



Get ready for 2022 Live Webinar

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Get ready for 2022 Live Webinar
Online | December 13th, 2021

ERPsimLab
HEC MONTRÉAL

Serious games to learn enterprise
systems and business analytics

Your Speakers Today



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Agenda

1. Introduction
2. Why SAS and Cortex?
3. What is Cortex?
4. The Scenarios
5. Teaching with Cortex
6. Get started
7. Q&A

Why SAS?

Fortune 500 (2020)
91 of the top 100 companies use SAS



Why Cortex?

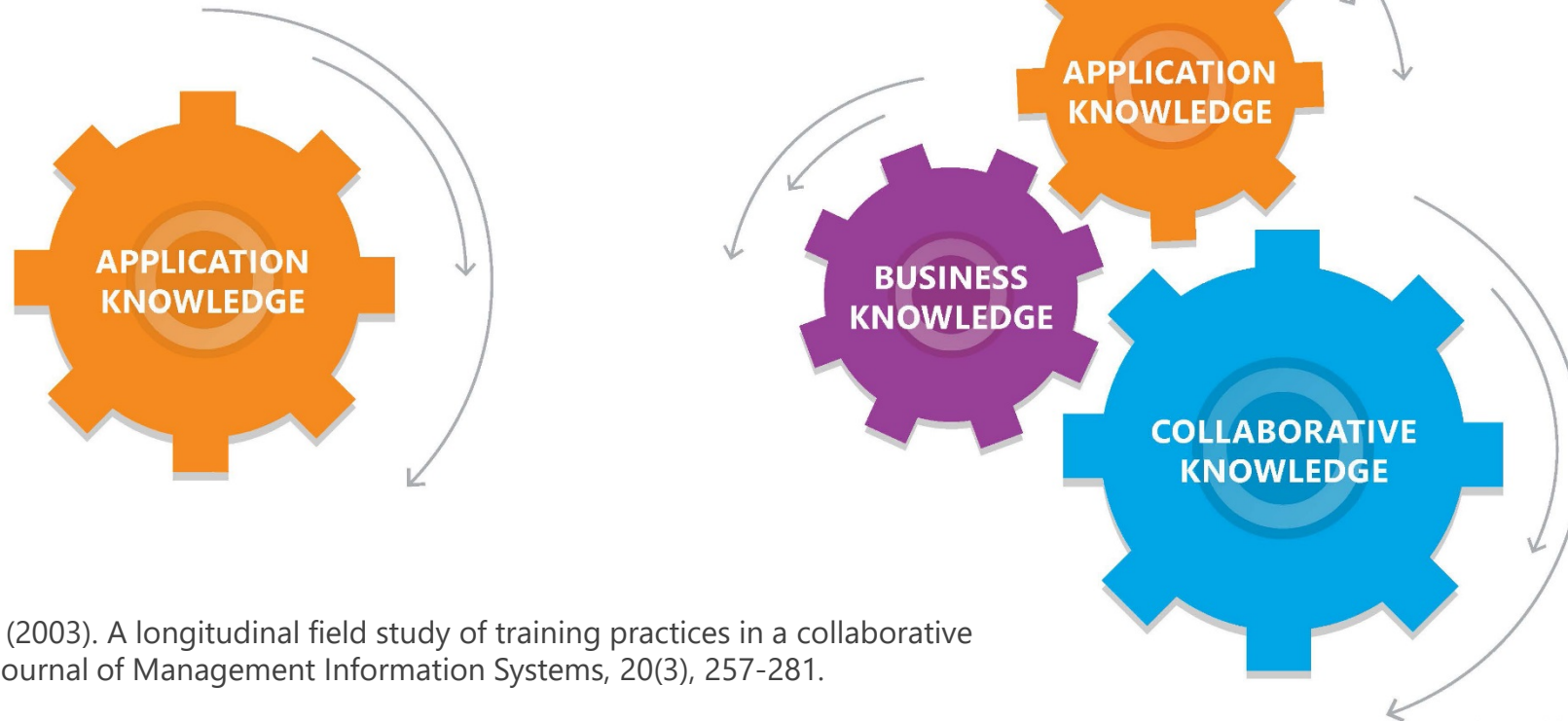
“The growing gap between the need for a data savvy citizenry and the data science education of students is equally astonishing, greatly troubling, and extremely perplexing.”

FINZER, W. (2013). The data science education dilemma. Technology Innovations in Statistics Education, 7(2).

A Competency Approach

From a standard approach...

... to a competency approach



Kang, D., & Santhanam, R. (2003). A longitudinal field study of training practices in a collaborative application environment. *Journal of Management Information Systems*, 20(3), 257-281.

