***Problem Description***

You are an Analytic Engineer for a company which produces a new generation of electric men razor. Your company registered an e-commerce site at www.Coolmen-Coolrazors.com 1 month ago to sell its product online instead of the traditional supermarket channel. During the last month, it piloted advertising on 2 channels:

* Email Channel
* SMS Channel

Data are extracted from a centralized database and stored in the attached file called “mkt\_data.csv”.

The schema for this dataset is as follow:

* id: Integer, representing each message
* send\_date: data, date when SMS/Email was sent
* estimated\_age: Integer, ranging from 0 to 100
* age\_range: string. The audience is divided into 4 age ranges
* channel: string, either SMS or Email
* coupon: float, the value of coupon expressed in each message, valid for up to 3 units for each order
* clicked: binary, either 0 (customer doesn’t click on the link in SMS/Email) or 1 (they clicked)
* last\_step: string. It can have one of the following values: “received”, “bounced”, “saw review”, “added to cart”, “payment page”, “purchased”
* nb\_units: integer, representing the number of units of customers’ order.
* order\_value: float, representing the value of the order the customer made. Already minus the coupon applied.

The column “last\_step” is the final point of contact with customers before they leave our website. Its values are explained below:

● Received: sms/email sent successfully, but not clicked.

● Bounced: they clicked but exited immediately.

● Saw review: scroll down and read the review and information of the product

● Added to cart: customers added the product to cart to check out

● Payment page: they stopped at payment without finishing it

● Purchased: they made an order

Financial Information

Together with the data above, you have additional information about the production cost and the

marketing campaigns.

● The production cost for each razor is 18$.

● Cost per one SMS is $0.050, cost per one email sent is $0.075.

● Each email or SMS will be supplied with a coupon that can have a value of 2$, 4$ or 6$. The coupon is valid for up to 3 razors in each order. They have the option to wrap the items as a gift. Ignore wrapping and shipping costs.

● The price without coupons is 40$ / razor.

● From experience (and some models), potential customers are divided into 4 age groups:

○ 18 - 30

○ 31 - 45

○ 46 - 60

○ 60 +

***Questions***

a) (3 pts) For the next quarter, your marketing department has a budget of $60,000 to spend on

online campaigns. How would you allocate it between SMS and Email? Assume that we have a

potential customer pool for each age group as below:

| **Age group** | **Pool size** |
| --- | --- |
| 18 - 30 | 300 000 |
| 31 - 45 | 350 000 |
| 46 - 60 | 500 000 |
| 60+ | 200 000 |

b) (2 pts) Now assume that you are also responsible for the operation of the company’s website. Do you have any comments or suggestions so that we can improve the website’s performance in order to maximize net profit?

*Note:* *A perfect answer is not required. Do the best you can to showcase your problem solving skills, coding skills and analytical mindset.*