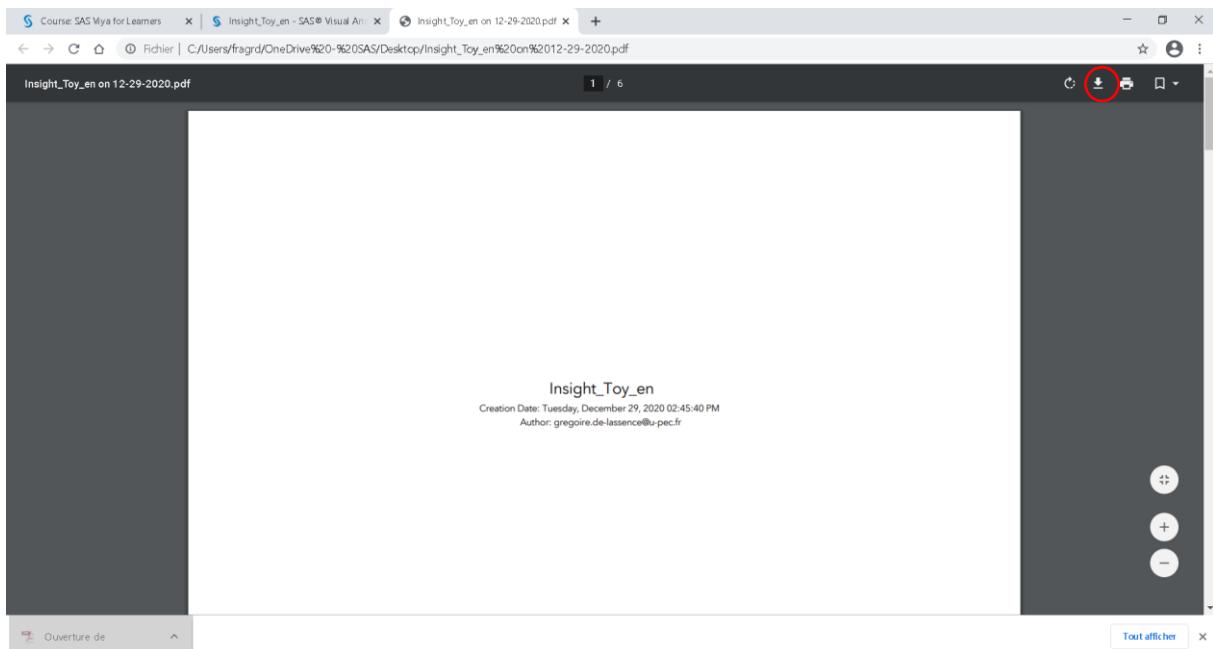
Export in pdf your work in pdf

The screenshot shows the SAS Visual Analytics interface with a report titled "Insight_Toy_en". On the left, there's a sidebar with "Objects", "Suggest", and "Outline" sections. The main area displays three visualizations: a bar chart titled "Product Sale by Facility Continent" showing sales for North America (~24 million), Europe (~6 million), South America (~1 million), and Asia (~0.5 million); a chart titled "Product Sale by Product Line" showing Plush (~15 million) and Figurine (~5 million); and a circular gauge chart titled "Customer Satisfaction" with a value of 79%. A context menu is open at the top right, with the "Print..." option circled in red.

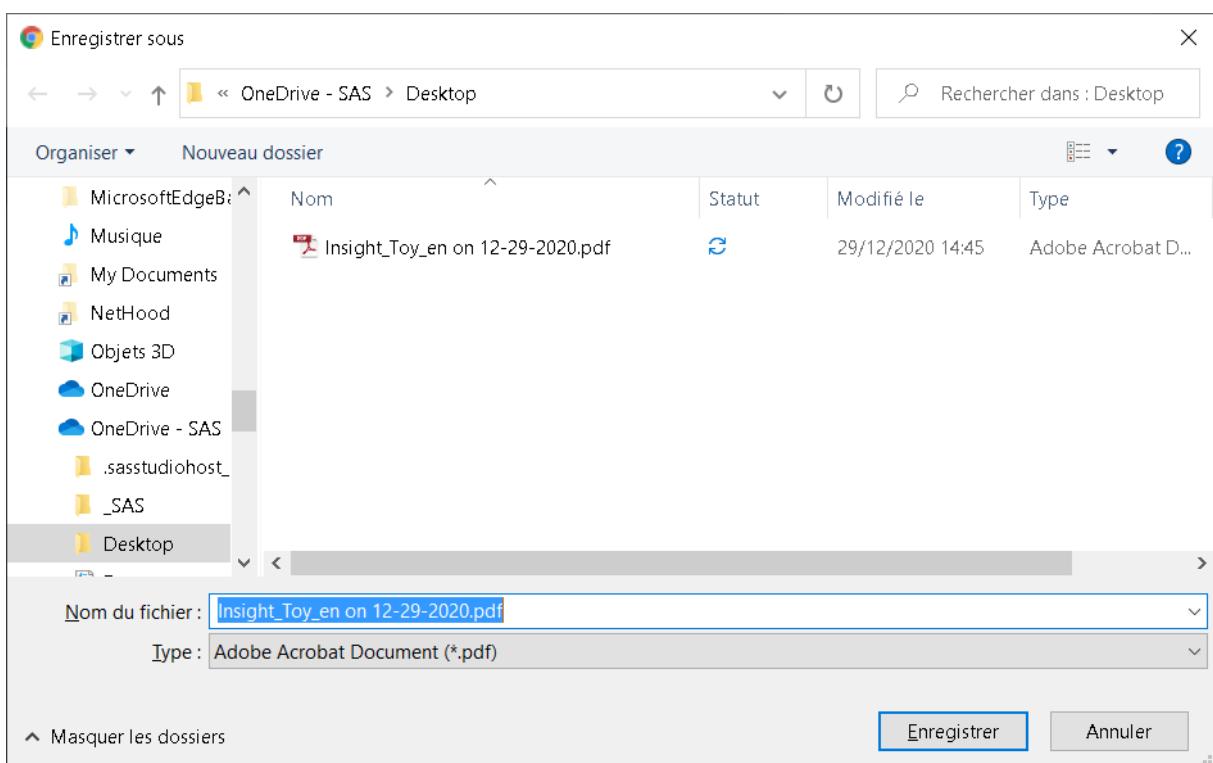
Print

The screenshot shows the "Print to PDF" dialog box overlying the SAS Visual Analytics interface. The dialog has two tabs: "Document Setup" and "Select Objects". Under "Document Setup", the "PAGE SETUP" section is selected, showing options for "Paper size" (Letter), "Orientation" (Portrait), and "MARGINS" (Top: 0.25, Right: 0.25, Left: 0.25, Bottom: 0.25). The "OPTIONS" section contains several checkboxes, most of which are checked. The "Select Objects" tab is also visible. At the bottom right of the dialog, the "Print" button is circled in red.

Print



Save your pdf in your computer.



OK

Go back to SAS Visual Analytics

Create a new report

The screenshot shows the SAS Visual Analytics interface. The title bar reads "SAS® Visual Analytics - Explore and Visualize" and the report title is "Insight_Toy_en". The left sidebar includes sections for "Objects", "Suggest", and "Outline". A "Filters" dropdown is set to "South America". The main content area displays three visualizations: a horizontal bar chart titled "Product Sale by Facility Continent" showing sales for North America (~24 million), Europe (~7 million), South America (~1.5 million), and Asia (~0.5 million); a two-panel chart titled "Product Sale by Product Line" showing sales for Figurine (~12 million) and Plush (~12 million); and a circular gauge titled "Customer Satisfaction" with a value of 79%. A context menu is open on the right side of the interface, listing options such as "New", "Open", "Save", "Save as", "Reopen report", "Close", "View report", "Print...", "Share report", "Copy link...", "Distribute report...", "Localize report...", "Interface options", "Expand report controls", "Expand report controls and all page controls", "Actions diagram", "Keyboard shortcuts", and "Take a tour".

Exercises

Create a new report on Insight toy Demo (same data base)

- 1) Create an automatic chart that shows the Product Cost of Sale by Facility Continent.
- 2) Create in a new page, a box plot that shows the Product Cost of Sale by Product Line.
- 3) Create in a new page, an automatic chart that shows the Unit Capacity by Transaction Month.
- 4) Create a tree map visualization that shows Product Sale by Facility Country.
- 5) What is the product sale for each country in South America? Use at least three types of charts and suggest which one in your opinion works better in answering this question. After you created the first chart, duplicate your chart by clicking on Duplicate.
- 6) In which two months of 2004 the cost of sale was lowest in Atlanta? Use just one chart to answer the question.
- 7) Create a report with at least four sections (=pages).

The BI report should include key facts about company's performance on a global and regional level. These facts should include both financial and marketing related data.

Try to decide the appropriate visualization tool depending on the data you use. How will the charts be perceived by a simple user? What questions he/she may ask?

Make use of additional tools such as global and local filters and text inputs.

Use at least six different charts from both Graphs and Tables objects, two from Gauges, two from Controls and two from Others.

Print your report: it will create a pdf. Save the pdf and send it by mail to our professor.

Machine Learning with Visual Analytics Hands-On

Big Organics

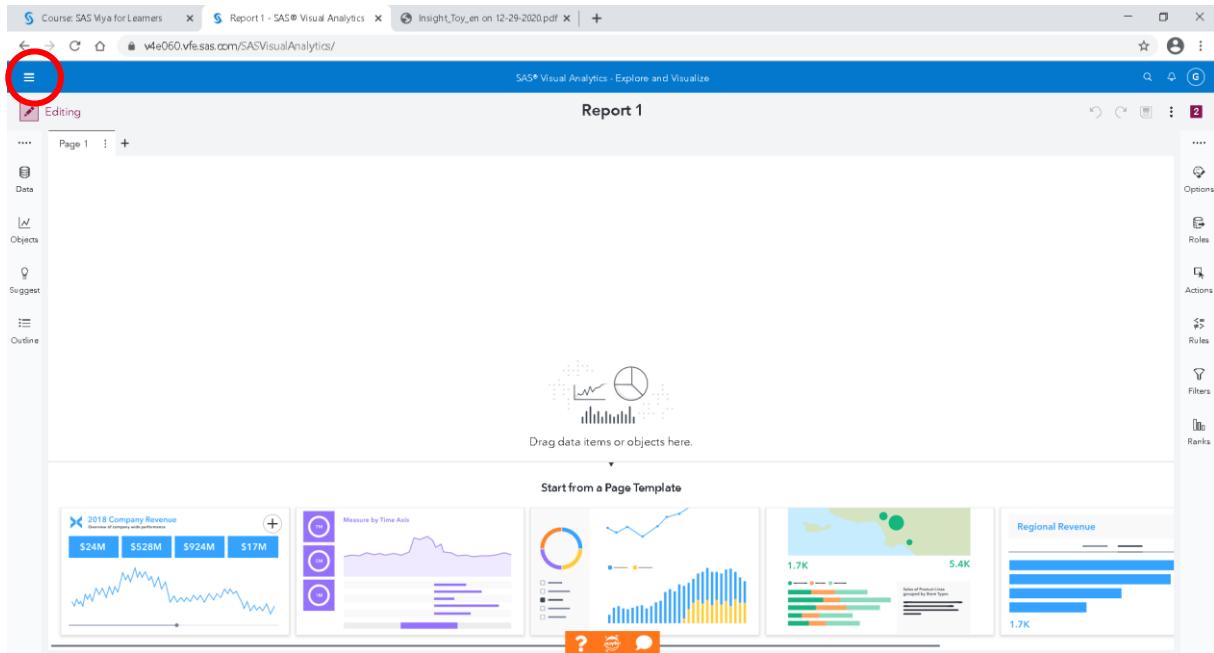
Description:

A supermarket has a customer loyalty program and is offering a new line of organic products. As an initial buyer incentive plan, the supermarket provided coupons for the organic products to all of the loyalty program participants and collected data that include whether these customers have purchased any of the organic products. The supermarket's management wants to determine which customers are likely to purchase these organic products.

