



# How to play Cortex on SAS Viya

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## ROUND 1

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**ERPsimLab**  
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Serious games to learn  
enterprise systems and  
business analytics

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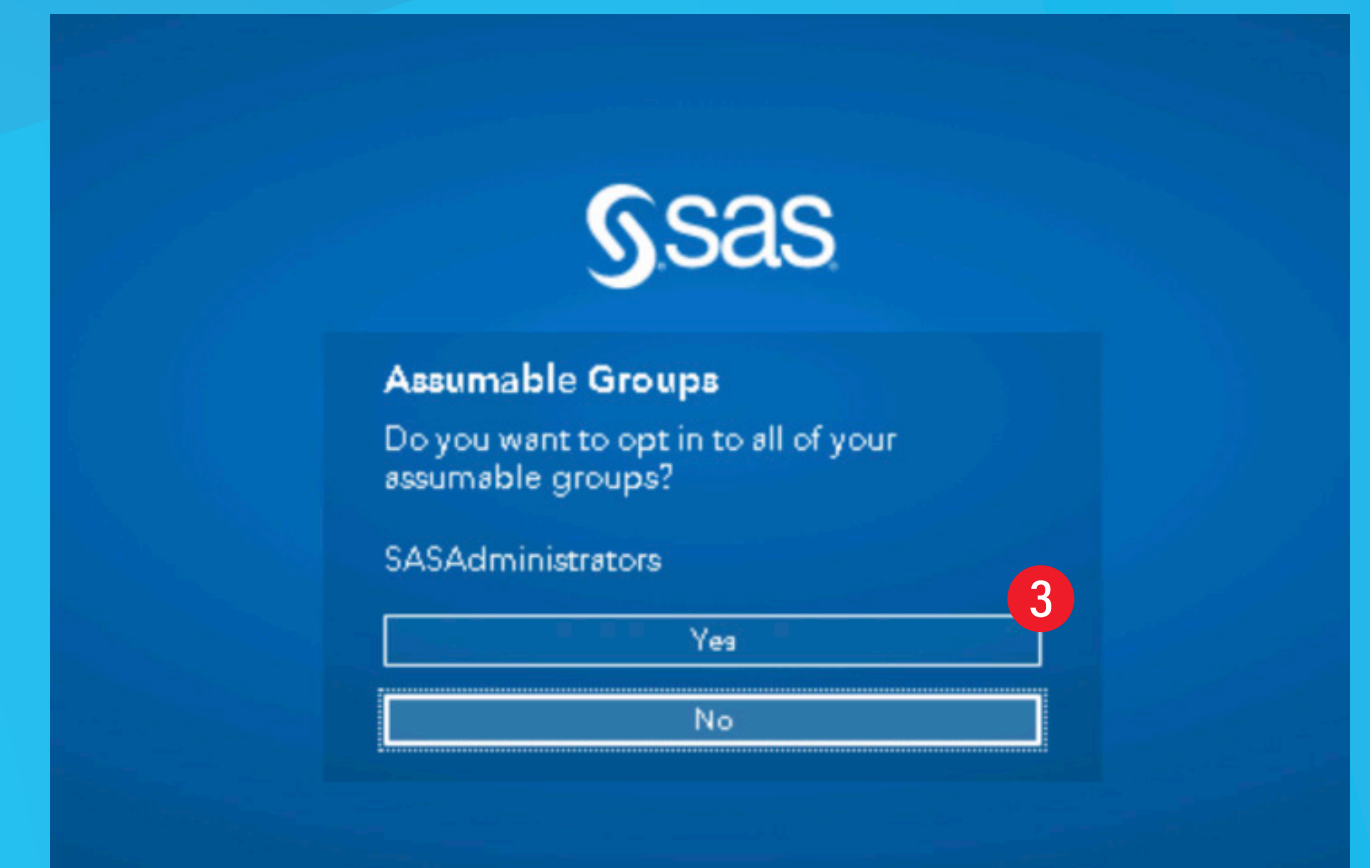
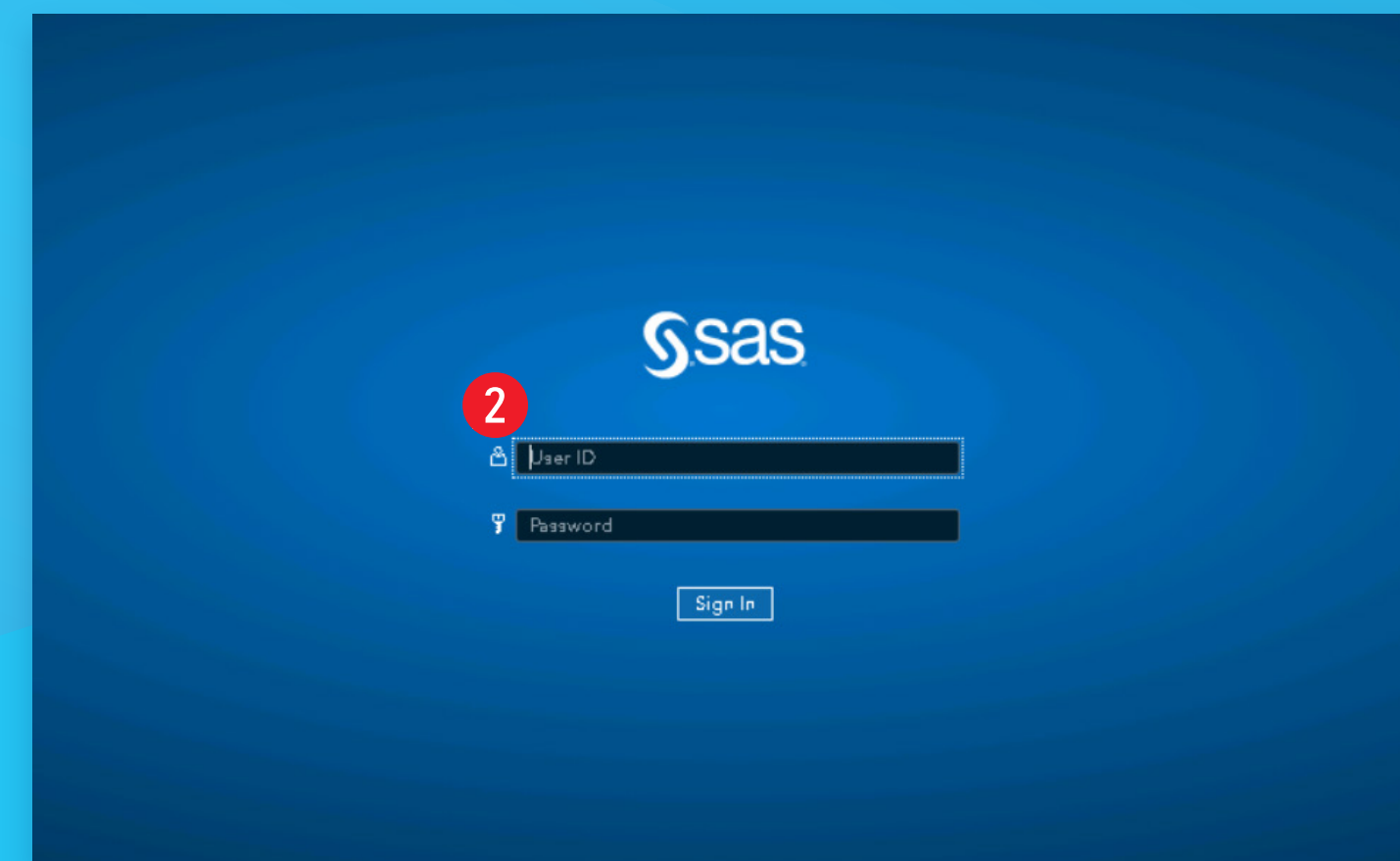
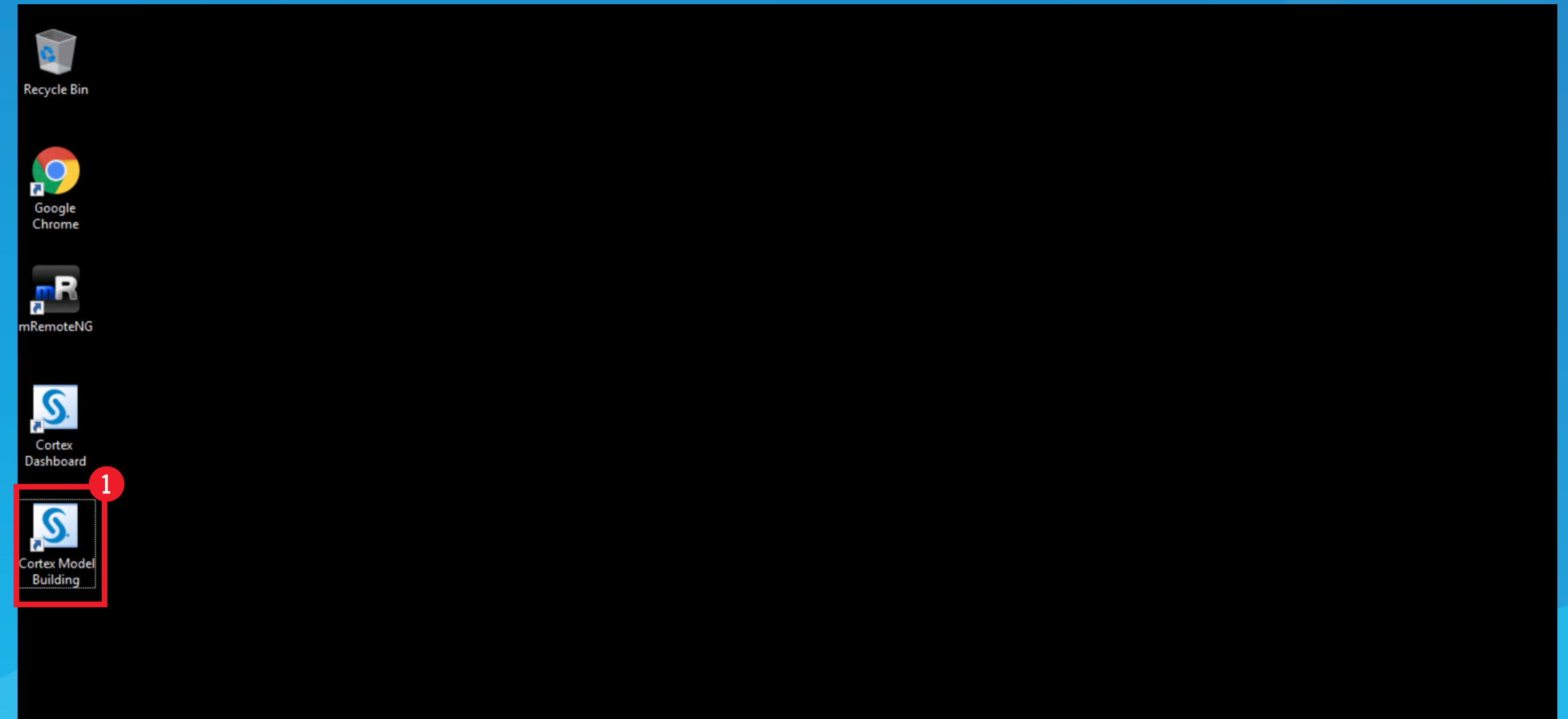
# Access SAS Viya

