

## PFG Bank (aka Capital One): Data Driven Credit Card Design

Your goal is to maximize profits from solicitation 92-1 by planning and implementing mailings of up to 12 different product offers to up to 750,000 prospects.

There are 750,000 people in a database; 250,000 in each of three BK groups (150, 200, and 250). You can send, at most, one solicitation (product) to each prospect. Each solicitation can offer one, and only one, of the 12 available products, but you can send different solicitations to different prospects.

You can send your solicitations in two separate mailings (**test** and **roll out**). Or you can choose to forego a test and simply send out a single roll-out mailing. See the case on Study.Net for more information about the cost of developing and mailing a solicitation.

***Note: You only get one shot at this! You can send out only one test mailing and one roll-out mailing. It is not possible to reset the exercise, even if you make a mistake in either mailing, so please be careful!***

One week before the due date I will post a user ID and password for each team. To log in for the exercise, submit decisions, or review team results go to:

<https://forio.com/simulate/darden/credit-card-simulation>

Once you log in you will find a link on the landing page to a pdf "Scenario and User Guide," that provides screenshots and a user-guide.

### Preparation questions:

1. Why does Customer Lifetime Value vary with BK score? Why does Customer Lifetime Value vary by product? (See Exhibit 2 to help answer these questions) **(3 points)**
2. Are predictive models estimated on historical data useful in this case? If so, why? If not, why not? **(4 points)**
3. Is there a "best product" that will likely be preferred by all customers? If so, what is it? **(3 points)**
4. Describe and justify your testing strategy **(10 points)**
5. Generative AI **(5 points)**: Describe **in detail** how your team used Generative AI-tools like ChatGPT to support your work on this case. Provide pdfs and/or screenshots of your "discussions" with these tools and comment on what things did and did not go well. Make sure to add discussion about your thought process and how you tried to maximize the benefits from using these tools. Also add any questions you may have about the assignment and the support you received from GenAI so we can discuss these topics in class.

Note: No matter how you used Generative AI-tools, you are expected to fully understand all elements

of the case solution submitted by your group. Any group member may be called on in class to walk us through your thought process and how different parts of your code work and how you arrived at your solution.

### Write-up Instructions:

- Please create a notebook describing your work on the steps listed above. The text in the report, excluding exhibits, should **not** be more 1,000 words. Please push your work to GitHub and submit through GradeScope before the due date.
- The case write-up must be pushed to GitHub and submitted to GradeScope before 9am on the day of class.

### Presentation:

In addition to your Jupyter notebook with analysis and text, with your team, create a video presentation that lasts no more than 10 minutes and that covers your approach to solve the case. Target your presentation to (1) the senior data scientist at the company and (2) the chief product manager for credit cards at PFG bank. You should explain the technical details of your work and provide context on the proposed next steps in decision making. Please use the “PFG Bank” directory in the Panopto Page to upload the link to your group video (**10 points**)

### Grading system:

We will use results from the interactive web simulation to assess your testing strategy. 10 points will be based on the total profit generated in the exercise (i.e., round 1 + round2) and 25 points will be based on the quality of your analysis, supporting arguments, and use and discussion of GenAI in the write-up. A final 10 points will be assigned based on the quality of your group’s presentation.

### Hints:

- A (slightly) cleaned-up version of the data in the exhibits is available on GitLab (data/exhibits.xls). For the purpose of the analysis, you may equate “bk\_score” and “average\_bk”.
- In exhibit 1, “Number of Accounts” is the number of people that responded to the mailing and opened an account (i.e., “resp” in the data/exhibits.xlsx).
- If you generate a (partial) factorial design, make sure to clearly describe what assumptions you are making and why you believe they are justified in this case. Also, try different *random seeds* (e.g., 19, 1234, or 172110) and discuss the impact of these different settings on the factorial design (are they the same?) and on your subsequent decisions.
- What sample size should be used for a cell? As a guideline use 4,000 per cell. This is approximately the sample size you would need to distinguish between a 2% and a 3% response rate. Note, however, that this is just a guideline – you can deviate from it if you believe there is a need for more (or less) precision. You can re-calculate this sample size yourself using *Design > Sample size (compare)* in Radiant.
- The results from round 1 will be returned as a table on a webpage. You can copy-and-paste the table to Excel. An additional video with information on how to generate an experimental design (partial or full factorial) and analyze data in table format in Radiant is linked below.

<https://www.youtube.com/watch?v=lk3ufN2igOo>

The data used in the video is available in a project folder that you can access by executing the command below from a terminal in Jupyter. The py/ directory shows how you can analyse data presented in table form in python. The R/ directory has two radiant state files. You can use the harrahs-doe.state.rda file to learn about (partial) factorial designs.

`usethis "https://www.dropbox.com/sh/8b5xrwtxre10wrm/AAC-yhIr8Kk-32XN_Q_7sqKDa?dl=1"`