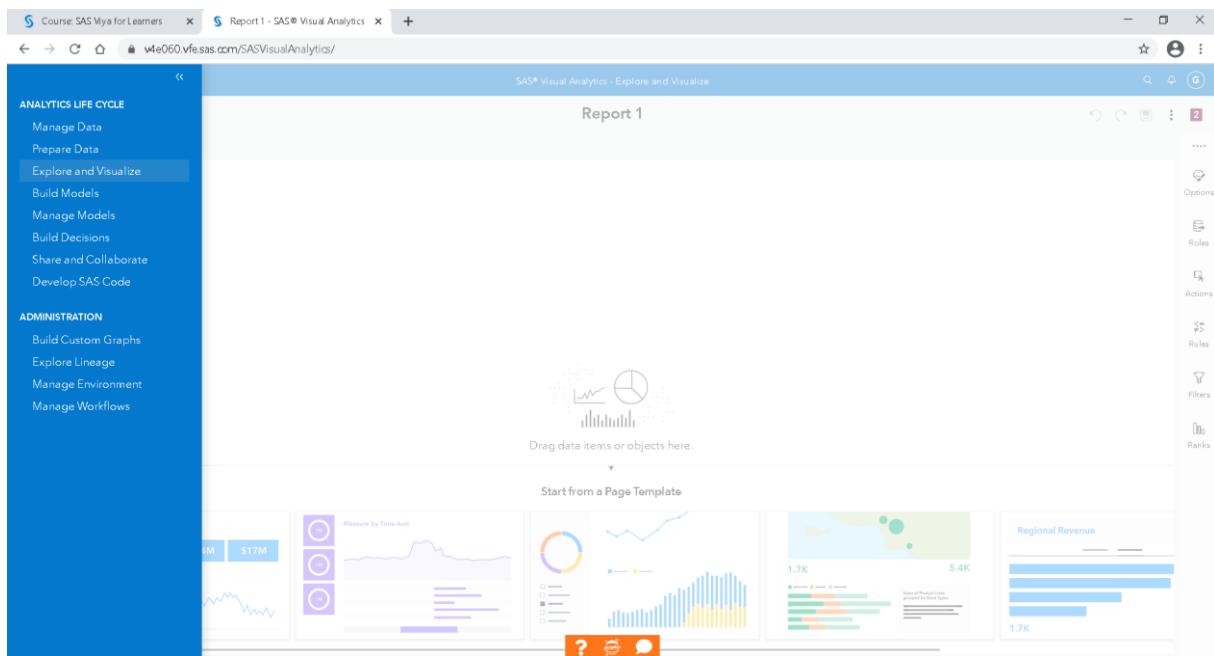
Data

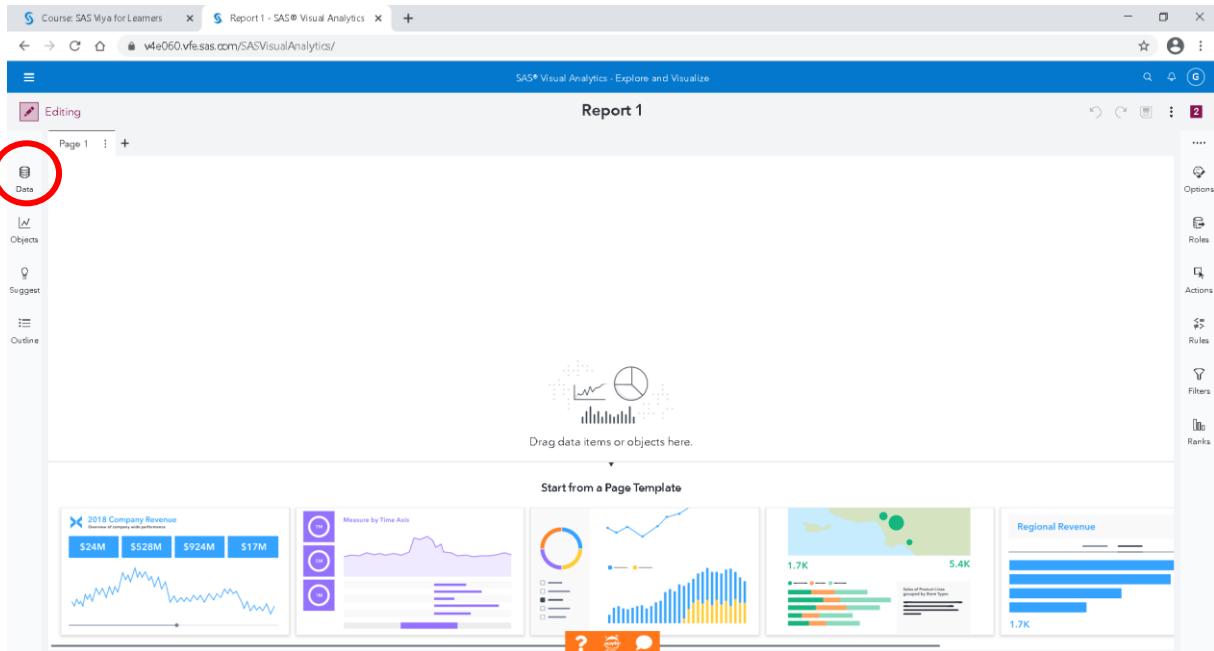
The Organics data set contains 13 variables and 111 115 observations.

Name	Type	Class	Description
Affluence Grade	Numeric	Measure	Affluence Grade is a grade measured on a scale from 1 to 34
Age	Numeric	Measure	Age is the age in years
Customer Loyalty ID	Character	Category	Customer Loyalty Identification number
Gender	Character	Category	Customer gender (M = male, F = female, U = unknown)
Geographic Region	Character	Category	Geographic Region (5 regions in UK: South East, South West, Midlands, North, Scottish)
Loyalty Card Tenure	Numeric	Measure	Loyalty Card Tenure is the time as a loyalty card member (in months: 0-39)
Loyalty Status	Character	Category	Status of the loyalty card (Tin, Silver, Gold, Platinum)
Organics Purchase Count	Numeric	Measure	TARGET (discrete) - Number of Organic Products Purchased
Organics Purchase Indicator	Numeric	Measure	TARGET (binary) - Organic Products Purchased? (1 = yes, 0 = no)
Television Region	Character	Category	Regional TV broadcasting
Total Spend	Numeric	Measure	Total amount spent (previously)



Once in the SAS Viya for Learners - Drive, on the three small lines at the top left, select "Explore and Visualize Data"





Choose a data source

The screenshot shows the 'Choose Data' dialog box. On the left, a list of available data sources is shown, with 'BIGORGANICS' circled in red. On the right, details for 'BIGORGANICS' are displayed, including its type (TUNDATA), location (cas-v4e060-default/TUNDATA), and creation date (Dec 8, 2020). The 'OK' button at the bottom right is also circled in red.

Open Organics data

The screenshot shows the SAS Visual Analytics interface. The left pane, titled 'Editing', contains sections for 'Data' (selected 'BIGORGANICS') and 'Objects'. It includes a 'Suggest' dropdown and a 'Category' section with items like 'Customer Loyalty ID - 111K', 'Gender - 4', etc. The right pane is titled 'Report 1' and features a 'Start from a Page Template' section with four preview cards: 'Measure by Time Axis', 'Regional Revenue', 'Organic Purchase Count', and 'Loyalty Card Tenure'. A vertical red arrow on the left points to the 'Category' section, and another vertical red arrow on the right points to the 'Ranks' icon in the toolbar.

The left pane enables you to work with data, add objects, and use the report outline to organize your content.

The right pane enables you to work with details about the report, its pages, and its objects.

To start with, let's check the distribution of Organics Purchase Indicator, but before drop the data item into your Visualization window, you must change the level Measure to Category just with 3 clicks on it.

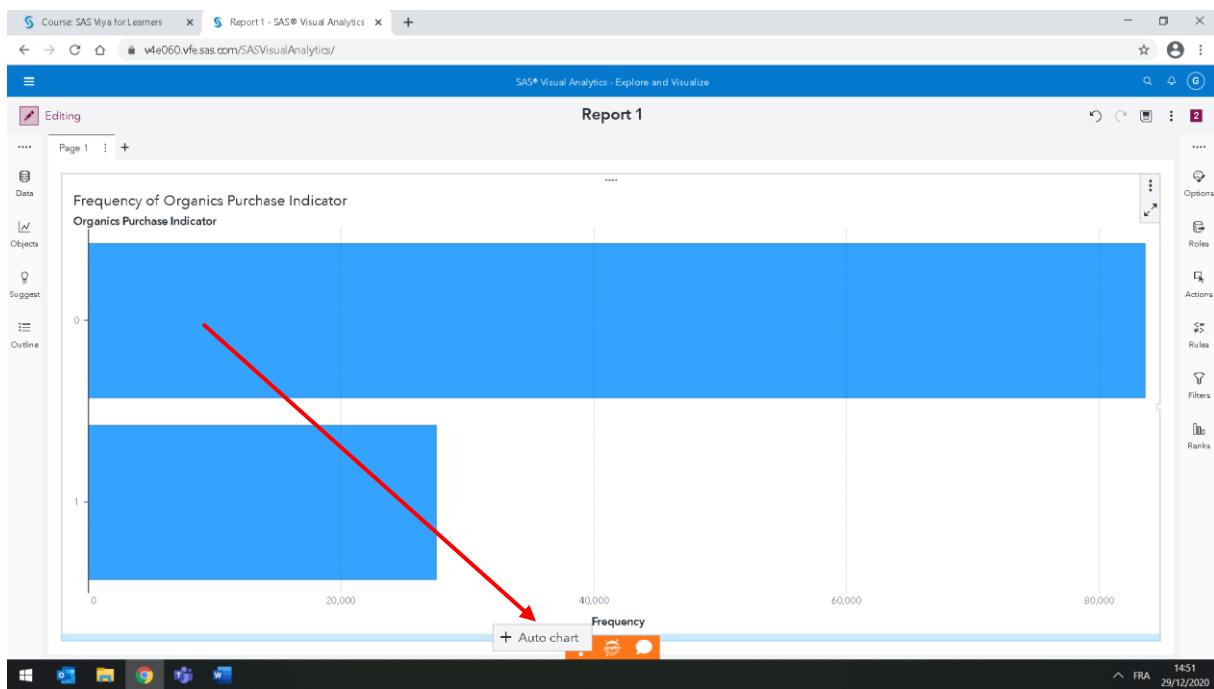
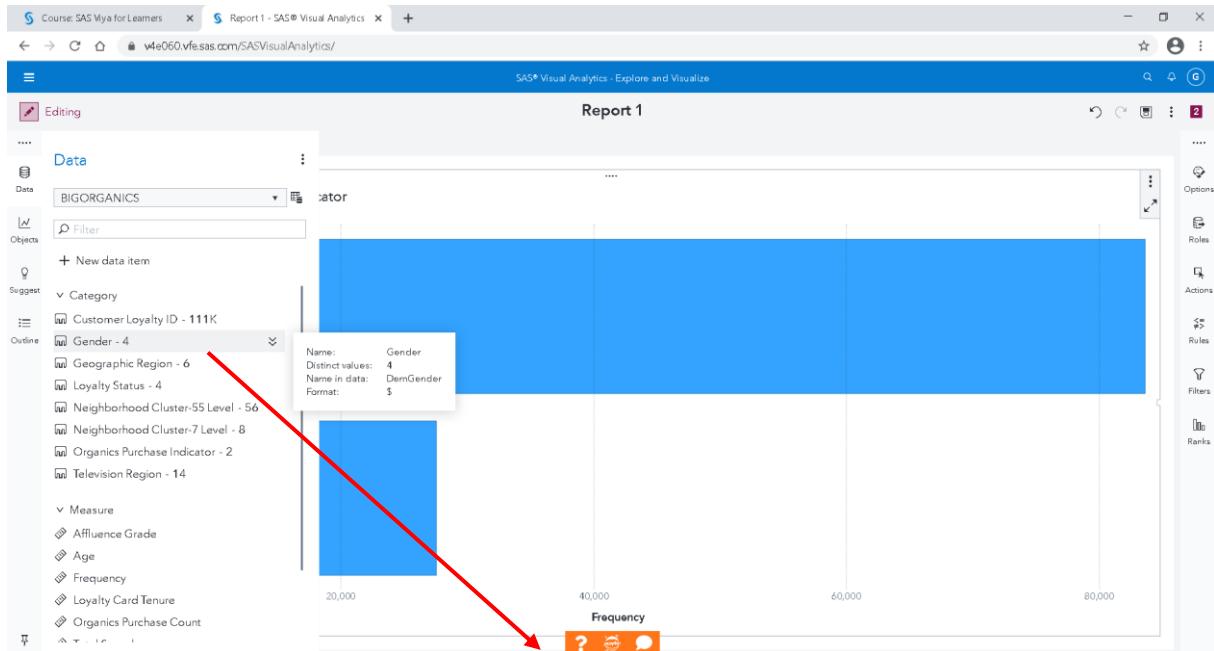
This screenshot shows the 'Classification' dropdown in the left pane's 'Objects' section. The dropdown menu is open, showing 'Measure' (circled with a red '1') and 'Category' (circled with a red '2'). The 'Category' option is highlighted. A red circle also highlights the 'Organics Purchase Indicator' entry in the main list. The right pane shows the same report structure as the previous screenshot.

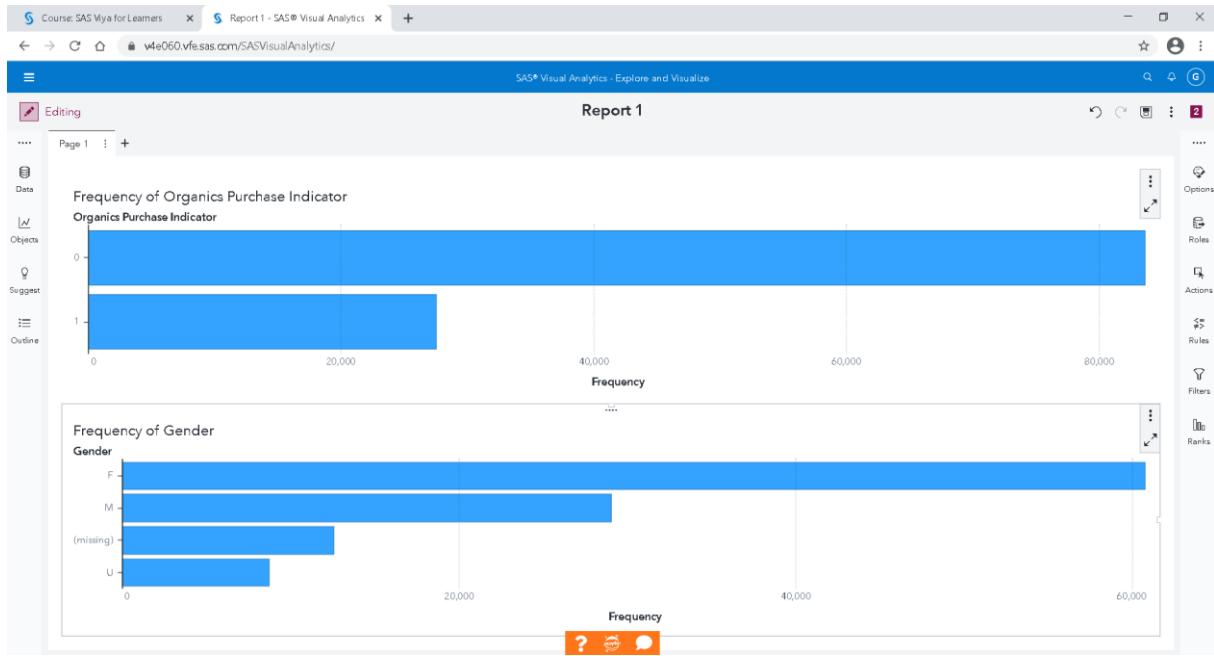
The screenshot shows the SAS Visual Analytics interface. On the left, the 'Data' pane is open, displaying a list of data items from the 'BIGORGANICS' dataset, including 'Customer Loyalty ID - 111K', 'Gender - 4', 'Geographic Region - 6', 'Loyalty Status - 4', 'Neighborhood Cluster-55 Level - 56', 'Neighborhood Cluster-7 Level - 8', 'Organics Purchase Indicator - 2', and 'Television Region - 14'. A red arrow points from the 'Organics Purchase Indicator' item in the Data pane towards the central visualization area. The central area is titled 'Report 1' and contains a visualization workspace with various chart thumbnails and a placeholder text 'Drag data items or objects here.'