1. On your desktop, click on 'Cortex Model Building' icon
2. Enter your User ID and Password\*
3. Select 'Yes' when asked about 'Assumable Groups'

\* Please use the following user ID and password unless otherwise specified by your instructor:

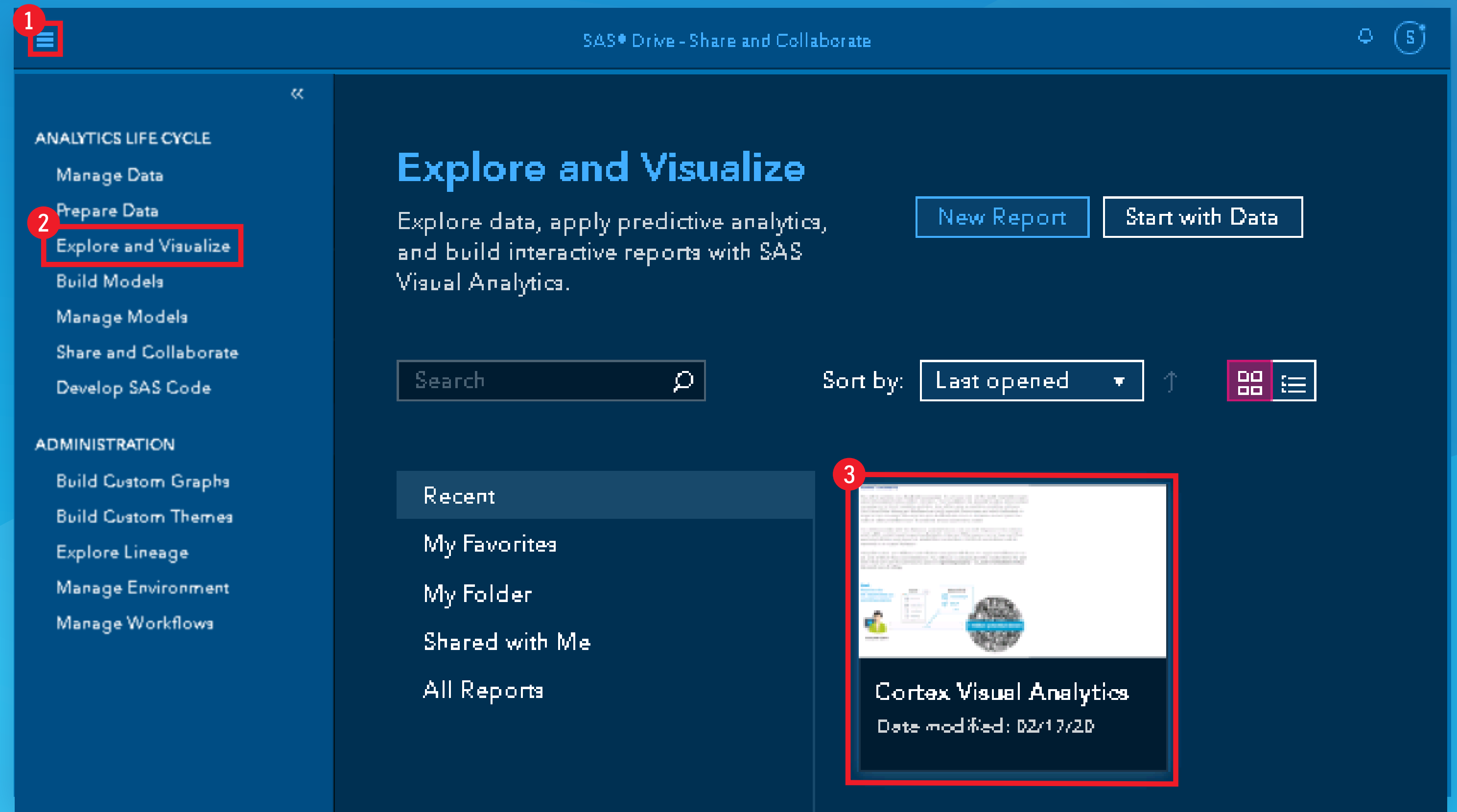
**User ID:** student

**Password:** Metadata0



# Explore the Game

1. In SAS Drive, click on the hamburger icon at the top left corner
2. Select 'Explore and Visualize'
3. Double click on 'Cortex Visual Analytics'







Use the first three tabs (Game Scenario, Data Dictionary and RD1: Explanation AmtThisYear) to explore the game scenario and game data for round 1

Editing

Cortex Visual Analytics

Game ScenarioData DictionaryRD1: Explanantion AmtThisYearRD1: DonorsRD2: Explanation Conditional Give This YearRD2: Explanation Conditional AmtThisYearRD2: Donors+

Game's scenario

You will be working on a fundraising campaign for a 12-year old, not-for-profit charitable organization (foundation) with a million members. The foundation has decided to add a direct contact campaign to its list of marketing activities. You will be using a predictive modeling software (SAS Visual Data Mining and Machine Learning) to predict how many and which individuals to target in the campaign. The objective is to fundraise the most in donation amount given the costs of calling members (sum of predicted amount given minus costs).

You will be provided with the dataset of potential donors, and pre-built diagrams in the software, which will fit models based on previous behavior of donors (if they gave or not or how much they gave) and will also score donors to predict this year donation. The list of scored donors will be exported to an output file/report.

Using this output, you will have to decide how many potential donors to target and will have to create a list of IDs of those potential donors. You will have to upload/submit the created list to the platform which will rank the submissions based on **operating surplus – i.e., sum of donations minus the total cost of calling**.

Goal:

Maximize the net raised funds (i.e. operating surplus)

DATA

Income  
Education  
Location  
History  
...

ANALYTICS

How many?  
Who?  
...

1 million potential donors

CALLING COST

Available information

In order to play the game and make decisions, you will have access to a dataset of 1 million potential donors as well as the costs associated to calling them (given to you by your teacher):

**Table 1 Members' Data (please see table 3 for a full list of variables)**

Category of data	Example
Membership activity (historical info)	Minimum, maximum, & total donation, ...
Demographic data	Age, Gender, ...
Socioeconomic status	Salary, education...
Previous behaviour (last year & this year)	If members gave and how much

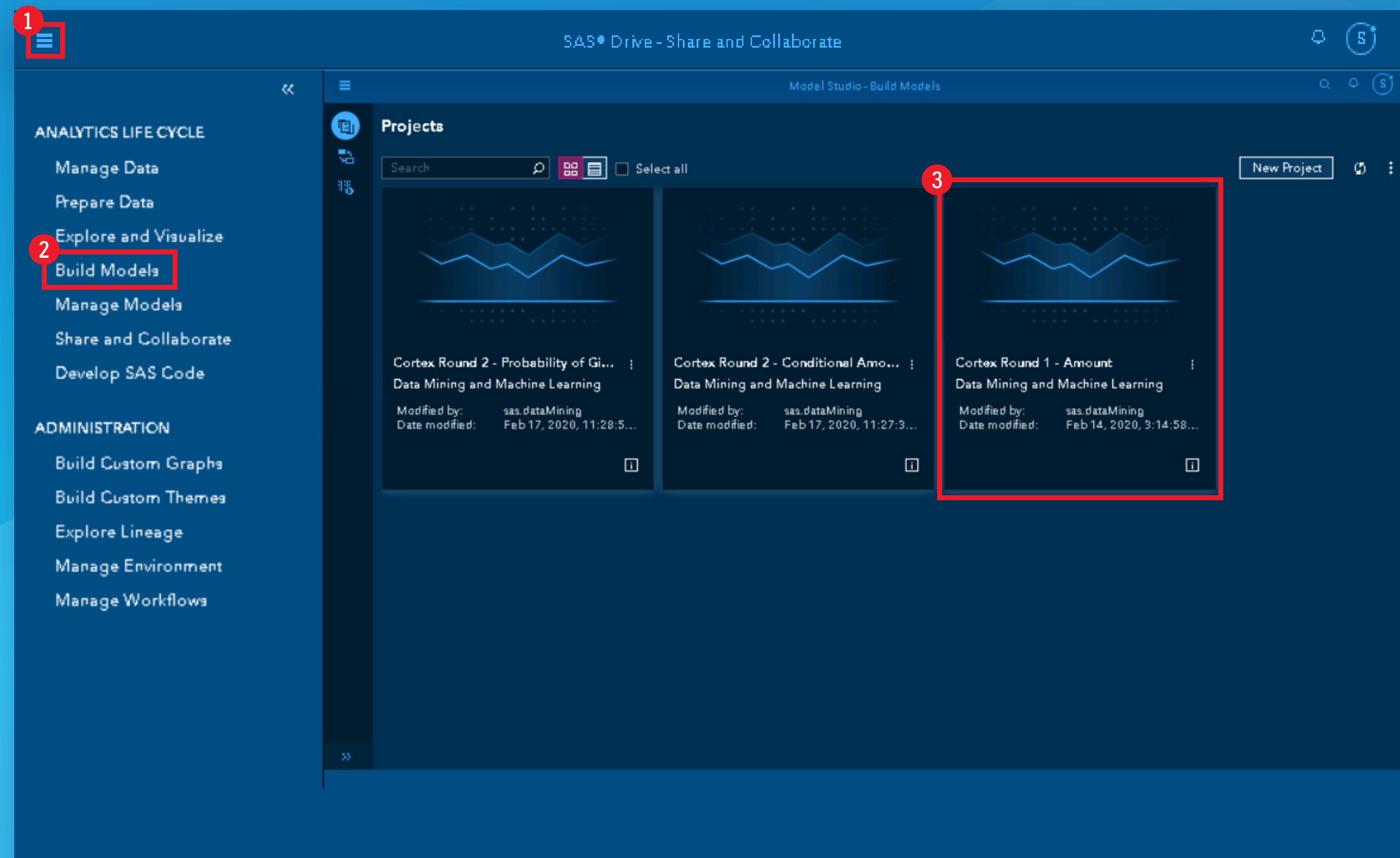
**Table 2 Example of a Cost Schedule\***

Number of contacted members	Cost per person
0 - 60,000	5\$/person
> 60,000	25\$/person

\* Please note that the cost schedule could vary from game to game. Make sure that you are using the correct cost schedule communicated to you by your teacher.