Active Learning

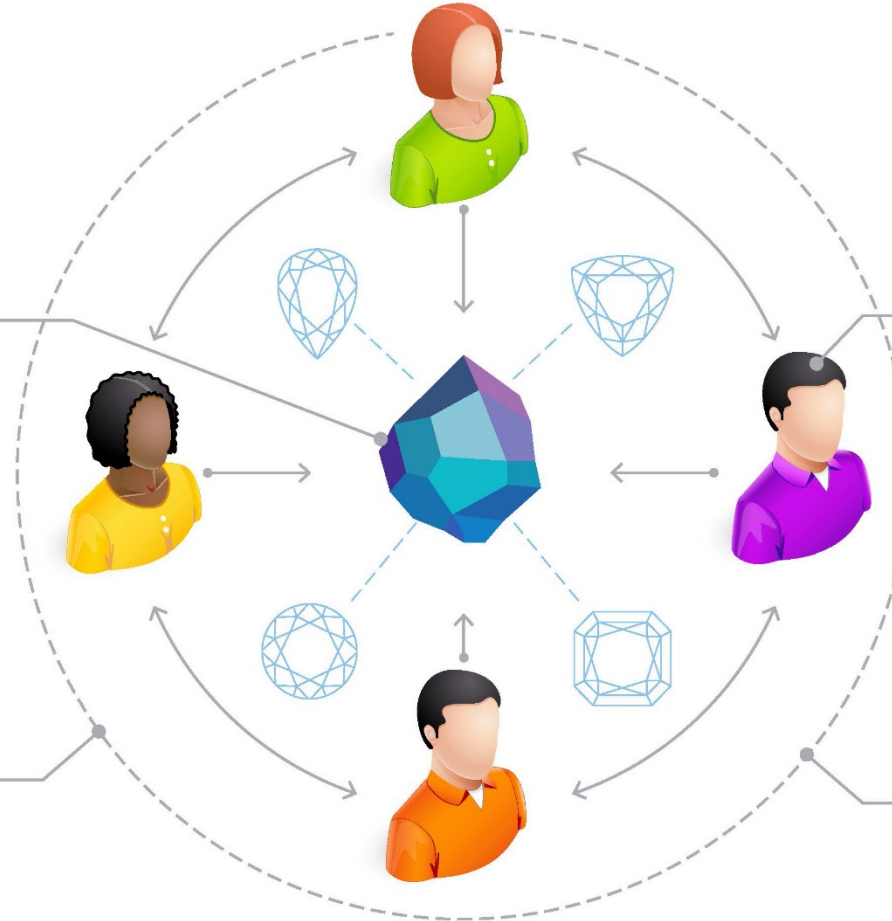
Problem Based Learning Approach

Léger, P. M., Cronan, P., Charland, P., Pellerin, R., Babin, G., & Robert, J. (2012). Authentic OM problem solving in an ERP context. *International Journal of Operations & Production Management*, 32(12), 1375-1394.

AUTHENTICITY
Realistic situations



TEACHER
acts as facilitator
or tutor

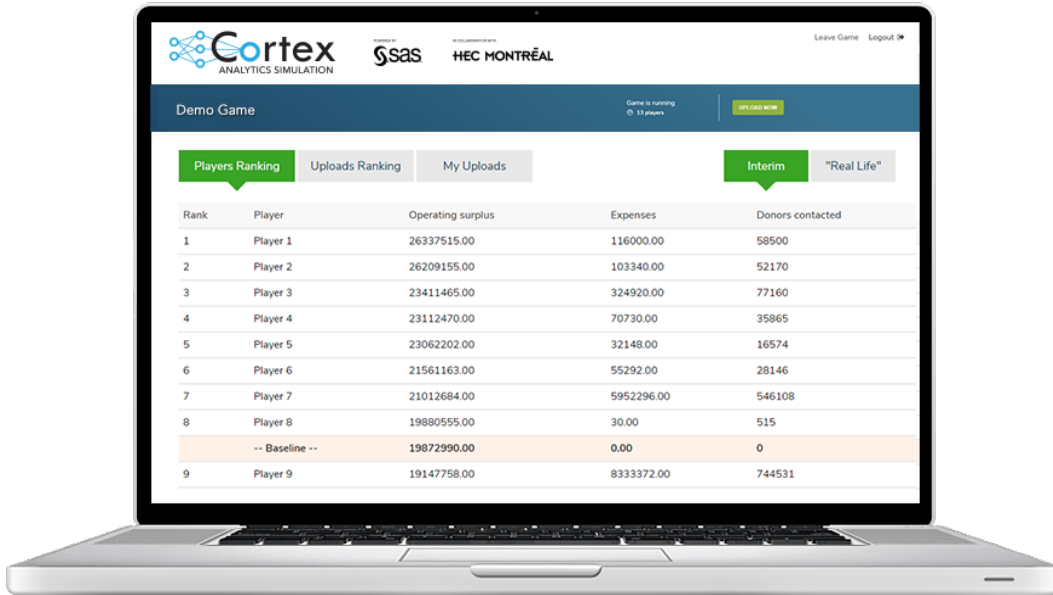


**STUDENT CENTERED
APPROACH**

**COMPETITIVE
ENVIRONMENT**

What is Cortex?