Drop the data item into your Visualization window

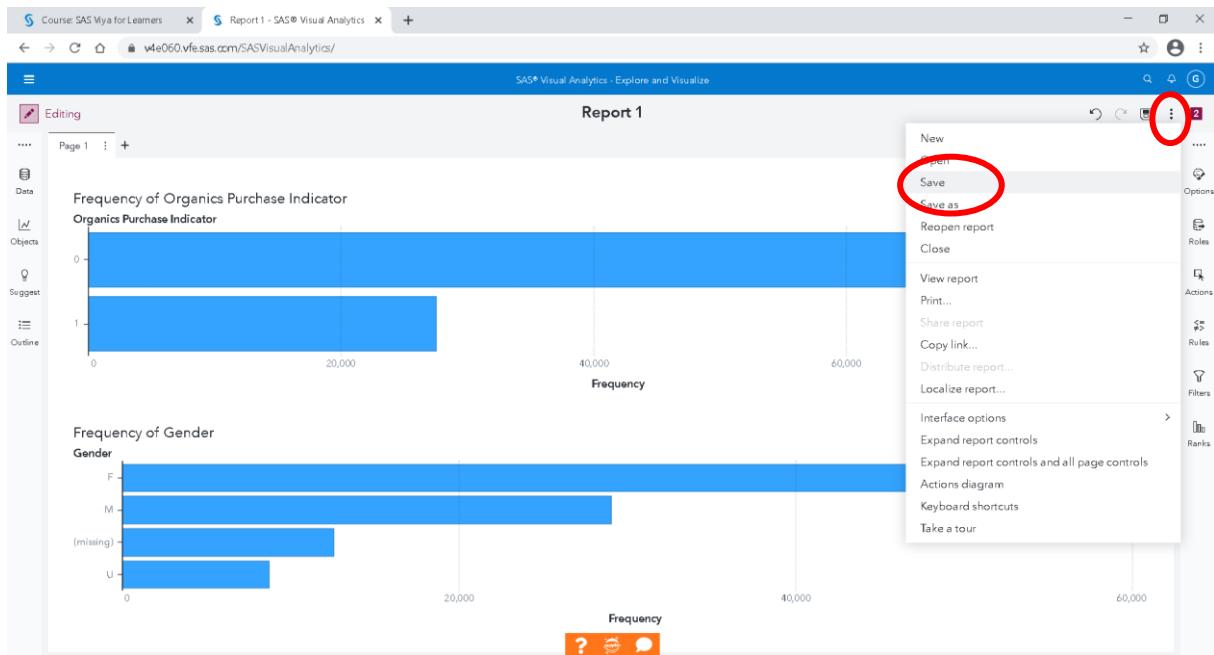
The screenshot shows the SAS Visual Analytics interface with a bar chart visualization titled 'Frequency of Organics Purchase Indicator'. The chart displays the frequency of two categories (0 and 1) across a range of values from 0 to 80,000. Category 0 has a frequency of approximately 80,000, and category 1 has a frequency of approximately 10,000. The visualization workspace also includes a 'Start from a Page Template' section with other chart thumbnails.

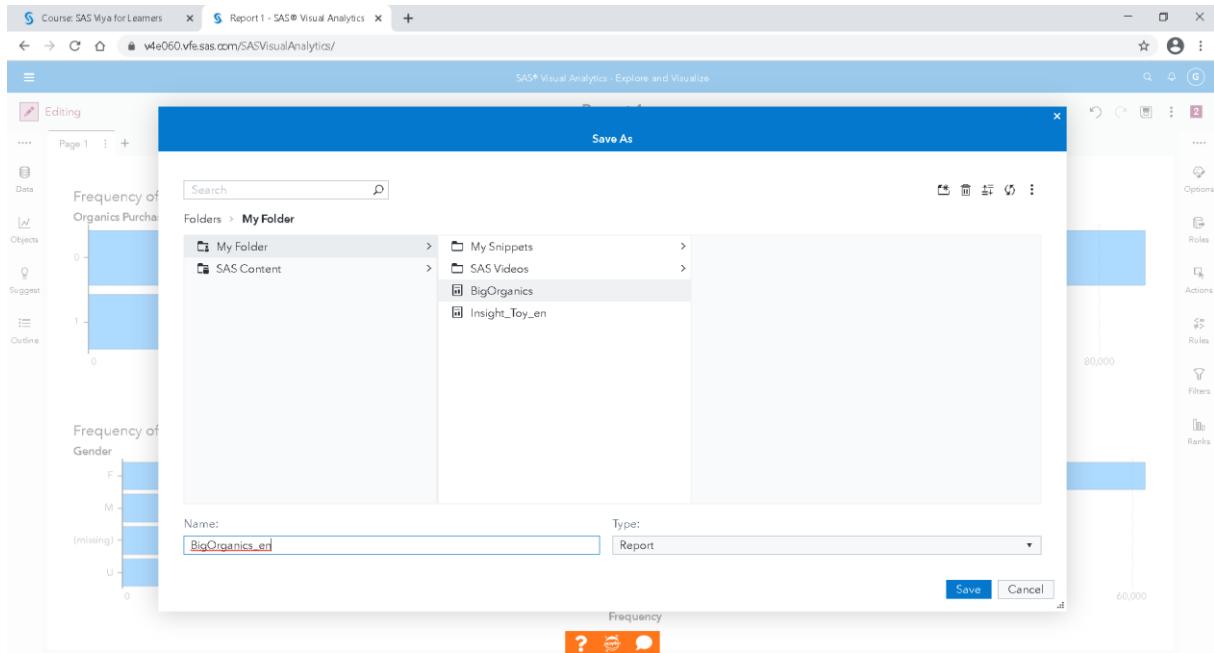
Check the distribution of Customers Gender, just drop the data item Gender into your Visualization window.



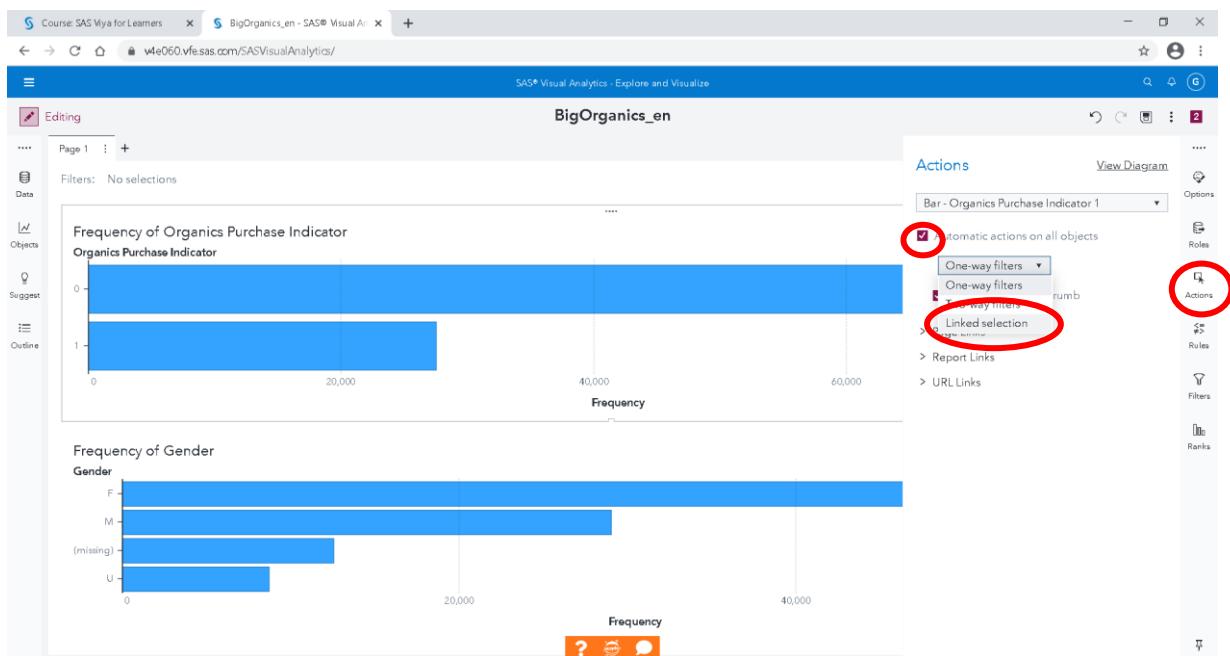


Save frequently your report



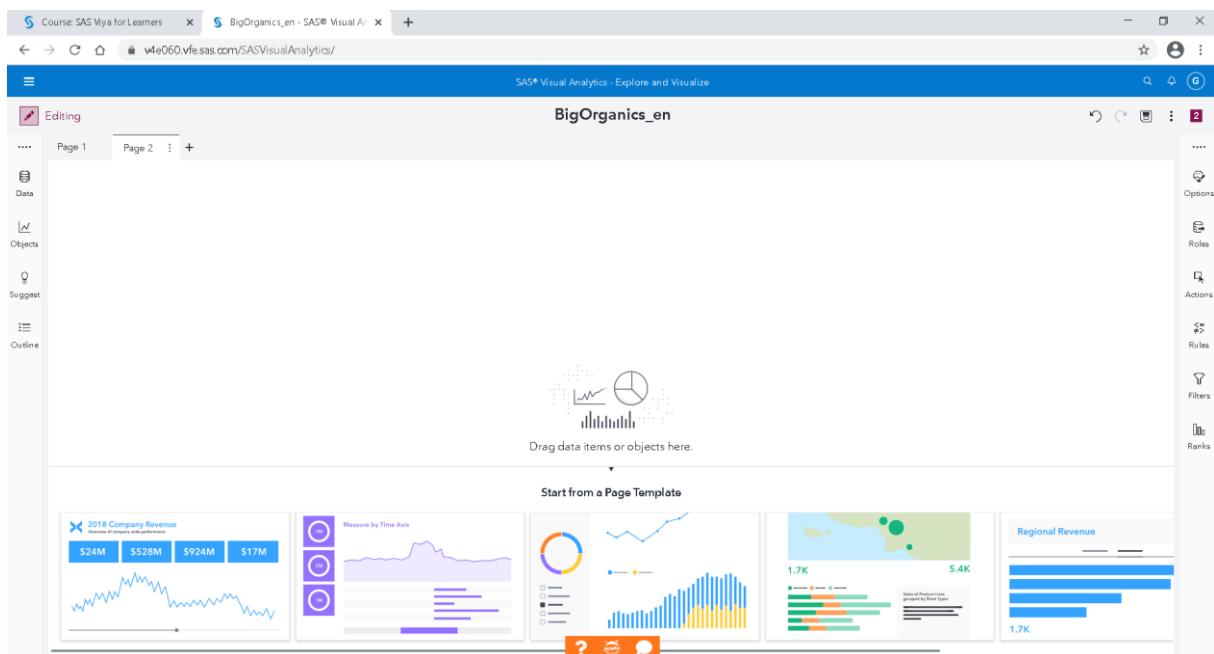
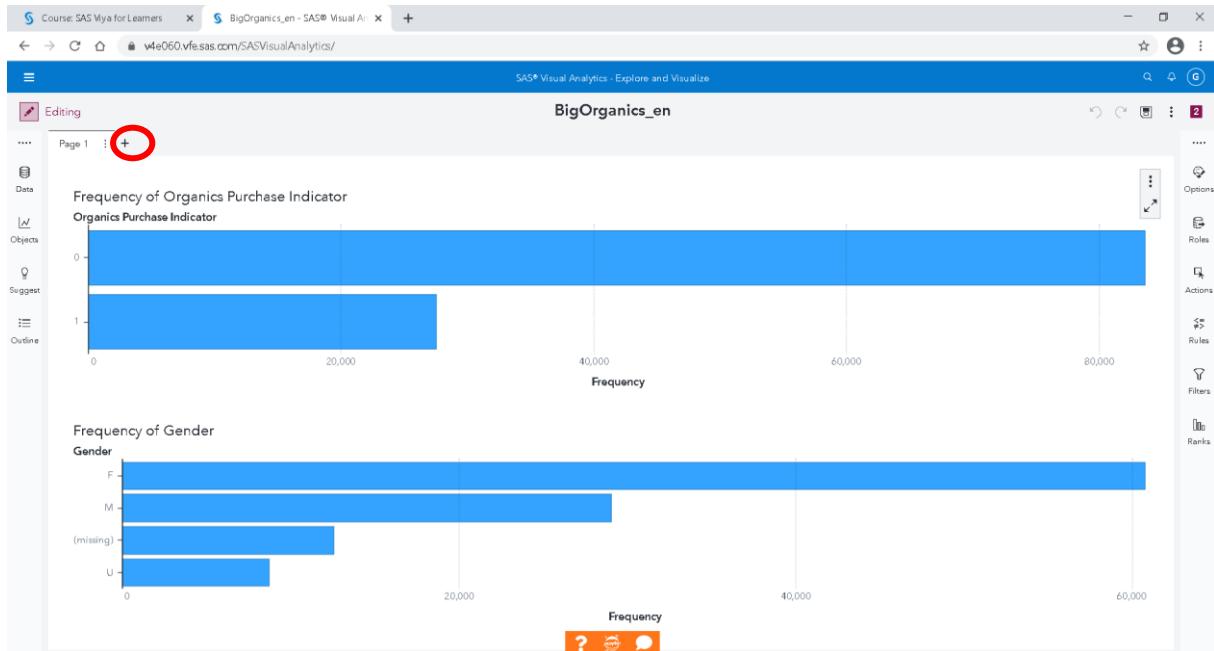


Save in your folder



Select one graph, go to Actions on the right, select Automatic actions on all objects and Linked selection.

If you click on female in the gender graph, you can see that in proportion, female by more organic's products.



You can create a new page

Decision Trees

A decision tree creates a segmentation of the data based on a series of rules. Each rule assigns an observation to a node based on the value of one predictor. Rules are applied sequentially, which results in a hierarchy called a tree. The initial node contains the entire data set and is called the root node. A node and all of its successors form a branch. The final nodes are called leaves. For each leaf, a decision is made about the response variable.

A decision tree is a supervised Predictive Model, in the sense that it requires one Target variable and at least one predictor. The Target can be a category variable (Classification Tree) or a measure variable (Regression Tree). A predictor can be a category or measure variable, but not an interaction term. A decision tree will be automatically built, but you can also manually train and prune nodes by entering interactive mode.

Now let's build a decision tree to predict who is likely to purchase organic products.

You can create a new page.