# Open Project: Cortex Round 1 - Amount

1. In SAS Drive, click on the hamburger icon at the top left corner
2. Select 'Build Models'
3. Double click on 'Cortex Round 1 – Amount'





# Assign Variable Roles

To change or reject some variable roles:

- 1. Select the variable and change their roles on the right-side panel

**NOTE:** Choose variables one at a time by deselecting one before selecting the next

- 2. Once done with changing variable role, click on the 'Pipelines' tab

**NOTE:** 'AmtThisYear' should stay the target Variable and 'GaveThisYear' should stay rejected

2

Pipelines

Variable Name	Label	Type	Role	Level	Order	Comment	Number
<input checked="" type="checkbox"/> Age		Numeric	Input	Interval	Default		75
<input type="checkbox"/> AmtLastYear		Numeric	Input	Interval	Default		49
<input type="checkbox"/> AmtThisYear		Numeric	Target	Interval	Default		49
<input type="checkbox"/> City		Character	Input	Nominal	Default		4
<input type="checkbox"/> Education		Character	Input	Nominal	Default		3
<input type="checkbox"/> FirstName		Character	ID	Nominal	Default	The variable exceeds the maximum number of levels cutoff value.	>254
<input type="checkbox"/> Frequency		Numeric	Input	Interval	Default		10
<input type="checkbox"/> GaveLastYear		Numeric	Input	Binary	Default		2
<input type="checkbox"/> GaveThisYear		Numeric	Rejected	Binary	Default		2
<input type="checkbox"/> ID		Numeric	ID	Interval	Default		>254
<input type="checkbox"/> LastName		Character	ID	Nominal	Default	The variable exceeds the maximum number of levels cutoff value.	>254
<input type="checkbox"/> MaxGift		Numeric	Input	Interval	Default		48
<input type="checkbox"/> MinGift		Numeric	Input	Interval	Default		48
<input type="checkbox"/> NbActivities		Numeric	Input	Interval	Default		11
<input type="checkbox"/> Recency		Numeric	Input	Interval	Default		10

1

Age

Role: 

Input

Level: 

Interval

Order:

Transform: 

Default

Impute: 

Default

Lower limit: 

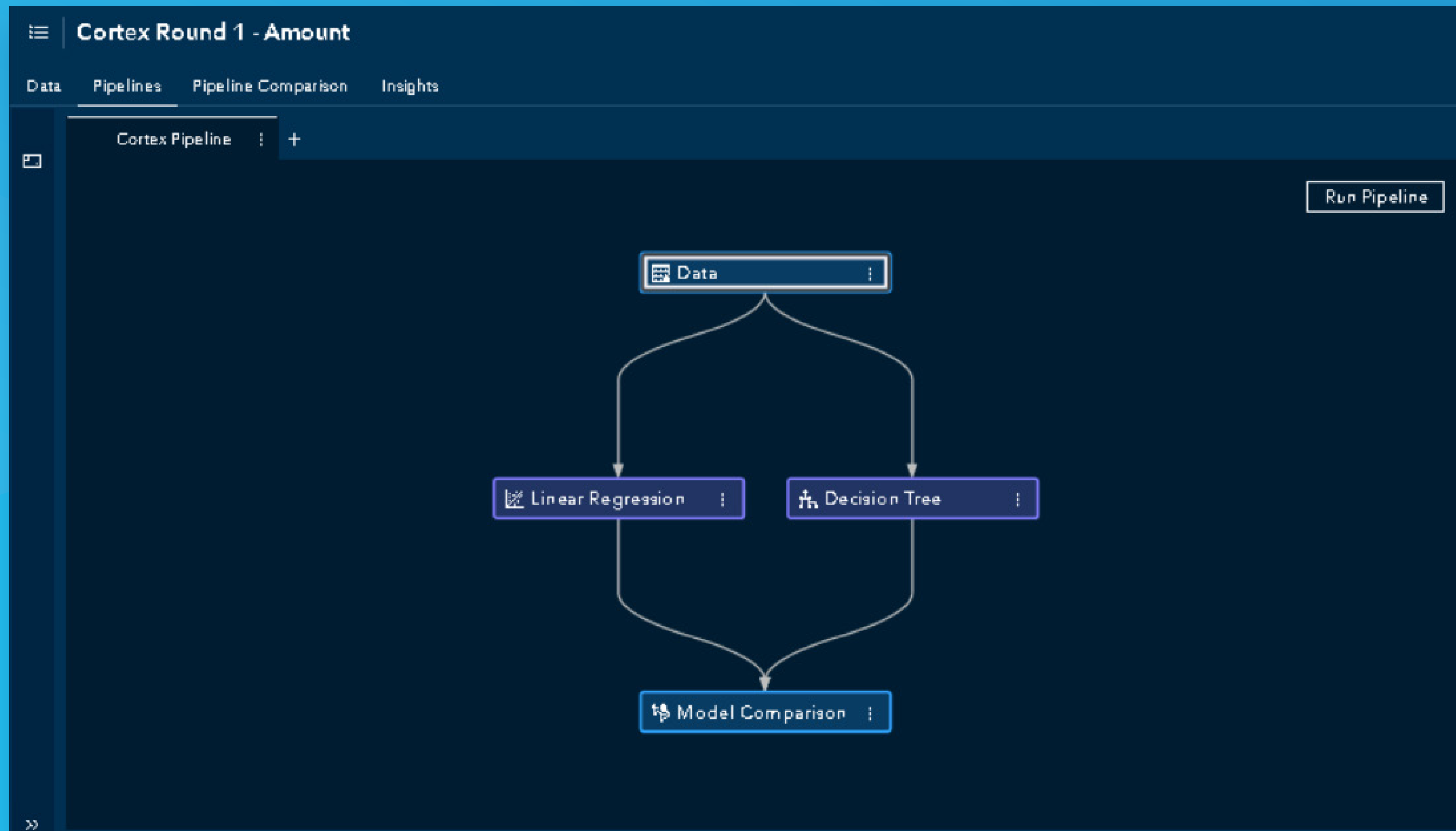
Enter a decimal value

Upper limit: 

Enter a decimal value

# Pipeline for Round 1

*Here is a pre-built pipeline that you can start with*



# Improve the Default Models

To open the properties of each model:

1. Click on the model's node to see the node options on the right-hand side.
2. To learn more about the nodes click on 'Node' details:
  - You should try to improve models' properties.
  - Remember your mission is to better predict who to call!



*Different models have different properties that can be modified*

**Change properties:**  
Click on the model node you want to change, and modify the properties (right-hand side)

**1** Linear Regression

**2** Linear Regression

Description:  
Fits an ordinary least squares regression model for an interval target.

> Effects Options

Selection method:  
Stepwise

> Selection Options

☒ Use the exact percentile method for lift calculations

Post-training Properties  
Changing these properties will not retrain the model.