Cortex Analytics Simulation



Rank	Player	Operating surplus	Expenses	Donors contacted
1	Player 1	26337515.00	116000.00	58500
2	Player 2	26209155.00	103340.00	52170
3	Player 3	23411465.00	324920.00	77160
4	Player 4	23112470.00	70730.00	35865
5	Player 5	23062202.00	32148.00	16574
6	Player 6	21561163.00	55292.00	28146
7	Player 7	21012684.00	5952296.00	546108
8	Player 8	19880555.00	30.00	515
--	Baseline --	19872990.00	0.00	0
9	Player 9	19147758.00	8333372.00	744531

- Virtual or in-class instructor tool
- Turn-key solution, includes case study, dataset, online leaderboard, tutorials
- Teaches **predictive modeling** concepts in an exciting and **hands-on** environment.

POWERED BY


IN COLLABORATION WITH


The benefits of gamification



Observed Benefits

- Increased engagement
- Desire from students to know more
- A surge in the number of hours willingly spent by students for the course
- Risen awareness of students in the feedback session

The Scenarios

Scenarios Features

	Fundraising Scenario	Credit Risk Scenario	Retention Scenario
Level	Beginner	Intermediate	Advanced
Datasets	✓	✓	✓
Case study	✓	✓	
Game instructions	✓	✓	
Pre-built diagrams	✓		
Teaching notes	✓		
Videos	✓		
Software	EM, Studio, Python	EM	EM

Fundraising: Turnkey Solution

Fundraising Scenario

Foundation targeting potential donors

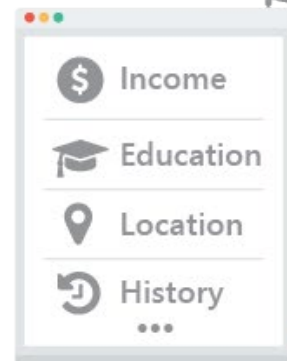
GOAL

Maximize the net raised funds



CALLING COST

DATA



DECISIONS



1 million potential donors



Credit Risk: Intermediate Level

Credit Risk Scenario

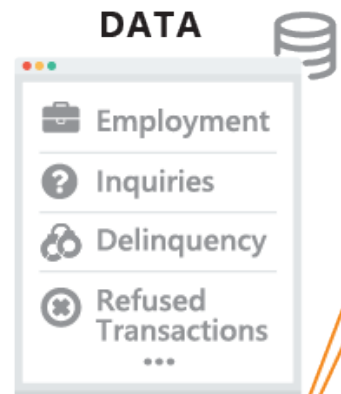
Financial institution processing car loan applications

GOAL

Maximize Net Profit
after 2 years



THE PLAYER
(Lender)



DECISIONS



How many to accept?



Who to accept?

...

1 million potential borrowers



Retention: Advanced Level

Retention Scenario

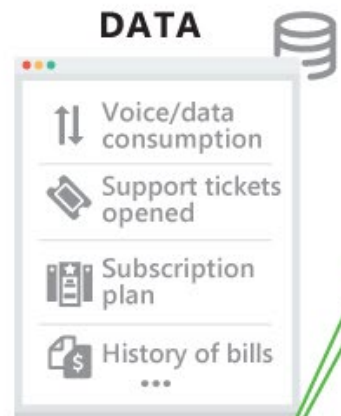
Telecom company looking to retain customers

GOAL

Maximize Net Profit after 2 years



THE PLAYER
Customer Relationship



DECISIONS

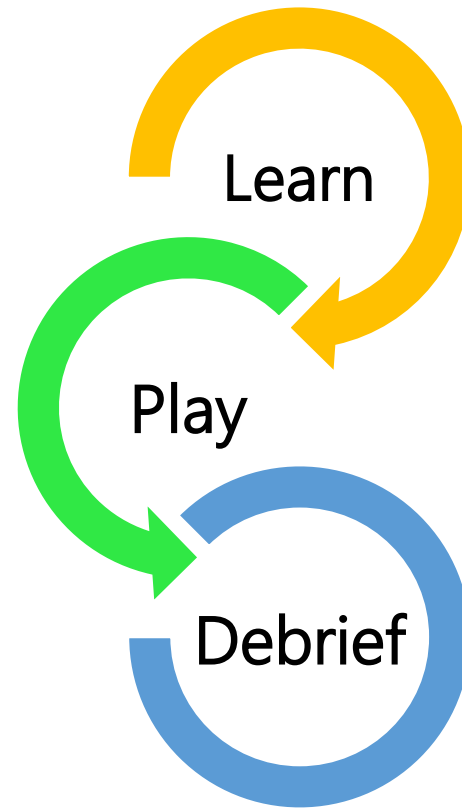


How many families and which ones to invite?