The screenshot shows the SAS Visual Analytics interface. On the left, there is a sidebar titled 'Objects' with a search bar. Under 'Data', the 'Decision tree' option is highlighted with a red arrow pointing to it. Other options include 'Web content', 'SAS Visual Statistics', 'Cluster', 'Generalized additive model', 'Generalized linear model', 'Linear regression', 'Logistic regression', 'Model comparison', 'Nonparametric logistic regression', 'SAS Visual Data Mining and Machine Le...', 'Bayesian network', 'Factorization machine', 'Forest', 'Gradient boosting', 'Neural network', and 'Support vector machine'. The main workspace is titled 'BigOrganics_en' and shows a placeholder message 'Drag data items or objects here.' Below this, there are four preview cards for different page templates: 'Measure by Time Axis', 'Start from a Page Template' (selected), 'Sales of Product Lines segment by Item Type', and 'Regional Revenue'.

Drop Decision Tree from Objects → SAS Visual Statistics

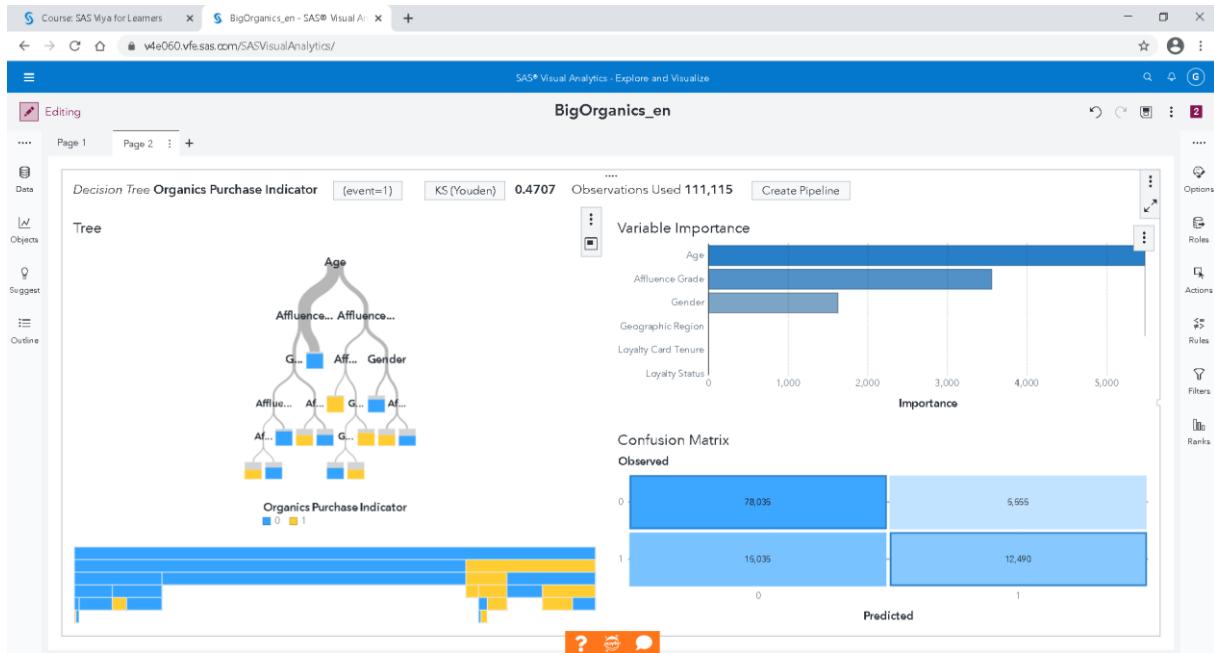
The screenshot shows the SAS Visual Analytics interface. On the left, there's a navigation bar with 'Editing', 'Page 1', 'Page 2', and a '+' button. Below it are sections for 'Data', 'Objects', 'Suggest', and 'Outline'. The main area displays a 'Decision Tree Example Data' visualization with 'Observations Used 0' and 'Unused 0'. To the right of the visualization is a 'Tree' diagram with three nodes. A 'Variable' section lists 'Example 1', 'Example 2', and 'Example 3'. A 'Confusion Matrix' table shows observed vs predicted values for four events. A 'Add Data Item' dialog box is open, listing various variables like 'Customer Loyalty ID - 111K', 'Gender - 4', etc., with 'Organics Purchase Indicator - 2' selected. On the far right, a 'Roles' panel shows 'decision tree 1' with 'Response', 'Predictors', and 'Partition ID' sections.

We want to build a classification tree, so we want a categorical variable, our **Organics Purchase Indicator**.

On, the right, in Roles, Add **Organics Purchase Indicator** as Response.

This screenshot is similar to the previous one but focuses on the 'Add Data Items' dialog box. The 'Response' section now has a checked checkbox next to 'Organics Purchase Indicator'. The other sections ('Predictors' and 'Partition ID') remain the same as in the first screenshot.

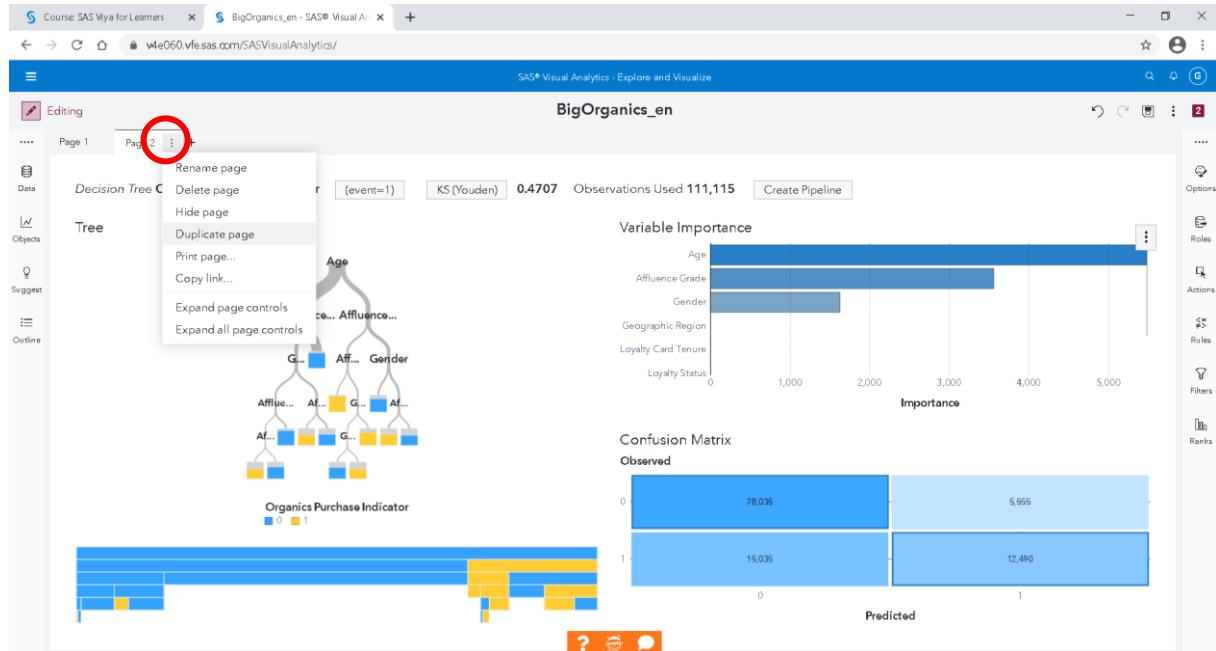
Add the following variables as **predictors**: Gender, Geographic Region, Loyalty Status, Television Region, Affluence Grade, Age, Loyalty Card Tenure and Total Spend.
OK



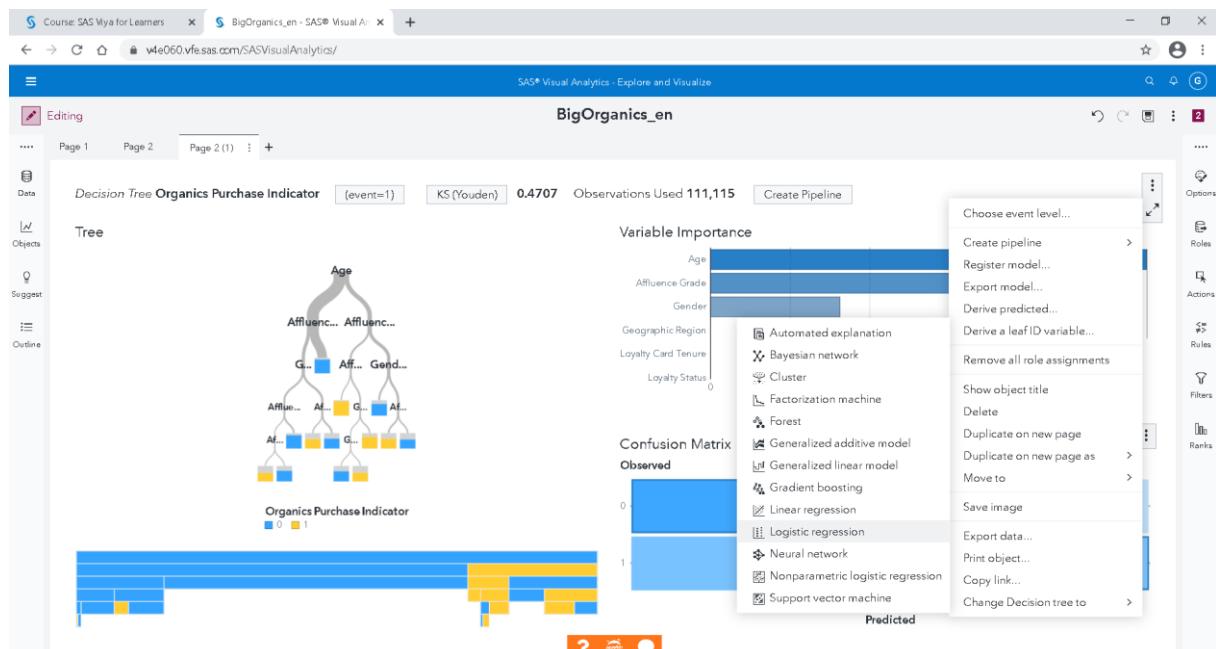
Logistic Regression

A logistic regression attempts to predict the value of a binary response variable. A logistic regression model approximates the probability that an individual observation to belong to the level of interest. It requires a category Target (or Response) variable and at least one effect variable or interaction term.

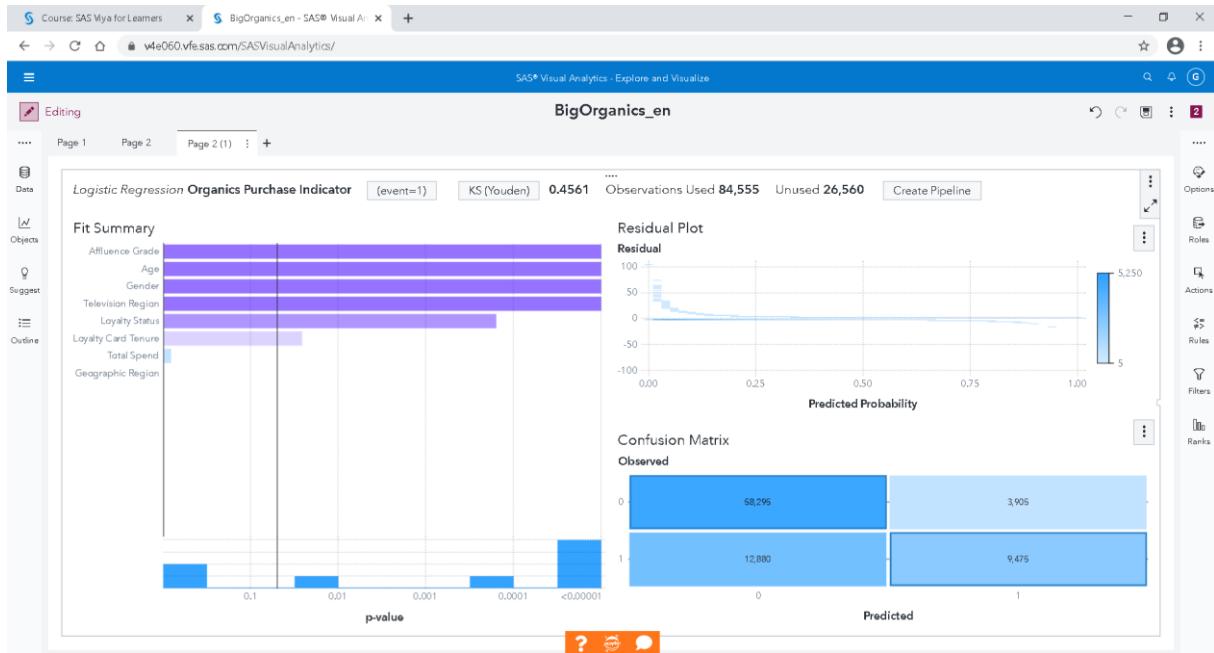
So let's create a Logistic Regression model to predict who is likely to purchase organic products.