Model Interpretability

> Global Interpretability

> Local Interpretability

> PD/ICE Options

Seed:  
12,345



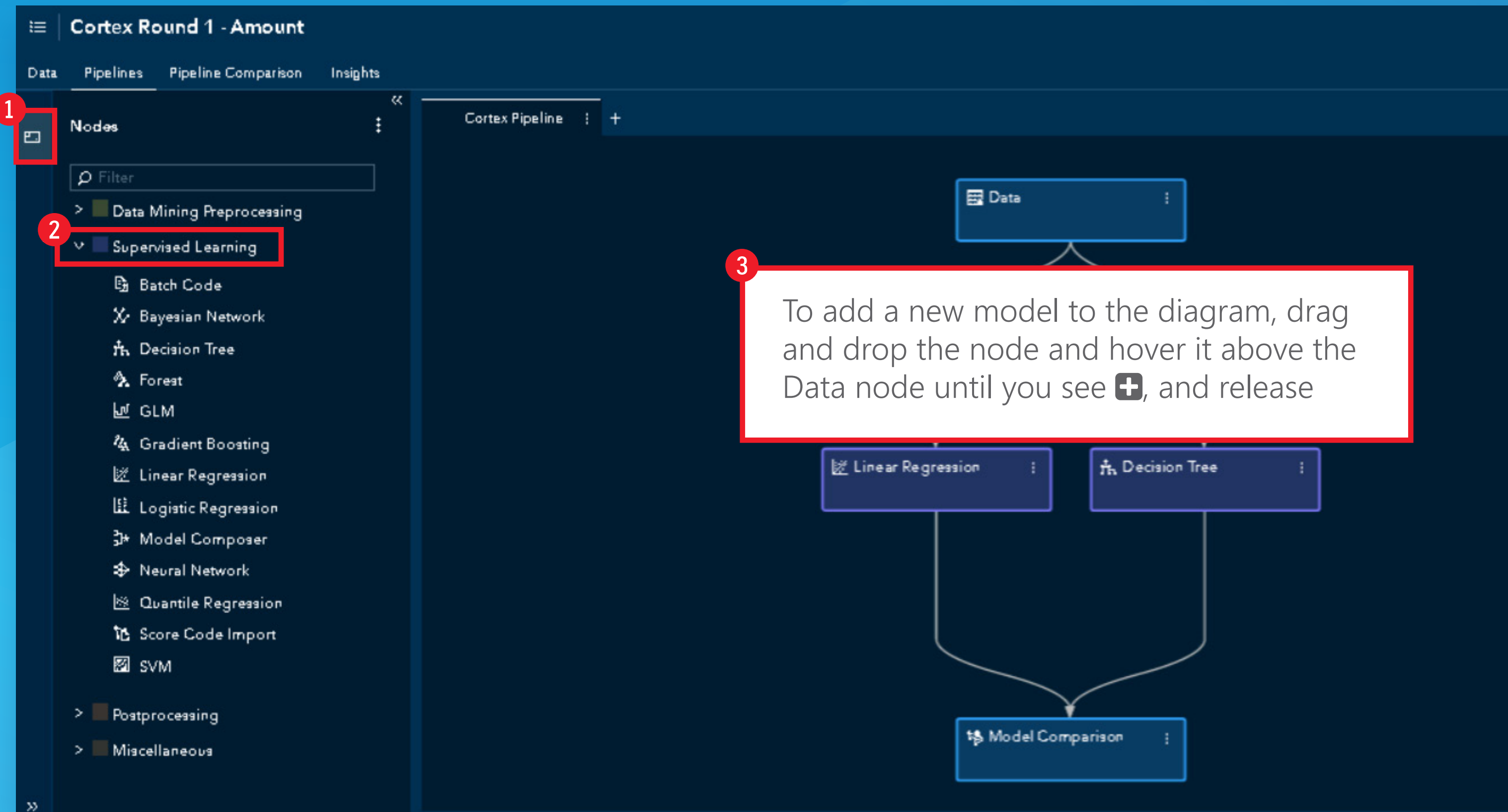
# Improve the Default Pipeline

1. Click on the 'Nodes' icon on the left to reveal additional nodes
2. Under 'Supervised Learning', find other predictive models that you can use
3. Drag the selected model to the data node and release

**NOTE:** Depending on the selected models, the 'run' time could vary significantly. E.g., execution of Neural Nets or Gradient Boosting, might take longer to finish!



*Additional models can be added to the pipeline to experiment with different predictive modeling approaches and to improve the pipeline*



# Run the Pipeline/ See Results

1. Click on 'Run Pipeline'

**NOTE:** green check marks appear on nodes when run is complete


2. When run is complete, right-click on the 'Model Comparison' node and click on 'Results'

3. In 'Model Comparison Results' see the Champion Model

**NOTE:** the model with the lower 'Average Squared Error' is chosen

4. Click on 'Close', to return to your pipeline page

The screenshot shows the Cortex Pipeline interface. At the top, a 'Run Pipeline' button is highlighted with a red box and a red circle with the number 1. The pipeline consists of three nodes: 'Data', 'Linear Regression', and 'Decision Tree'. All nodes have a green checkmark, indicating they are complete. A context menu is open over the 'Model Comparison' node, with the 'Results' option highlighted by a red box and a red circle with the number 2. A red arrow points from the 'Results' option to the 'Model Comparison Results' window below. In this window, the 'Champion' model is highlighted with a red box and a red circle with the number 3. The 'Average Squared Error' for the Champion model is highlighted with a red box. The 'Close' button in the top right corner of the window is also highlighted with a red box and a red circle with the number 4.

Champion	Name	Algorithm Name	Average Squared Error	Root Average Square...
	Linear Regression	Linear Regression	5,542.8827	74.4505
	Decision Tree	Decision Tree	5,556.3010	74.5406