1 million existing subscribers

Learning with Cortex

How to play the game?

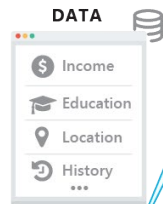


Fundraising: Turnkey Solution

Fundraising Scenario

Foundation targeting potential donors

GOAL
Maximize the net raised funds



DECISIONS

How many?
Who?
...



Predict how much they give

How?



PARTICIPANT



Assess Models



Create Output



Upload Decision



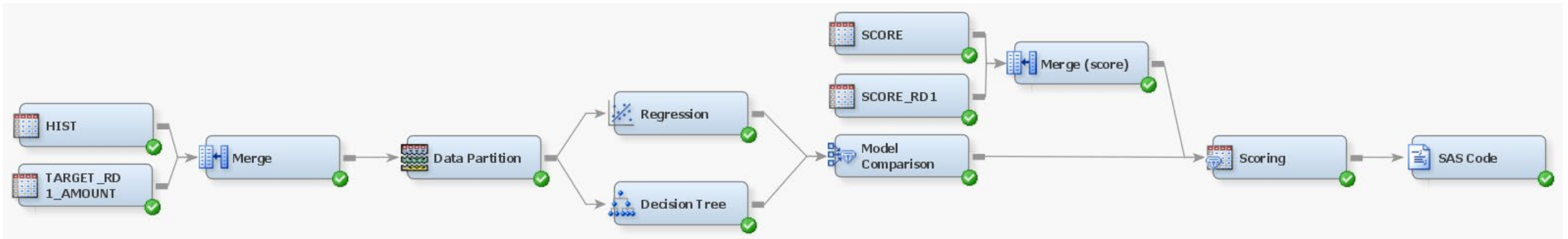
Leaderboard, discussions and feedback

Participants will design models and generate a list of donors that will be submitted for scoring, providing immediate feedback.

Variable Name	Description
ID	Member number (unique ID)
LastName	Last Name
FirstName	First Name
Woman	Sex (1=woman, 0=man)
Age	Age (years)
Salary	Annual salary in USD
Education	Highest education level
City	Type of neighborhood
SeniorList	Seniority for being on the VIP list
NbActivities	Number of participations to annual meeting
Referrals	Number of referrals
Recency	Number of years since last gift
Frequency	Number of donations
Seniority	Number of years since first donation
TotalGift	Total Donation since a member
MinGift	Minimum donation since a member
MaxGift	Maximum donation since on the VIP list
Contact	Direct sollicitaion this year
GaveLastYear	Did the individual give last year
AmtLastYear	Amount given last year
GaveThisYear	Did the individual give this year
AmtThisYear	Amount given this year

Fundraising Round 1

Round 1 - SAS EM: Predict the amount given in the current year



Players Ranking

Uploads Ranking

My Uploads

Interim

"Real Life"

Rank	Player	Operating surplus	Expenses	Donors contacted	Method	Uploads #	Selected
	-- Baseline --	\$7,602,655.00	\$0.00	0	-- Baseline --	0	Selected

Round 1 - SAS Studio:

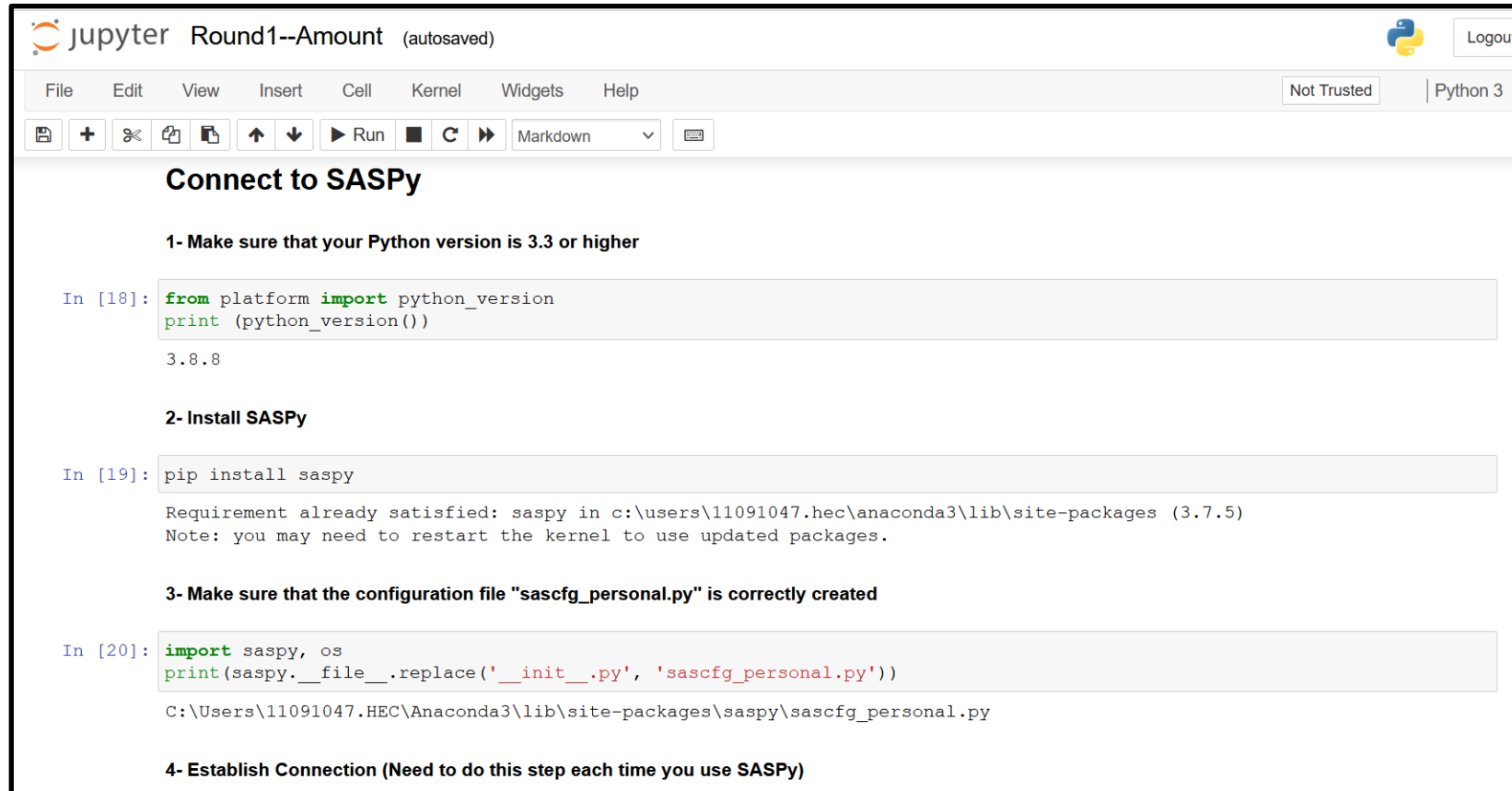
Predict the amount given in the current year

The screenshot displays the SAS Studio interface. On the left, the 'Server Files and Folders' pane shows a project structure. A red rectangle highlights the 'Cortex Code Files' folder, which contains three files: 'Round1--Amount.sas', 'Round2--Conditional Amount.sas', and 'Round2--Probability of Giving.sas'. The main editor window shows the 'Round1--Amount.sas' file. The 'CODE' tab is active, displaying a SAS program. The program includes a warning message, library creation, and a merge operation.

```
1 *****  
2                                     Warning!  
3     Please note that you need to change the user ID (u58717790) to your own user ID!  
4     To do so, use CTRL+F, and find and replace all the instances of the user ID.  
5 *****  
6 *****  
7 *****  
8 * Create libraries  
9 =====  
10 libname cortex '/home/u58717790/my_shared_file_links/u39842936/Cortex Data Sets';  
11 libname results '/home/u58717790/results';  
12 *****  
13 *****  
14 *****  
15 * Merge datasets 'hist' and 'target_rd1'  
16 =====  
17 DATA model_rd1;  
18     MERGE cortex.hist cortex.target_rd1;  
19     BY ID;  
20 run;
```

Round 1 - SAS Python:

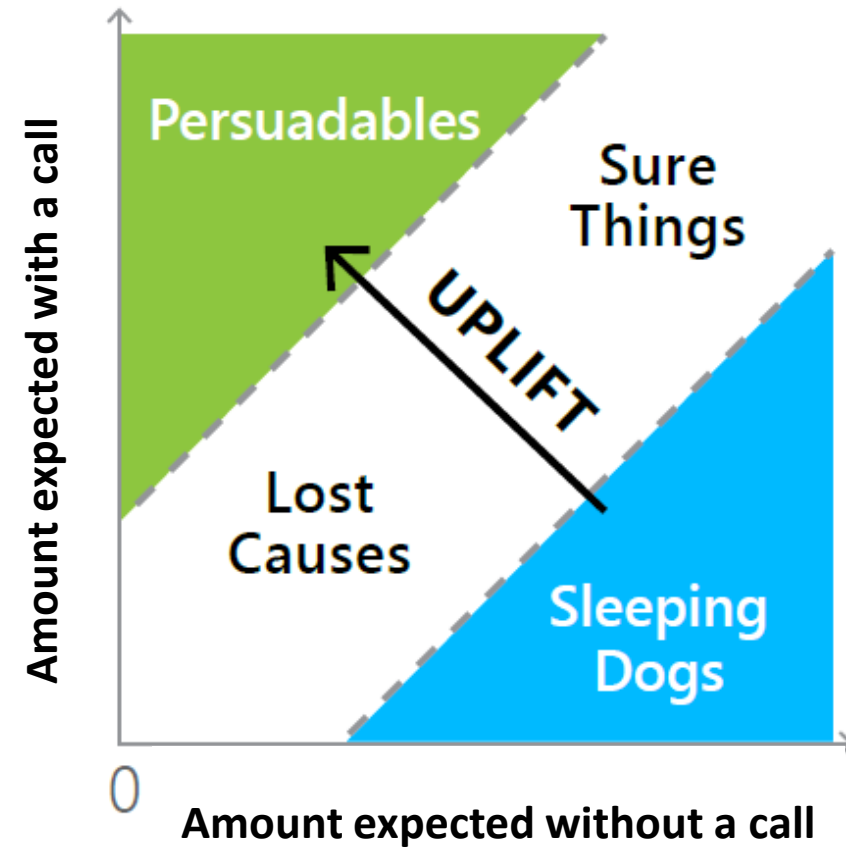
Predict the amount given in the current year



The image shows a Jupyter Notebook window titled "Round1--Amount (autosaved)". The interface includes a menu bar (File, Edit, View, Insert, Cell, Kernel, Widgets, Help) and a toolbar with icons for saving, running, and other actions. The notebook content is divided into four steps for connecting to SASPy:

- Connect to SASPy**
 - 1- Make sure that your Python version is 3.3 or higher**
In [18]: `from platform import python_version`
`print (python_version())`
3.8.8
 - 2- Install SASPy**
In [19]: `pip install saspy`
Requirement already satisfied: saspy in c:\users\11091047.hec\anaconda3\lib\site-packages (3.7.5)
Note: you may need to restart the kernel to use updated packages.
 - 3- Make sure that the configuration file "sascfg_personal.py" is correctly created**
In [20]: `import saspy, os`
`print(saspy.__file__.replace('__init__.py', 'sascfg_personal.py'))`
C:\Users\11091047.HEC\Anaconda3\lib\site-packages\saspy\sascfg_personal.py
 - 4- Establish Connection (Need to do this step each time you use SASPy)**

Fundraising Round 2



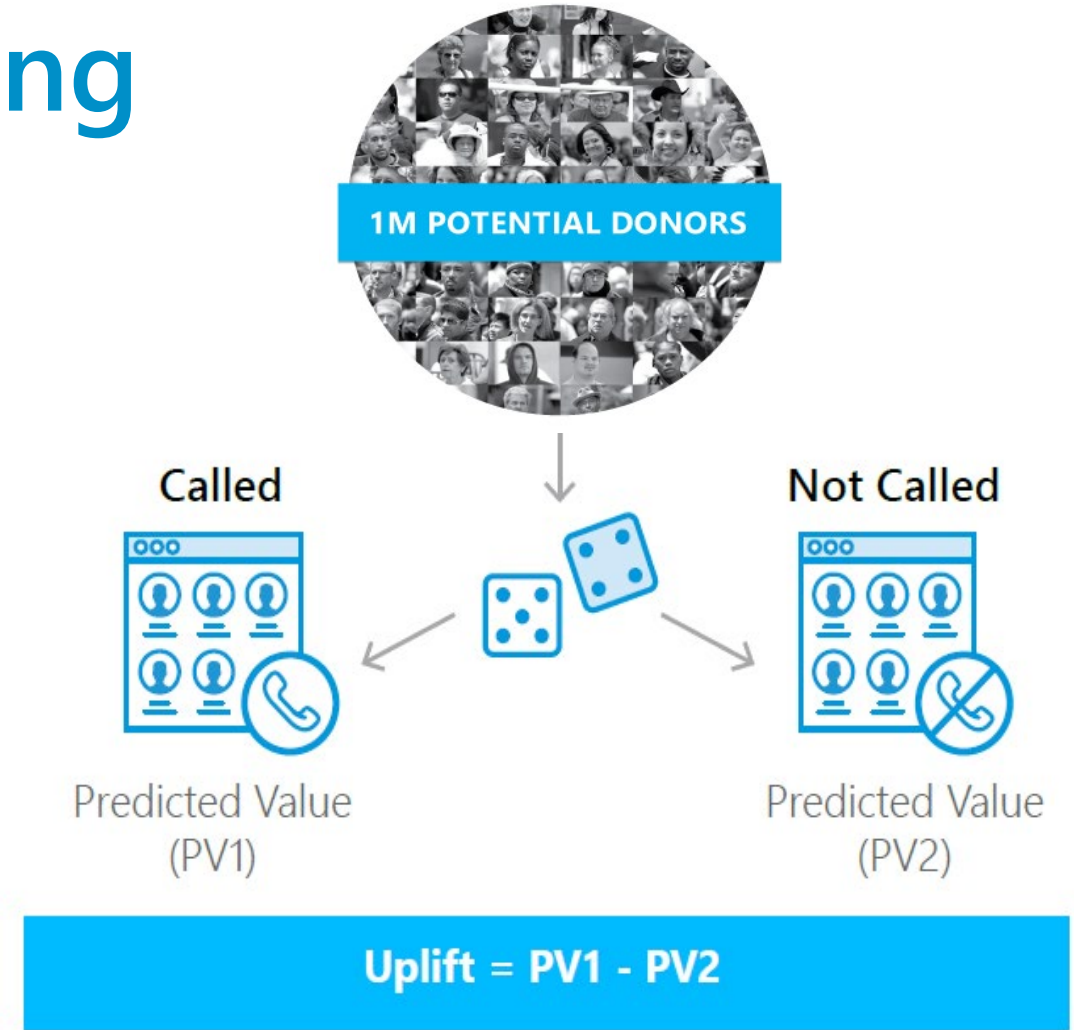
Task: Calculate the incremental value of a call