Duplicate page

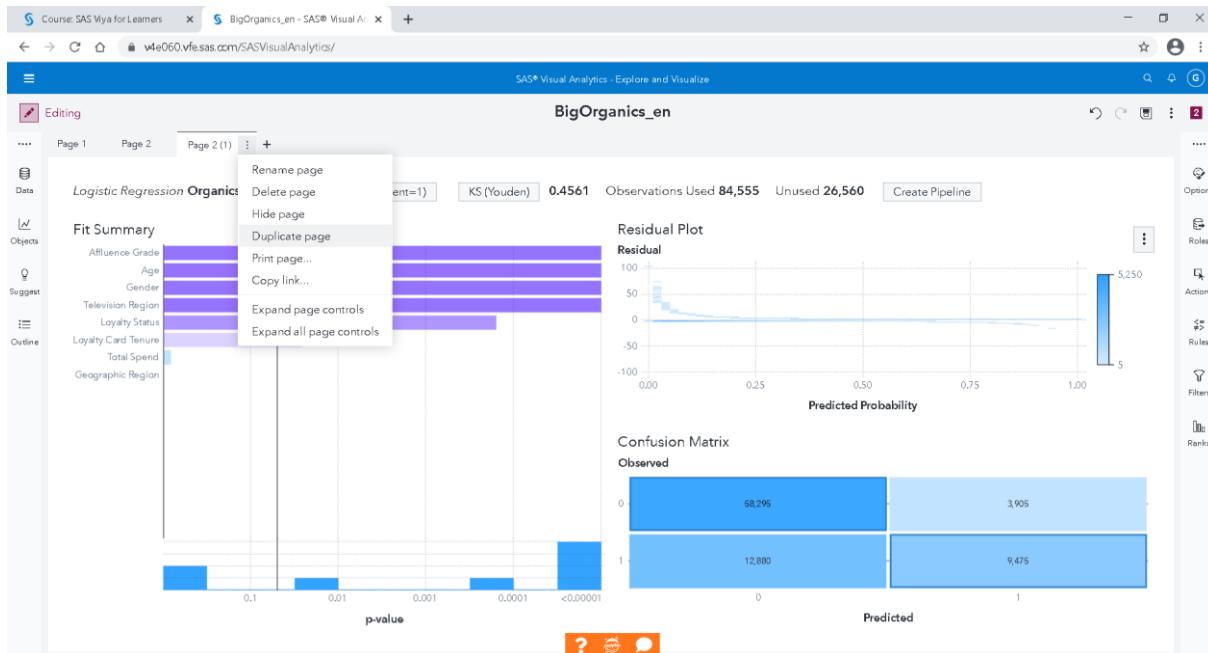


Change Decision Tree to Logistic Regression

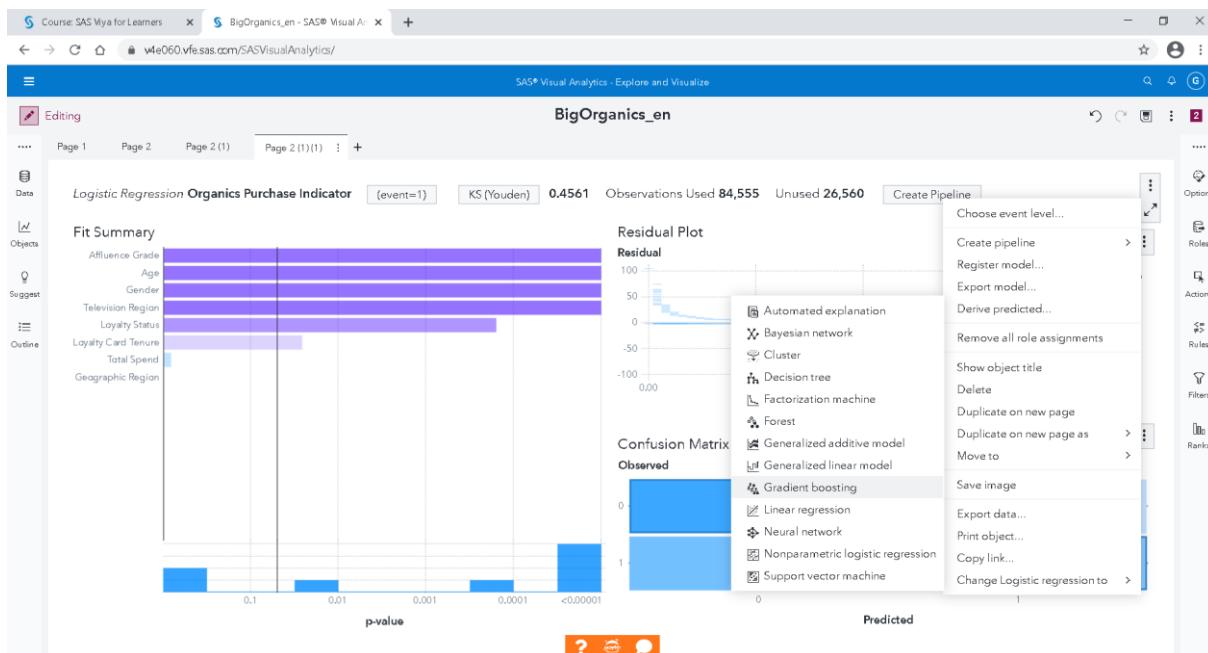


Gradient Boosting

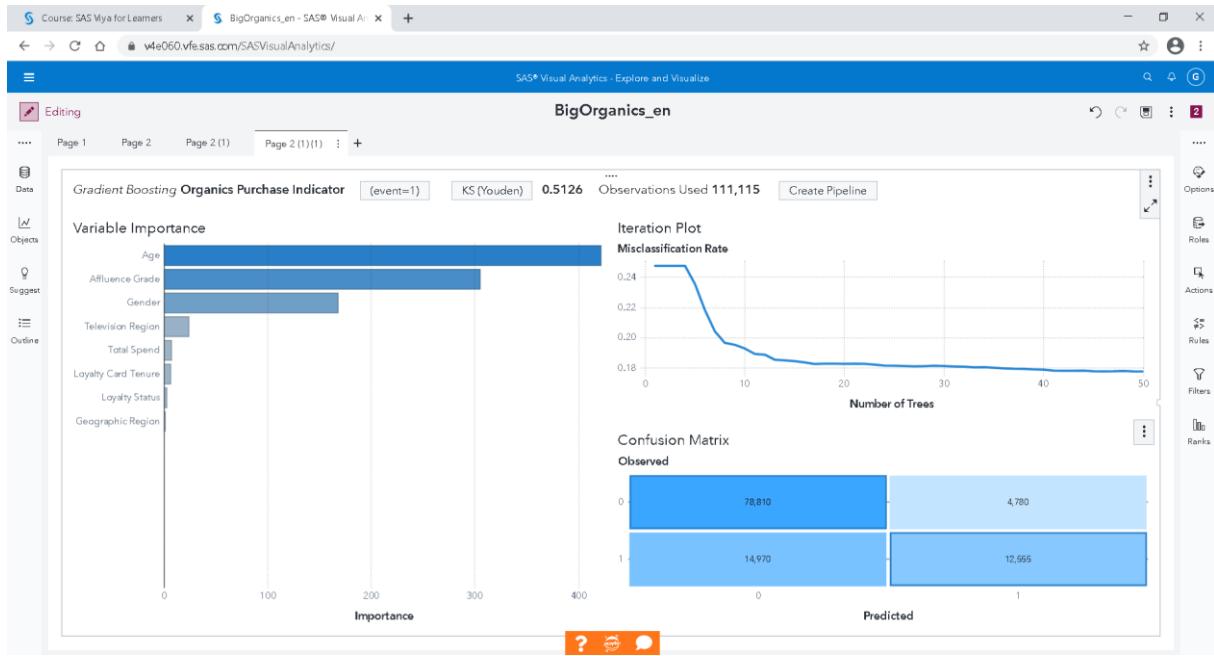
Gradient boosting is a machine learning technique for regression and classification problems, which produces a prediction model in the form of an ensemble of decision trees.



Duplicate page



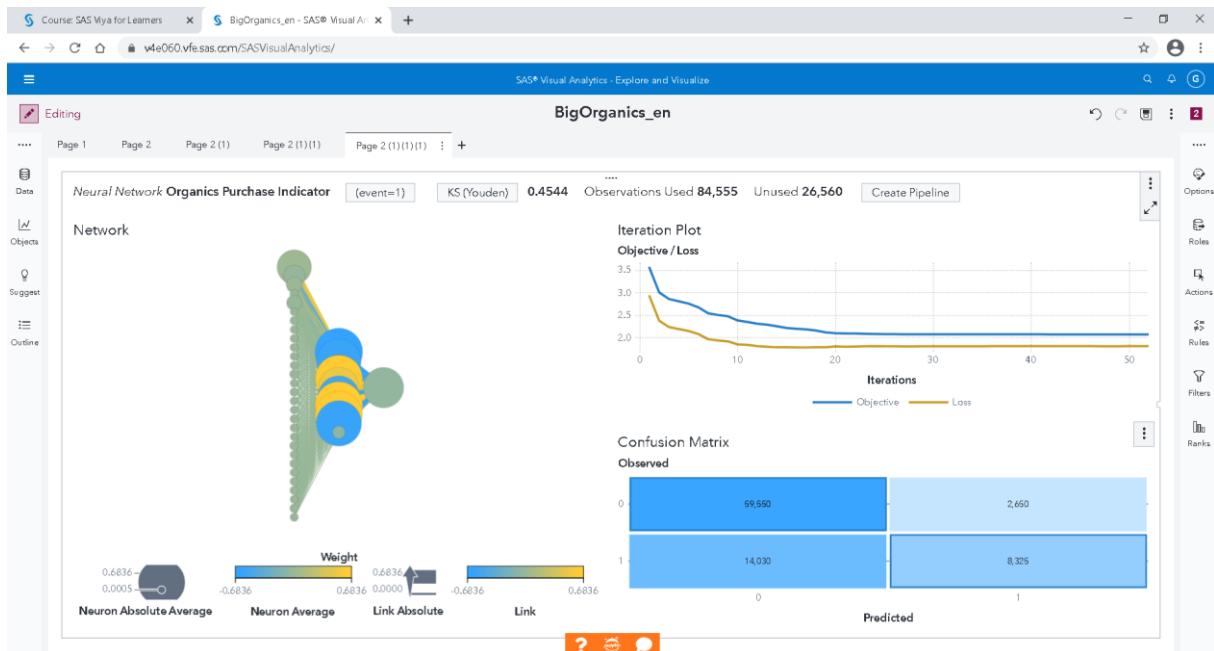
Change Logistic Regression to Gradient Boosting



Neural Network

Duplicate page

Change Gradient Boosting to Neural Network



Model Comparison

You can create a new page.

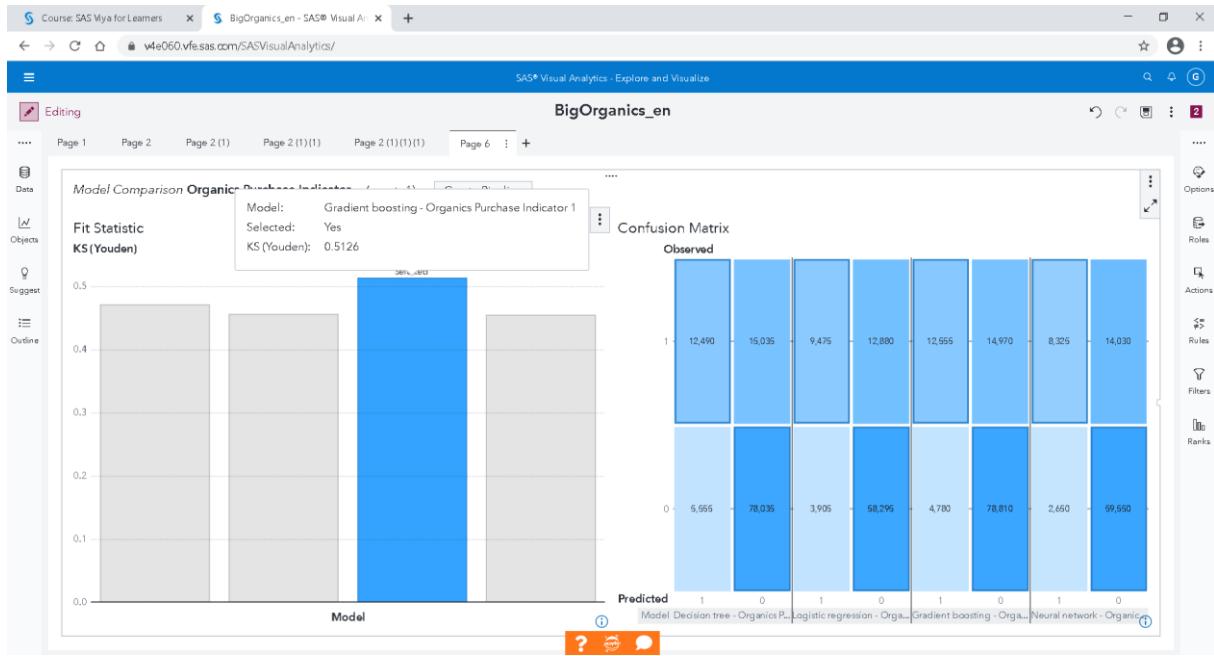
The screenshot shows the SAS Visual Analytics interface. On the left, the 'Objects' panel is open, displaying various modeling options like Decision tree, Logistic regression, and Model comparison. A 'Model comparison' icon is highlighted. In the center, there's a placeholder area with a message 'Drag data items or objects here.' Below it, a section titled 'Start from a Page Template' shows four preview cards: 'Measure by Time Axis', 'Regional Revenue', and two others partially visible. The top navigation bar shows 'Course: SAS Mya for Learners' and 'BigOrganics_en - SAS® Visual Analytics'.

Drop Model Comparison from Objects on the left.

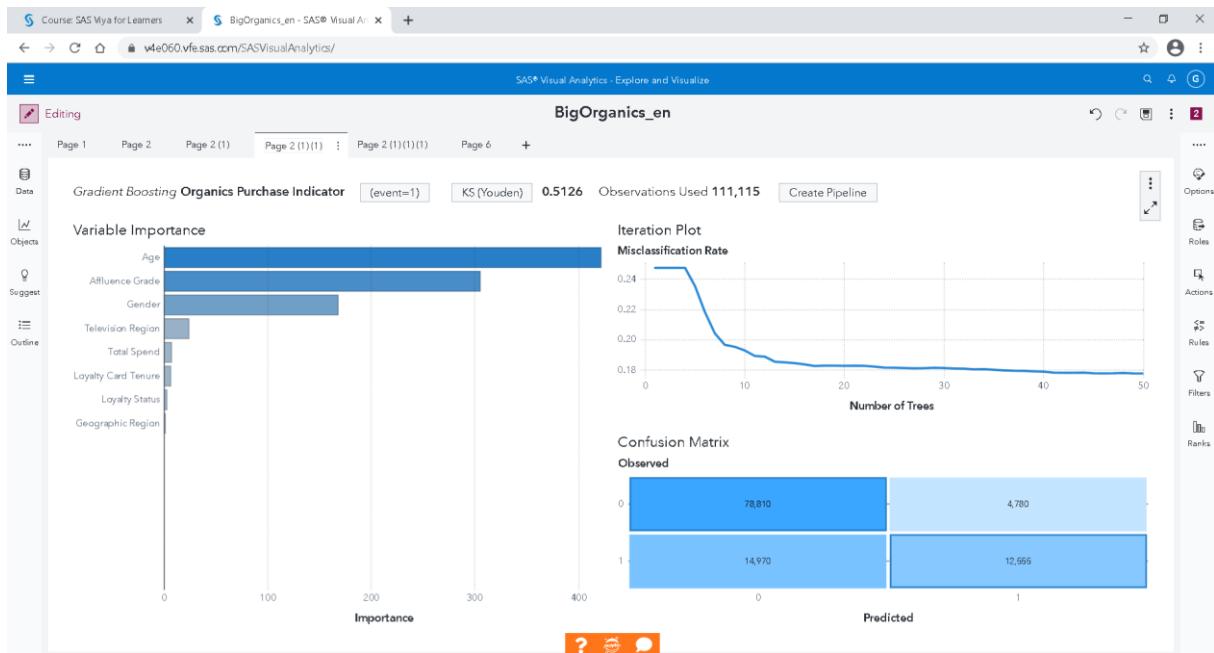
A modal dialog box titled 'Add Model Comparison' is displayed. It has several input fields: 'Data:' set to 'BIGORGANICS', 'Partition:' set to '[no partition]', 'Response:' set to 'Organics Purchase Indicator', 'Event level:' set to '1', and 'Group by:' set to '[none]'. Below these, a section titled 'Available models:' lists several predictive models, each preceded by a checkbox. The first checkbox, labeled 'select all', is checked and circled in red. The other three models listed are 'Decision tree - Organics Purchase Indicator 1', 'Logistic regression - Organics Purchase Indicator 1', and 'Gradient boosting - Organics Purchase Indicator 1'. At the bottom of the dialog, a note says 'Model Comparison: Compares predictive models with matching criteria.' with 'OK' and 'Cancel' buttons. The background shows the same SAS Visual Analytics interface as the previous screenshot.