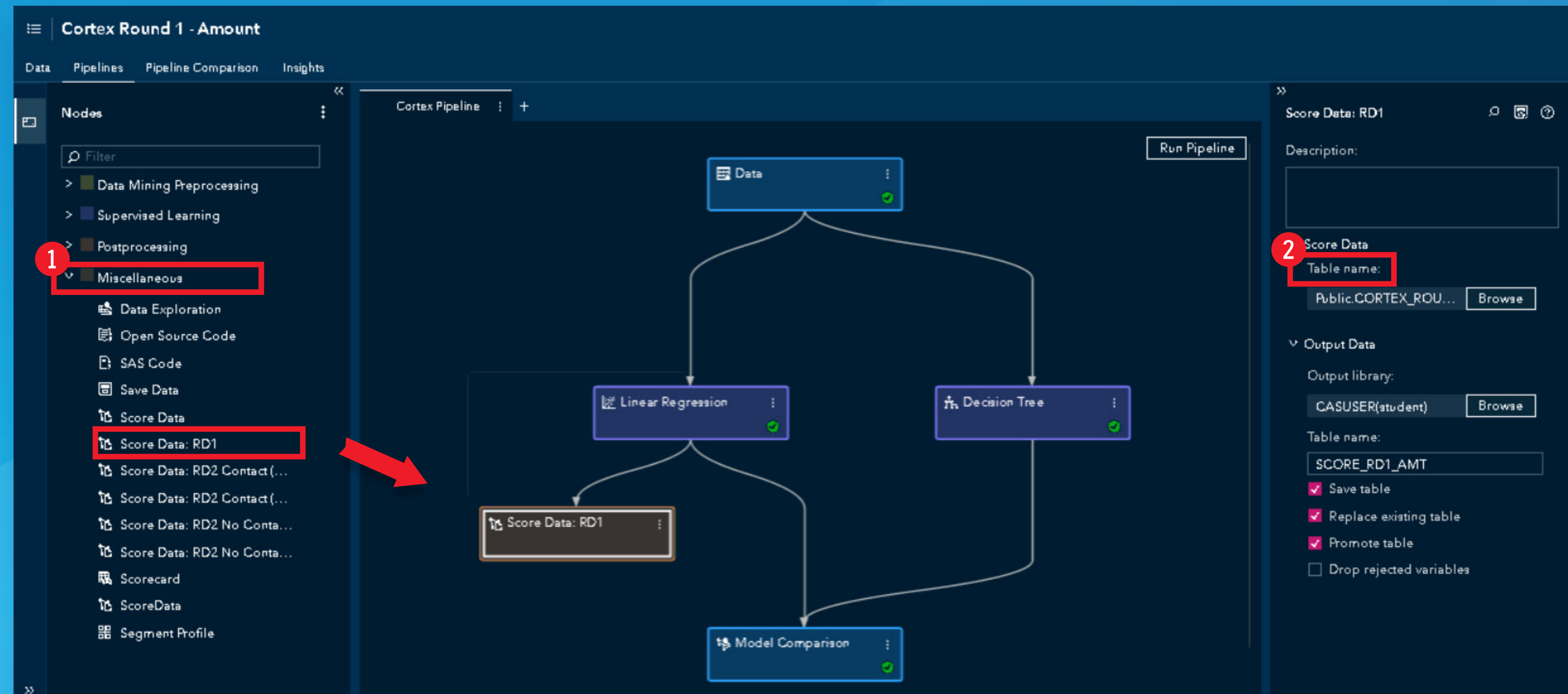
# Score New Data

1. Under 'Miscellaneous', select the 'Score Data: RD1' node and drag it to the Champion model node (here, Linear Regression) & release
2. In the node option pane, under Score data, in the table name, click on browse

**NOTE:** You should not change the name of the output table.



Use the 'Score Data: RD1' node on the champion model to score your data in your private directory



**NOTE:** Before scoring your data, it is recommended to evaluate the performance of your models using 'Insights' tab

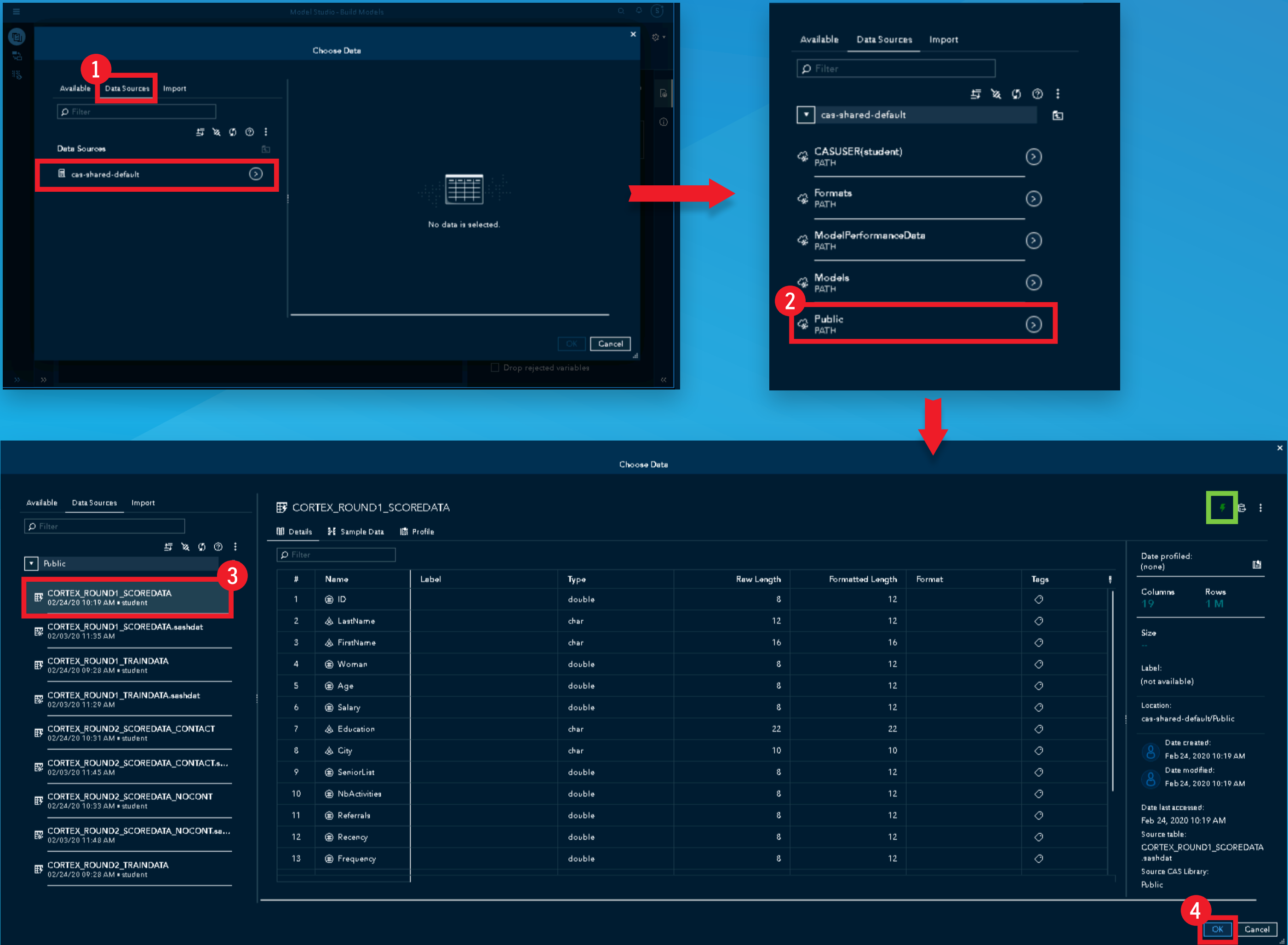


# Load Data

- 1. Under 'Data sources', select 'Cas-shared-default'
- 2. Click on 'Public'
- 3. Select 'CORTEX\_ROUND1\_SCOREDATA.sashdat'

**NOTE:** if data is not loaded, then click on the lightning icon to load the data first. This may happen only the first time that you access the game.