Round 2: Uplift modeling

There are many approaches to 2-stage modeling, but in most cases these steps are required:

- 1 Predict the value if a person receives a treatment (here called or contacted)
- 2 Predict the value if a person does not receive a treatment (here not called or not contacted)
- 3 Compute the difference between both (i.e. the uplift generated by the treatment or targeted action: here the call)

The Idea is to contact people who yield higher uplift (value) when called.



Task: Calculate the incremental value of a call

Round 2: Two-stage modeling

One way to improve your predictions is to adopt a two-stage modeling approach

To do so:

- 1 Fit a model to determine the probability **P** that an individual will give
- 2 Keeping only the data of those who gave, fit a model for **M** (the amount gave)
- 3 Use both models to make predictions on the population
- 4 Compute **P*M** to determine the 'expected donation' of each individual

MODEL



Probability of giving

P

MODEL



Conditional amount if they give

M

Expected Donation = $P * M$

Game Demonstration

Teaching with Cortex

A Complete Solution

Gamified Platform

Three scenarios where participants will design models and generate results that will be submitted for scoring, providing immediate feedback.

Instructional Assets

Ensure that students have a quick start and minimize the preparation time required by the professor.

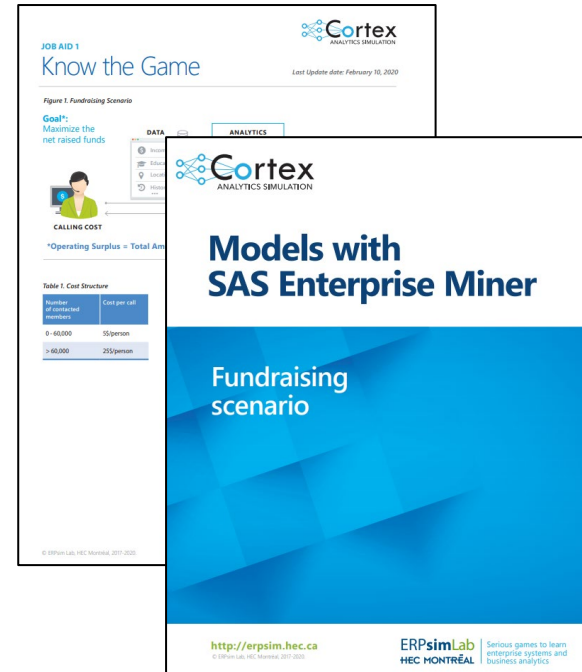
Specialized Support

We accompany you by providing technical and pedagogical support for a seamless journey!

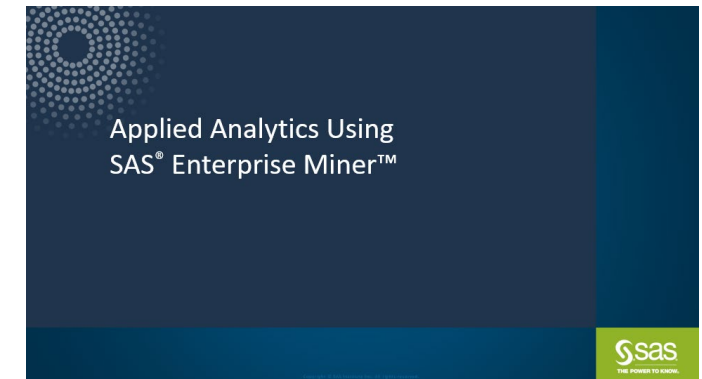
Instructional Assets and Support



Virtual Learning Environment



Teaching Guides



Extended Learning



Technical and Pedagogical Support

Get Started with Cortex

Discover what Cortex has to offer, learn how to play the game, know how to manage the game for your students and get ideas on how to incorporate Cortex into your curriculum.