Select all

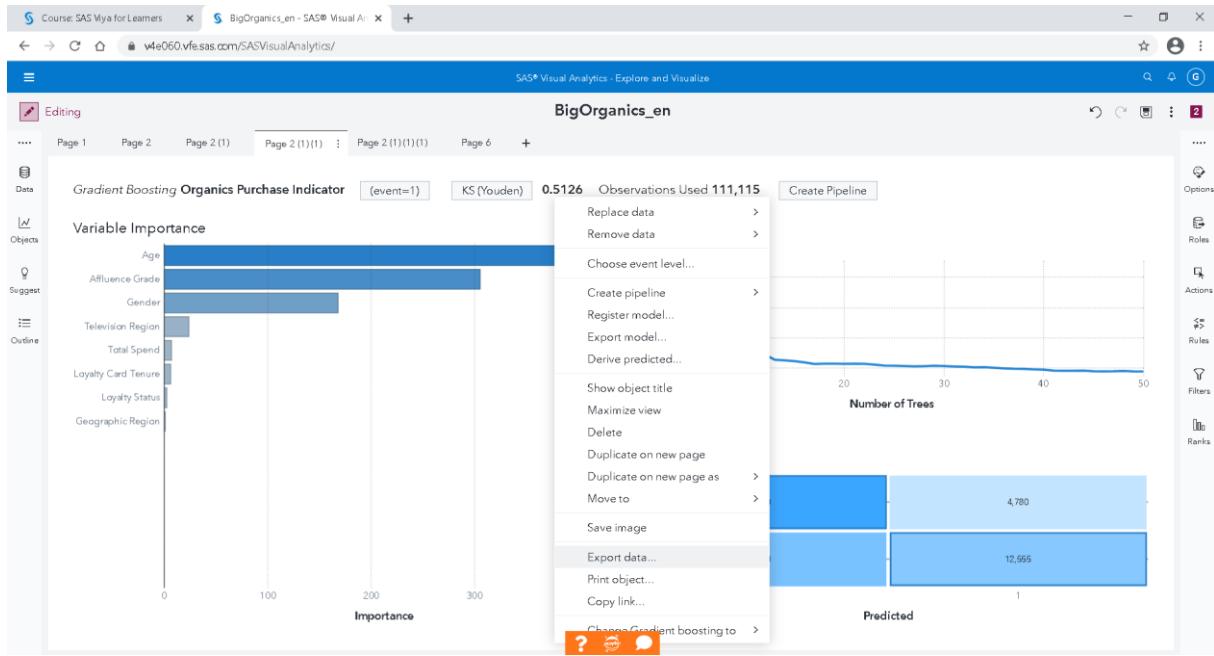
OK



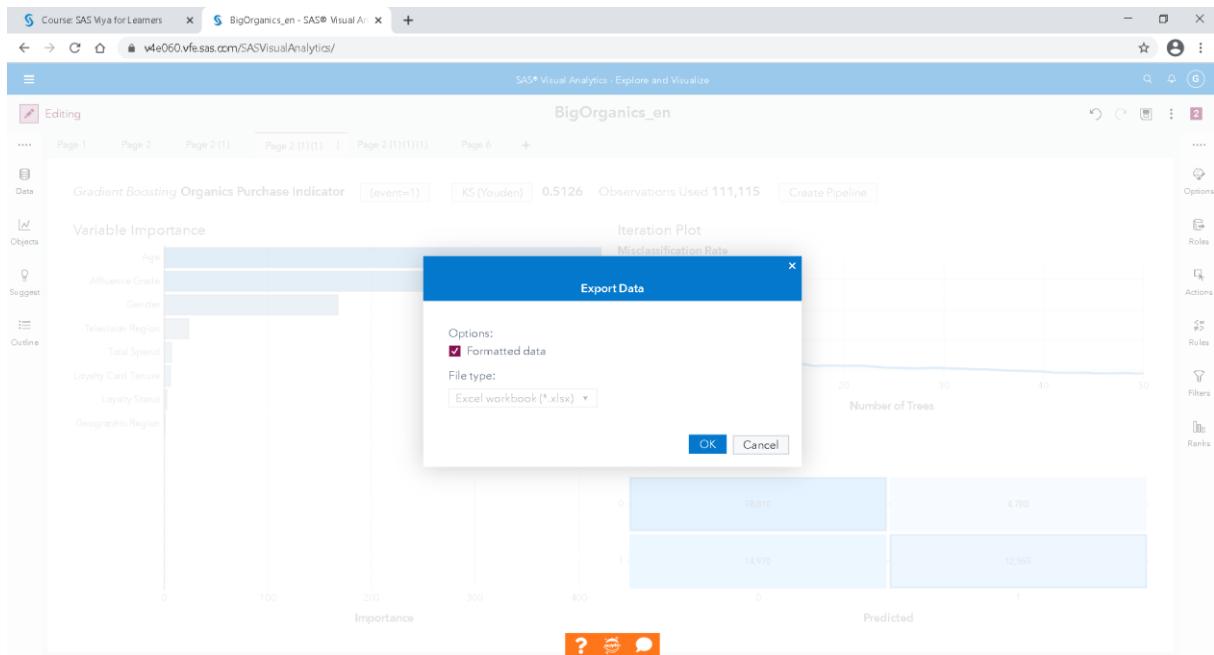
The best model is the Gradient Boosting according the KS (Youden) statistic and the lift curve.



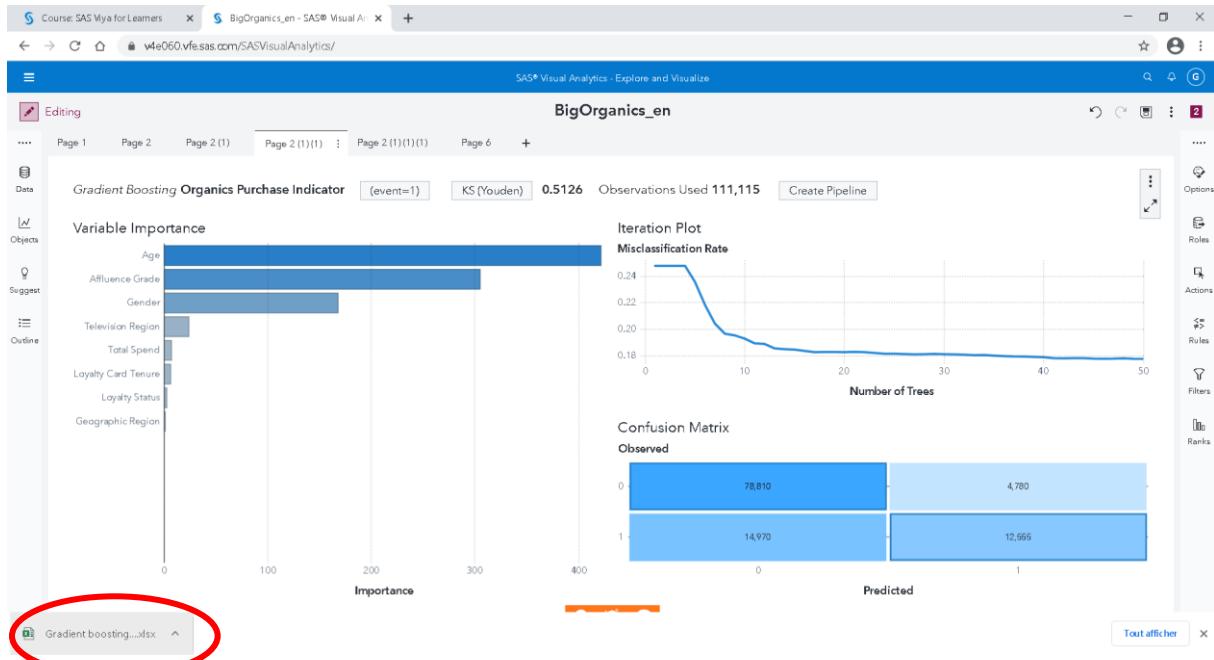
Go back to page 2(1)(1): Gradient boosting



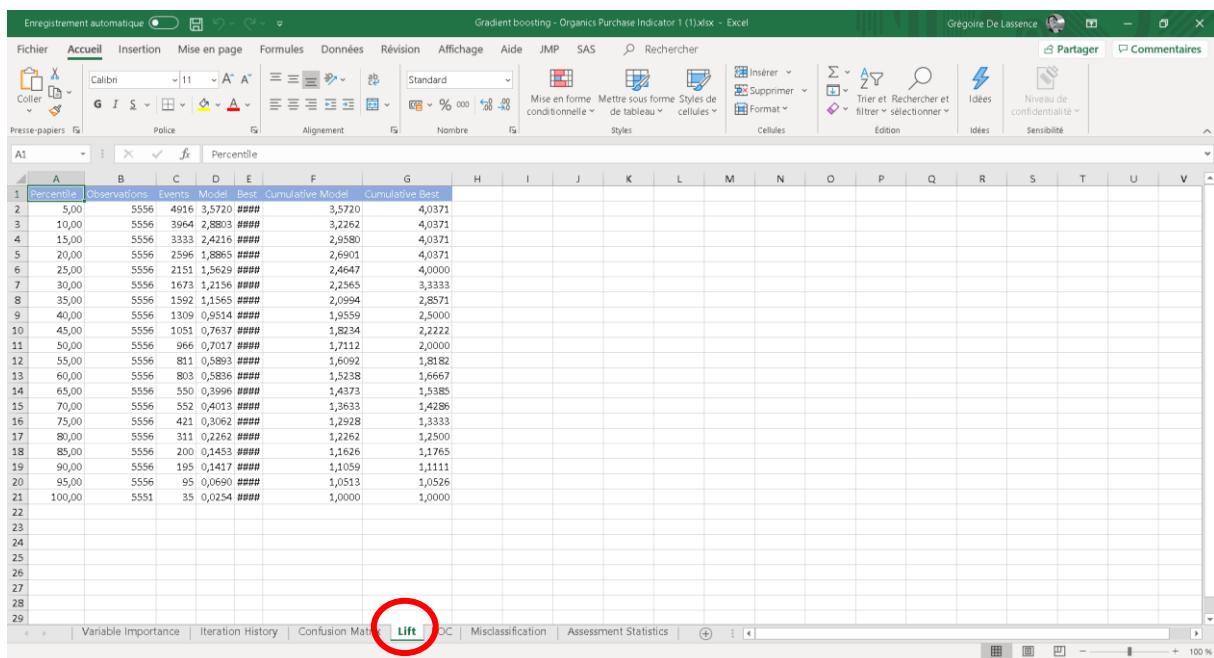
Right click in the middle → Export data



OK



Open the downloaded Excel file



Go to Lift Sheet
Create a ROI column

Gradient Boosting - Organics Purchase Indicator.xlsx - Lecture seule - Excel

The screenshot shows a Microsoft Excel spreadsheet titled "Gradient Boosting - Organics Purchase Indicator.xlsx - Lecture seule - Excel". The ribbon menu is visible at the top, showing tabs like Fichier, Accueil, Insertion, Mise en page, Formules, Données, Révision, Affichage, Aide, SAS, and Rechercher des outils adaptés. The main area displays a table with columns labeled Percentile, Observations, Events, Model_Best, Cumulative Model, Cumulative Best, and ROI. The first row contains the formula $=100000*A2/100*(-2+5*F2*25/100)$. The table has 21 rows of data, with the last row being the total.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
1	Percentile	Observations	Events	Model_Best	Cumulative Model	Cumulative Best	ROI														
2	5,00	5556	5021	3,6483 ####	3,6483	4,0371	12802														
3	10,00	5556	3976	2,8890 ####	3,2687	4,0371	20858,31														
4	15,00	5556	3216	2,3368 ####	2,9580	4,0371	25463,22														
5	20,00	5556	2664	1,9357 ####	2,7025	4,0371	27561,31														
6	25,00	5556	2078	1,5099 ####	2,4639	4,0000	26998,18														
7	30,00	5556	1760	1,2788 ####	2,2664	3,3333	24990,92														
8	35,00	5556	1491	1,0834 ####	2,0974	2,8571	21762,03														
9	40,00	5556	1377	1,0005 ####	1,9603	2,5000	18015,44														
10	45,00	5556	1057	0,7680 ####	1,8278	2,2222	12815,62														
11	50,00	5556	870	0,6322 ####	1,7083	2,0000	6766,576														
12	55,00	5556	880	0,6394 ####	1,6111	1,8182	762,9428														
13	60,00	5556	712	0,5174 ####	1,5200	1,6667	-6003,07														
14	65,00	5556	618	0,4490 ####	1,4376	1,5385	-13197,1														
15	70,00	5556	545	0,3960 ####	1,3632	1,4286	-20722,1														
16	75,00	5556	410	0,2979 ####	1,2922	1,3333	-28860,1														
17	80,00	5556	300	0,2180 ####	1,2250	1,2500	-37497,7														
18	85,00	5556	235	0,1708 ####	1,1630	1,1765	-46430,5														
19	90,00	5556	171	0,1243 ####	1,1053	1,1111	-55654														
20	95,00	5556	109	0,0792 ####	1,0513	1,0526	-65158,9														
21	100,00	5551	35	0,0254 ####	1,0000	1,0000	-75000														