- 4. Click on 'OK'
- 5. Run the Pipeline again



# Re-open Cortex Visual Analytics Report

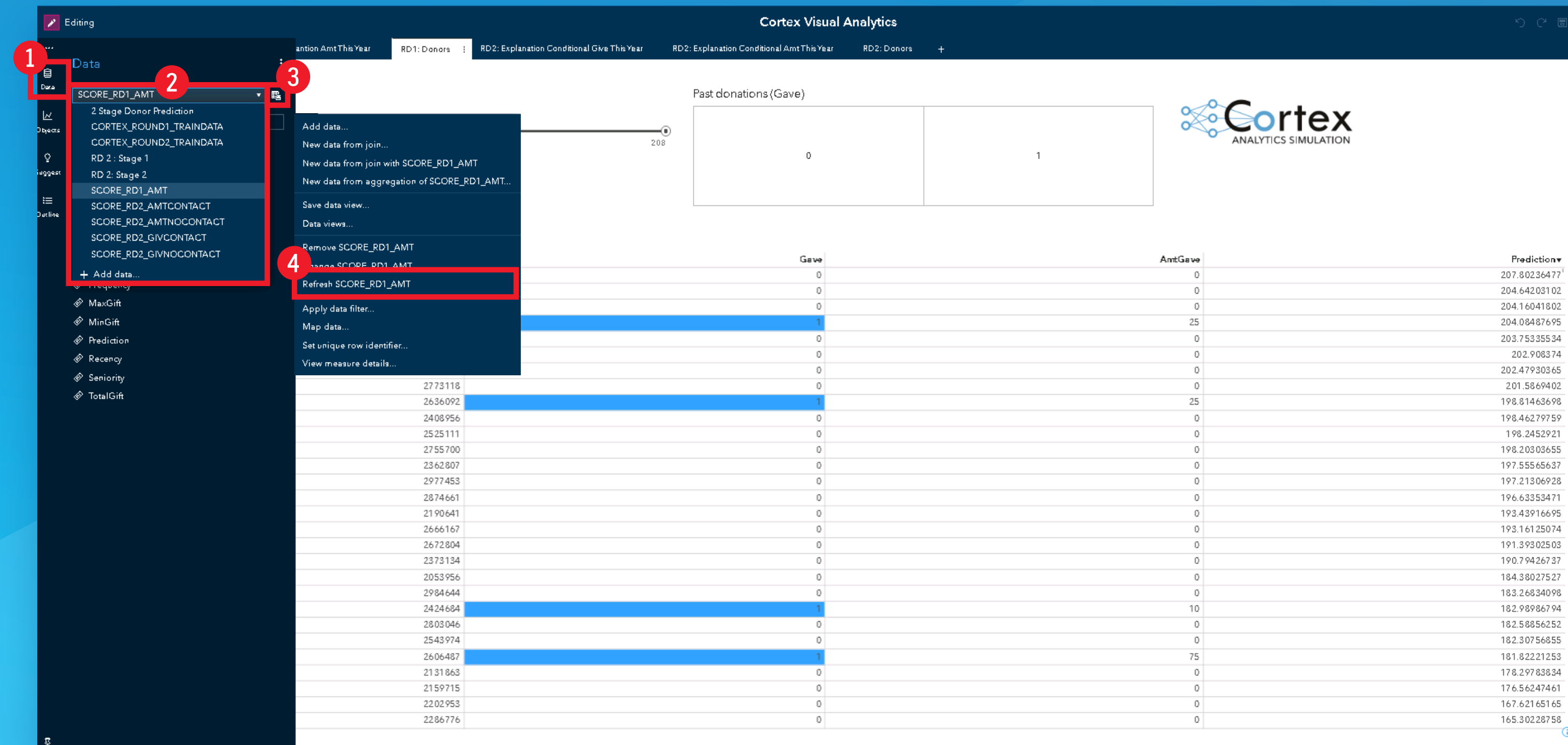
1. Click on the hamburger icon on the top left corner
2. Select 'Explore and Visualize'
3. Click on 'RD1: Donors' tab

The screenshot displays the SAS Cortex Visual Analytics interface. On the left, the 'ANALYTICS LIFE CYCLE' sidebar is visible, with 'Explore and Visualize' highlighted. The main area shows the 'RD1: Donors' tab, which includes a 'Prediction Cutoff' slider set to -11 to 208, a 'Past donations (Gave)' section with buttons for 0 and 1, and a table titled 'Selecting Individual Scored Donators'. The table lists donor IDs, their 'Gave' status, 'AmtGave', and 'Prediction'. The 'RD1: Donors' tab is highlighted in the top navigation bar.

ID	Gave	AmtGave	Prediction
2576905	0	0	207.80236477
2182146	0	0	204.64203102
2690177	0	0	204.16041802
2791448	1	25	204.08487695
2893680	0	0	203.75335534
2948017	0	0	202.908374
2795043	0	0	202.47930365
2773118	0	0	201.5869402
2636092	1	25	198.81463698
2408956	0	0	198.46279759
2525111	0	0	198.2452921
2755700	0	0	198.20303655
2362807	0	0	197.55565637
2977453	0	0	197.21306928

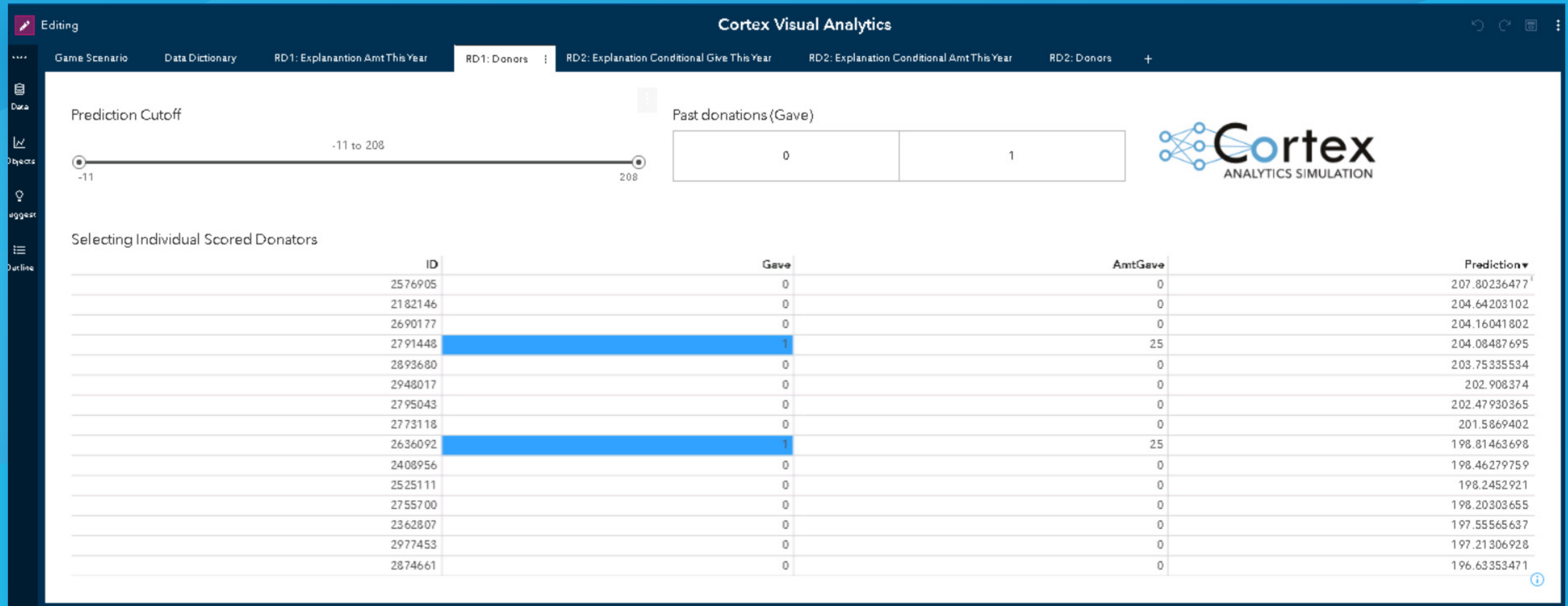
# Explore & Visualize Data

1. Click on the 'Data' Icon
2. Under 'Data' open the drop-down list and choose 'SCORE\_RD1\_AMT'
3. Click on 'Actions'
4. Click on 'Refresh SCORE\_RD1\_AMT'
5. Close data by re-clicking on 'Data' icon from step 1