Register at
erpsim.hec.ca/cortex/training

Online Course

Complete the
Online Course
in self-study mode



Session with our team

Register for a
one-on-one session with our
team. We'll answer all your
questions!



Receive your instructor digital
badge and start using Cortex
right away!

Price and Purchase Options

Free for Eligible Faculty Members

Cortex Desktop

\$50 USD*

Get the game materials and use your own installation of SAS Enterprise Miner software to play the game

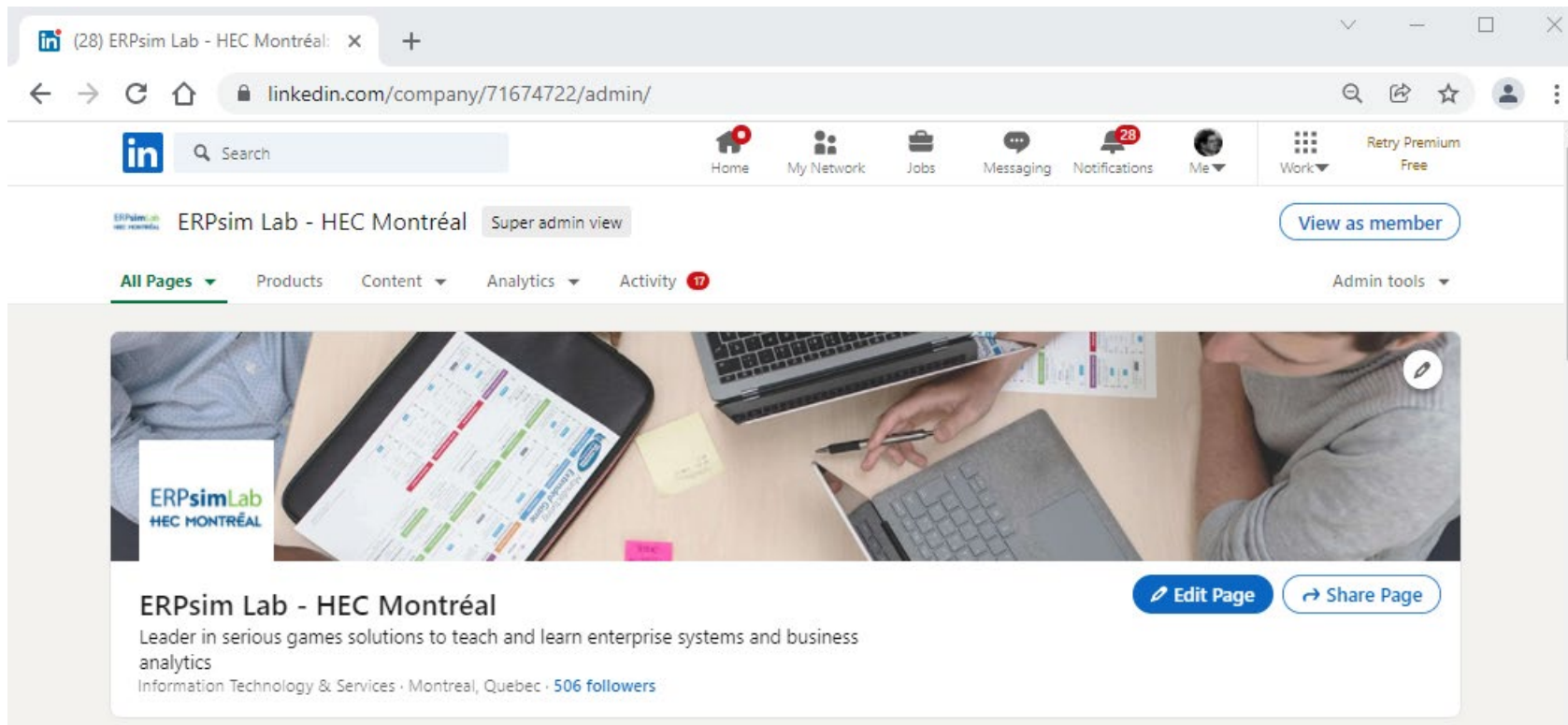
Cortex Cloud

\$100 USD*

Get the game materials and access up to 20 hours of SAS Enterprise Miner software in the cloud.

* Order Multiple Licenses option available

linkedin.com/company/erpsimlab



Questions

Thank You!

Website: erpsim.hec.ca/cortex

Email: cortex@hec.ca