Moyenne : 7486,347639 Nb (non vides) : 20 Somme : 149726,9520 100 %

For the first cell, the formula (in cell H2) is

$$=100000*A2/100*(-2+5*F2*25/100)$$

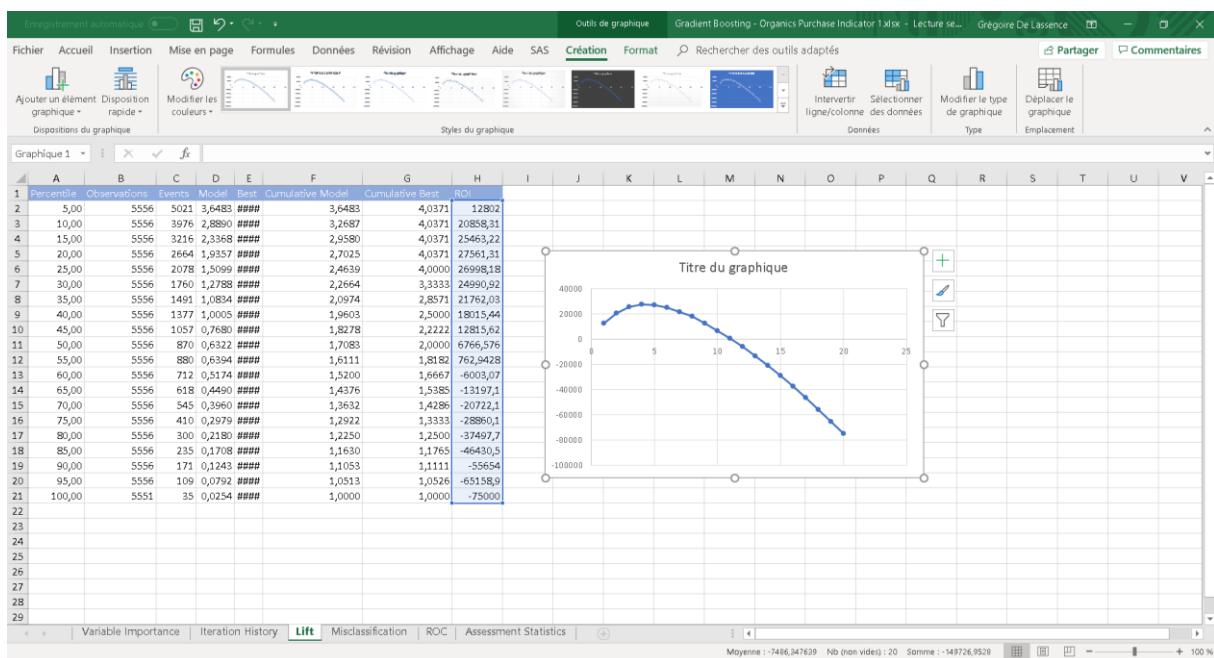
They is more than 100 000 customer in the Organics Table

25/100 : they is 25% of customer who by organic's products. That the default base rate in this case.

The cost of sending a letter is 2£. The Benefits is 5£.

If we select the 5% who've got the highest probability to by a product and send an advertise, the default return rate from 25% will be multiply by the lift from the model (3,64¹ at 5%). The ROI will be 12 802£.

Use can use the ROI formula to the all column



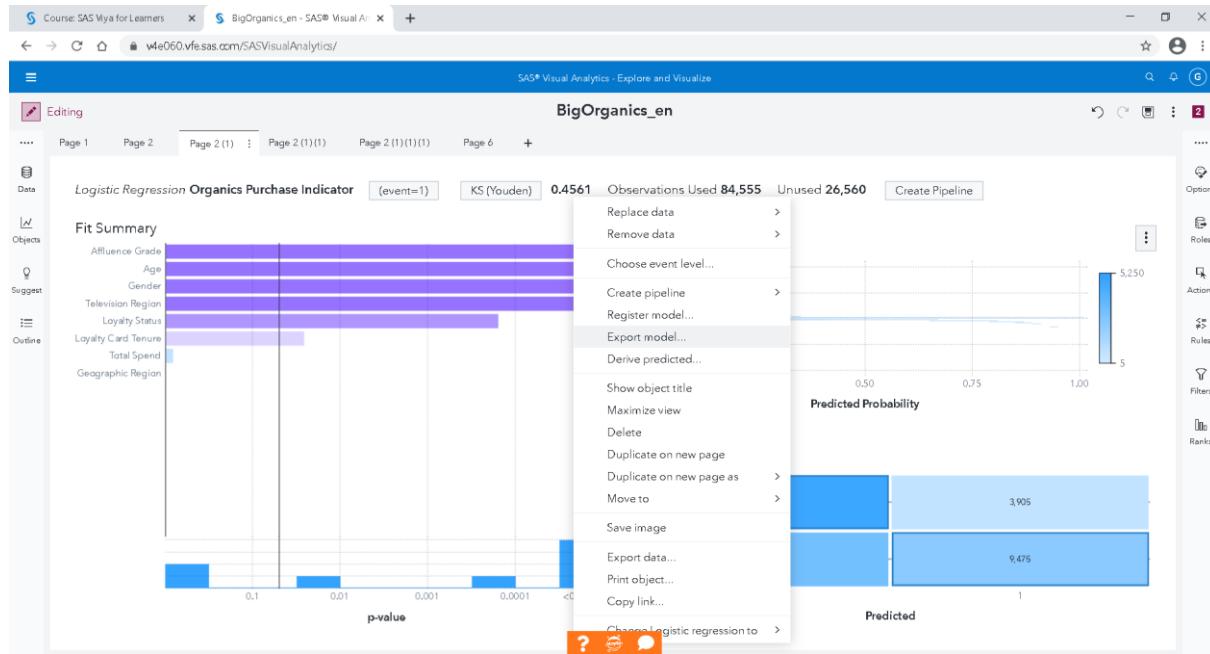
The maximum of the ROI is at 20%.

¹ SAS Viya compute Algorithms on data in block in memory, in parallel. All results can be a little different.

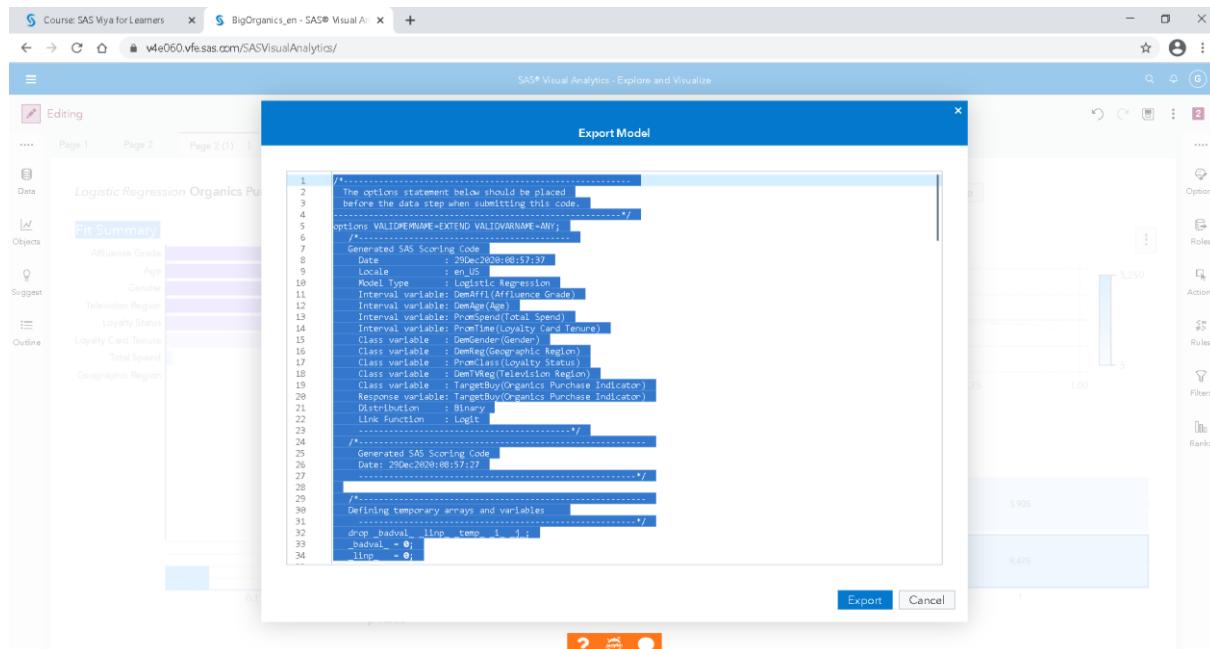
If we select the 5% who has the highest probability to by a product, we must get 12 802£ back.
If we select the 20% who has the highest probability to by a product, we must get 27 561£ back.

Score today table

[Go back to SAS Visual Analytics](#)

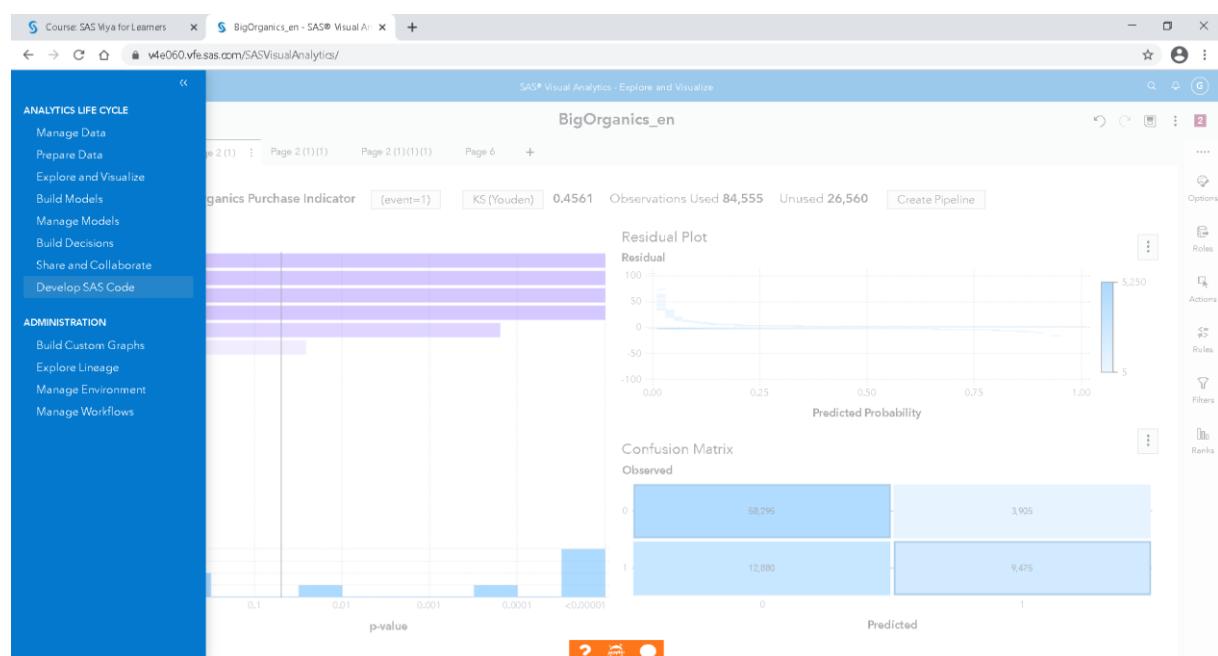
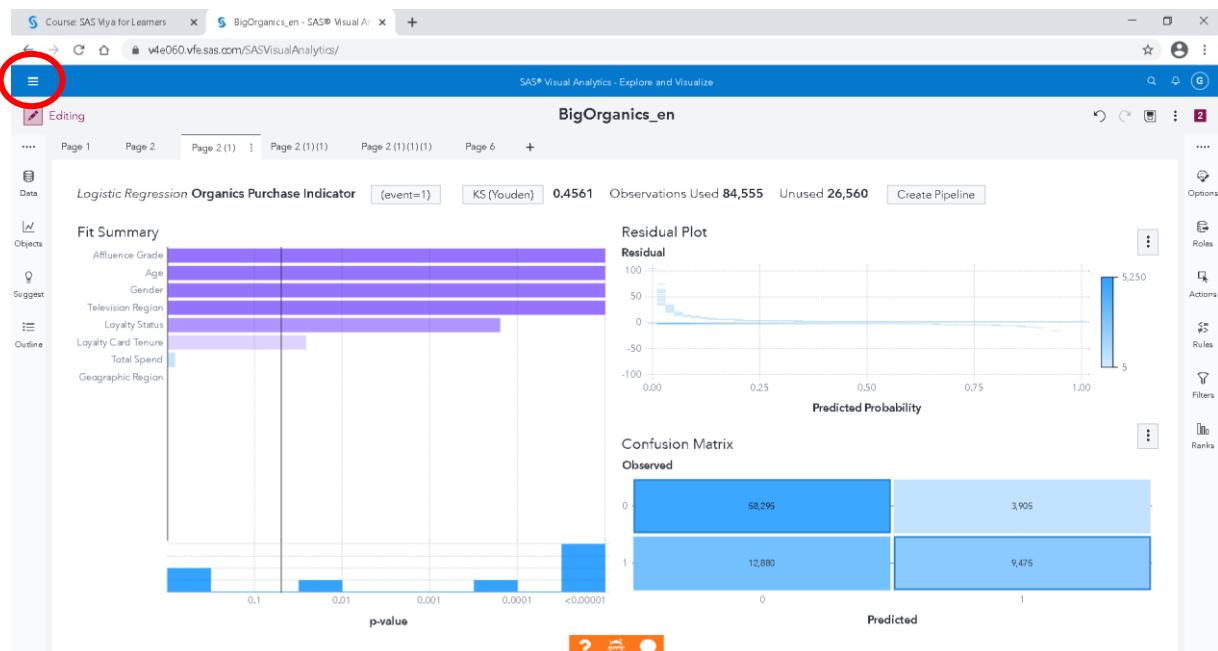


Go to page 2 (1): Logistic Regression
Right click in the middle → Export model



Select all (Ctrl + A)
Copy all (Ctrl + C)
Cancel

In the top left corner,



Select “Develop SAS code”

Welcome to
SAS STUDIO
Develop SAS programs in a rich programming environment.

Tasks
Analyze data and create reports via point-and-click interfaces.

Data Access
Import and access data seamlessly.

Data Preparation
Join, filter, sort, and transform data via a robust Query Builder.

Collaboration
Organize and share work.