# Report of Potential Donors



# Select Donors

- 1. Click on the 'Prediction Cutoff' and move the slider to choose your cutoff point
- 2. Right click on 'Prediction' column

Editing

Cortex Visual Analytics

Game ScenarioData DictionaryRD1: Explanantion AmtThis YearRD1: DonorsRD2: Explanantion Conditional Give This YearRD2: Explanantion Conditional AmtThis YearRD2: Donors

1

Prediction Cutoff

-11 to 208

-11208

Past donations (Gave)

01

2

Cortex

ANALYTICS SIMULATION

Selecting Individual Scored Donators

ID	Gave	AmtGave	Prediction
2576905	0	0	207.80236477
2182146	0	0	204.64203102
2690177	0	0	204.16041802
2791448	1	25	204.08487695
2893680	0	0	203.75335534
2948017	0	0	202.908374
2795043	0	0	202.47930365
2773118	0	0	201.5869402
2636092	1	25	198.81463698
2408956	0	0	198.46279759
2525111	0	0	198.2452921
2755700	0	0	198.20303655
2362807	0	0	197.55565637
2977453	0	0	197.21306928
2874661	0	0	196.63353471

## Select Donors (Cont.)

1. Click on 'Sort'
2. Choose 'Prediction: Descending'
3. Right click on any column
4. Select 'Export Data'

SAS Visual Analytics - Explore and Visualize

Cortex Visual Analytics

Editing

Game Scenario Data Dictionary RD1: Explanation Amt This Year RD1: Donors RD2: Explanation Conditional Give This Year RD2: Explanation Conditional Amt T

Prediction Cutoff: -11 to 208

Past donations (Gave): 0

Selecting Individual Scored Donators

ID	Gave
2576905	0
2182146	0
2690177	0
2791448	1
2893680	0
2948017	0
2795043	0
2773118	0
2636092	1
2408956	0
2525111	0
2755700	0
2362807	0
2977453	0
2874661	0
2190641	0
2666167	0
2672804	0
1272124	0

Sort

Replace data

Remove data

Manage columns

New filter from selection

Show totals

Hide headings

Wrap text

Use abbreviated numerical value

Hide object title

Maximize view

Delete

Duplicate

Duplicate as

Move to

Add link

Save image

Export data...

Print object...

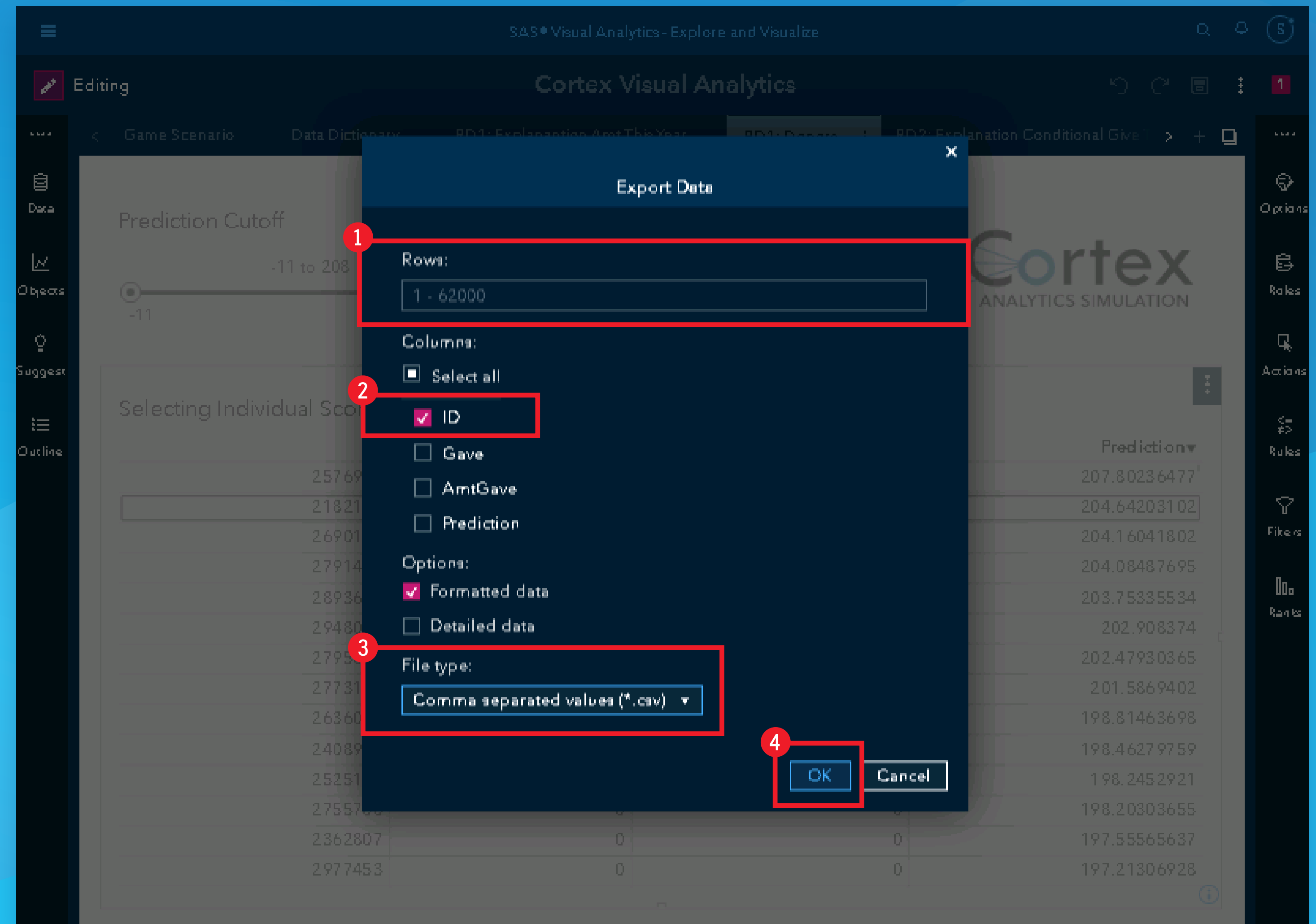
Copy link...

Save to Object page



# Export to .csv

1. Choose the rows you wish to export (e.g., 1-62000)
2. Select only the 'ID' column
3. Change the 'File type' to: Comma-separated values (\*.csv)
4. Click on 'OK'
5. Your .csv file will be in Download folder on the computer





**You are now ready to upload  
your solution (csv file)  
for Round 1 to  
the game leaderboard!**

Please refer to the Job Aids for a quick start on the game leaderboard