Start Page

New SAS Program

Past the code you copy and before, copy the following code

```
“
cas;
caslib _all_ assign;
```

Data MyOrganicsTableScored;
set tundata.bigorganics;

“

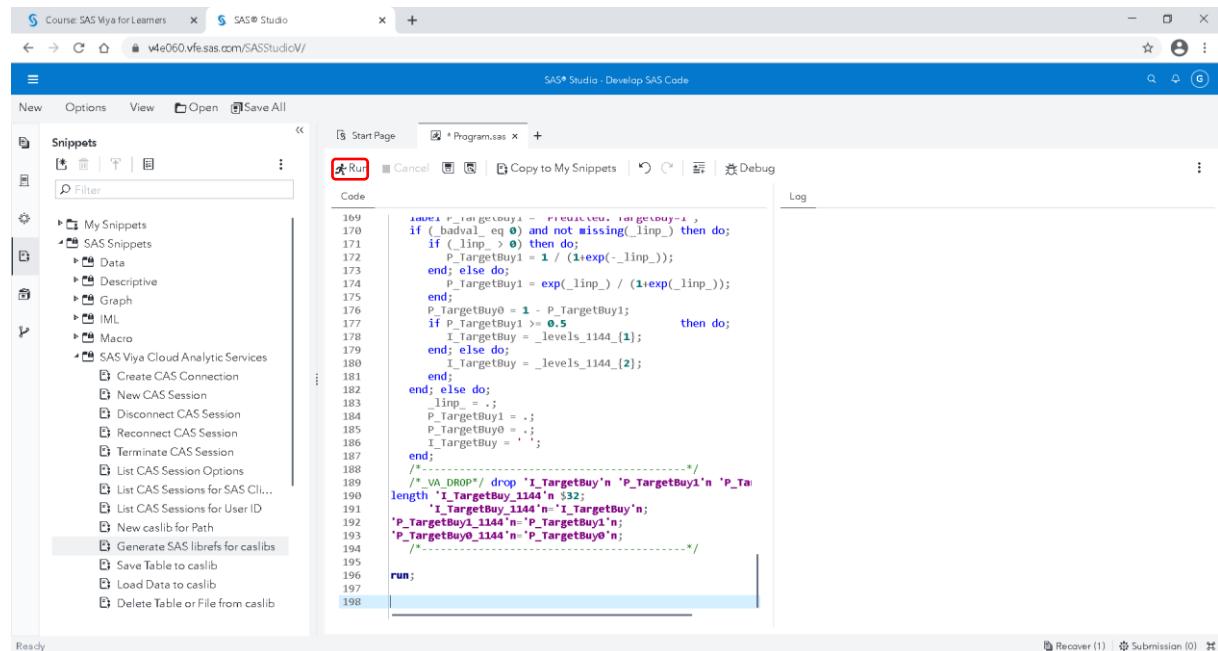
```
1 cas;
2 caslib _all_ assign;
3
4 Data MyOrganicsTableScored;
5 set tundata.bigorganics;
6
7 /*
8
9 *-----*
10 * The options statement below should be placed
11 * before the data step when submitting this code.
12 *
13 options VALIDMEMNAME=EXTEND VALIDVARNAME=ANY;
14 */
15
16 Generated SAS Scoring Code
17 Date : 29Dec2020:08:57:37
18 Locale : en_US
19 Model Type : Logistic Regression
20 Interval variable: Demographic Influence Grade
21 Interval variable: Demographic Age
22 Interval variable: PromSpend(Total Spend)
23 Class variable : DemGender(Gender)
24 Class variable : DemReg(Geographic Region)
25 Class variable : PromClass(Loyalty Status)
26 Class variable : DemTVReg(Television Region)
27 Class variable : TargetBuy(Organics Purchase Indic)
28 Response variable: TargetBuy(Organics Purchase Indic)
29 Distribution : Binary
30 Link Function : Logit
```

Go to the top bottom from the code, and tape

"

Run;

"



SAS Studio - Develop SAS Code

Start Page Program.sas

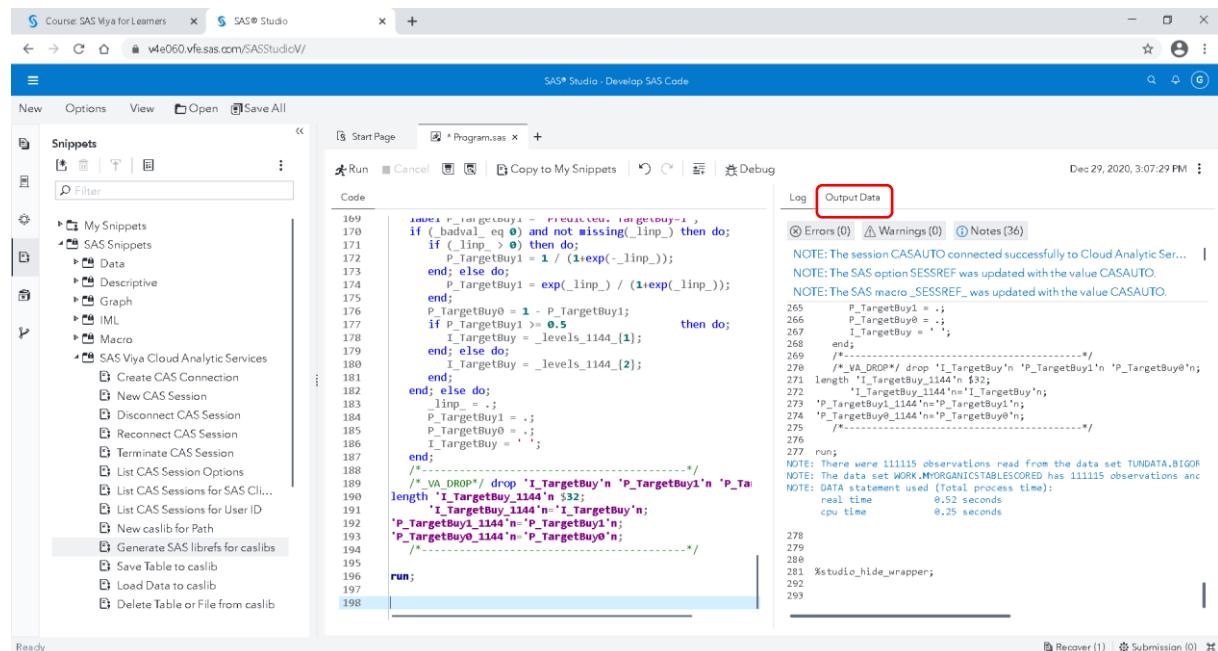
Run Cancel Copy to My Snippets Debug

Code

```
169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198
```

The screenshot shows the SAS Studio interface with the 'Program.sas' tab selected. The 'Run' button is highlighted with a red box. The code editor contains SAS code related to target buy calculations. The log pane at the bottom right shows the run status.

Then, click on run to Submit



SAS Studio - Develop SAS Code

Start Page Program.sas

Run Cancel Copy to My Snippets Debug

Output Data

Log Errors (0) Warnings (0) Notes (36)

Dec 29, 2020, 3:07:29 PM

```
169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198
```

The screenshot shows the SAS Studio interface after running the code. The 'Output Data' tab is highlighted with a red box. The log pane displays various notes and system messages related to the SAS session and macro updates.

```

169 label P_TargetBuy1 = 'Predicted: TargetBuy=1';
170 if (_badval_ eq 0) and not missing(_linp_) then do;
171   if (_linp_ > 0) then do;
172     P_TargetBuy1 = 1 / (1+exp(-_linp_));
173   end; else do;
174     P_TargetBuy1 = exp(_linp_) / (1+exp(_linp_));
175   end;
176   P_TargetBuy0 = 1 - P_TargetBuy1;
177   if P_TargetBuy1 >= 0.5 then do;
178     I_TargetBuy = _levels_1144_[1];
179   end; else do;
180     I_TargetBuy = _levels_1144_[2];
181   end;
182 end; else do;
183   _linp_ = .;
184   p_TargetBuy1 = .;
185   p_TargetBuy0 = .;
186   I_TargetBuy = ' ';
187 end;
188 /*-----*/
189 /* VA_DROP */ drop "I_TargetBuy'n" "P_TargetBuy1'n" "P_TargetBuy0'n";
190 length "I_TargetBuy_1144'n" $32;
191   "I_TargetBuy_1144'n" "I_TargetBuy'n";
192   "P_TargetBuy1_1144'n" "P_TargetBuy1'n";
193   "P_TargetBuy0_1144'n" "P_TargetBuy0'n";
194 /*-----*/
195
196
197 run;

```

	I_TargetBuy_1144	P_TargetBuy1_1144
1	0	0.229475763
2	0	0.0215158189
3	0	0.035659887
4	0	0.1057352977
5	0	0.2537037091
6	0	0.0140112865
7	0	0.2054086637
8	0	0.2504008888
9	0	0.1235823866
10		-
11	0	0.1800725018
12		-
n		0.229475763

In the Output Data, you can sort the table descending by the P_TargetBuy1_xxx column

Right-click on P_TargetBuy1_xxx column name, sort → Descending

```

169 label P_TargetBuy1 = 'Predicted: TargetBuy=1';
170 if (_badval_ eq 0) and not missing(_linp_) then do;
171   if (_linp_ > 0) then do;
172     P_TargetBuy1 = 1 / (1+exp(-_linp_));
173   end; else do;
174     P_TargetBuy1 = exp(_linp_) / (1+exp(_linp_));
175   end;
176   P_TargetBuy0 = 1 - P_TargetBuy1;
177   if P_TargetBuy1 >= 0.5 then do;
178     I_TargetBuy = _levels_1144_[1];
179   end; else do;
180     I_TargetBuy = _levels_1144_[2];
181   end;
182 end; else do;
183   _linp_ = .;
184   p_TargetBuy1 = .;
185   p_TargetBuy0 = .;
186   I_TargetBuy = ' ';
187 end;
188 /*-----*/
189 /* VA_DROP */ drop "I_TargetBuy'n" "P_TargetBuy1'n" "P_TargetBuy0'n";
190 length "I_TargetBuy_1144'n" $32;
191   "I_TargetBuy_1144'n" "I_TargetBuy'n";
192   "P_TargetBuy1_1144'n" "P_TargetBuy1'n";
193   "P_TargetBuy0_1144'n" "P_TargetBuy0'n";
194 /*-----*/
195
196
197 run;

```

	I_TargetBuy_1144	P_TargetBuy1_1144
1	0	0.229475763
2	0	0.0215158189
3	0	0.035659887
4	0	0.1057352977
5	0	0.2537037091
6	0	0.0140112865
7	0	0.2054086637
8	0	0.2504008888
9	0	0.1235823866
10		-
11	0	0.1800725018
12		-
n		0.229475763

The screenshot shows a SAS Studio interface with a code editor and a log viewer.

Code Editor:

```
169 label P_TargetBuy1 = 'Predicted: TargetBuy=1';
170 if (_badval_ eq 0) and not missing(_linp_) then do;
171   if (_linp_ > 0) then do;
172     P_TargetBuy1 = 1 / (1+exp(-_linp_));
173   end; else do;
174     P_TargetBuy1 = exp(_linp_) / (1+exp(_linp_));
175   end;
176   P_TargetBuy0 = 1 - P_TargetBuy1;
177   if P_TargetBuy1 >= 0.5      then do;
178     I_TargetBuy = _levels_1144_[1];
179   end; else do;
180     I_TargetBuy = _levels_1144_[2];
181   end;
182 end; else do;
183   _linp_ = .;
184   P_TargetBuy1 = .;
185   P_TargetBuy0 = .;
186   I_TargetBuy = '';
187 end;
188 /*-----*/
189 /* VA DROP */ drop 'I_TargetBuy'n 'P_TargetBuy1'n 'P_TargetBuy0'n;
length 'I_TargetBuy_1144'n $32;
'I_TargetBuy_1144'n='I_TargetBuy'n;
'P_TargetBuy1_1144'n='P_TargetBuy1'n;
'P_TargetBuy0_1144'n='P_TargetBuy0'n;
/*-----*/
run;
```

Log Viewer:

Log	Output Data
W Columns: 16 of 16 Total rows: 111115 Rows 1 to 200	Enter expression
1	0.9979369212
2	0.9979369212
3	0.9979369212
4	0.9979369212
5	0.9979369212
6	0.9963138555
7	0.9963138555
8	0.9963138555
9	0.9963138555
10	0.9963101119
11	0.9963101119
12	0.9963101119
13	0.9963101119

Go back to SAS Visual Analytics, on top left corner, click on “Explore and Visualize”.

Save your report as

Exercises

Create a new report on the table PVA and redo the same stuff as you do on Bigorganics.

A national veterans' organization seeks to better target its solicitations for donation. By soliciting only the most likely donors, less money is spent on solicitation efforts and more money is available for charitable concerns. Solicitations involve sending a small gift to an individual and include a request for a donation. Gifts to donors include mailing labels and greeting cards.

Name	Description	Role
DemAge	Age	Predictor
DemCluster	Demographic Cluster	Predictor
DemGender	Gender	Predictor
DemHomeOwner	Home Owner	Predictor
DemMedHomeValue	Median Home Value Region	Predictor
DemMedIncome	Median Income Region	Predictor
DemPctVeterans	Percent Veterans Region	Predictor
GiftAvg36	Gift Amount Average 36 Months	Predictor
GiftAvgAll	Gift Amount Average All Months	Predictor
GiftAvgCard36	Gift Amount Average Card 36 Months	Predictor
GiftAvgLast	Gift Amount Last	Predictor
GiftCnt36	Gift Count 36 Months	Predictor
GiftCntAll	Gift Count All Months	Predictor
GiftCntCard36	Gift Count Card 36 Months	Predictor
GiftCntCardAll	Gift Count Card All Months	Predictor
GiftTimeFirst	Time Since First Gift	Predictor
GiftTimeLast	Time Since Last Gift	Predictor
ID	Control Number	Don't use
PromCnt12	Promotion Count 12 Months	Predictor
PromCnt36	Promotion Count 36 Months	Predictor
PromCntAll	Promotion Count All Months	Predictor
PromCntCard12	Promotion Count Card 12 Months	Predictor
PromCntCard36	Promotion Count Card 36 Months	Predictor
PromCntCardAll	Promotion Count Card All Months	Predictor
StatusCat96NK	Status Category 96NK	Predictor
StatusCatStarAll	Status Category Star All Months	Predictor
TARGET_B	Target Gift Flag	Response
TARGET_D	Target Gift Amount	Don't use
TARGET_D_with zero	Target Gift Amount with zero	Don't use

For the Rol,

average cost = 2\$

Margin = 3\$

Print your report: it will create a pdf. Save the pdf and the Excel file and send them by mail to our professor.