# Credit Card Reward Points System

Implement a new Credit Card Rewards Points system.

# **Background**

Capital One has decided to introduce a new purchase promotion campaign based on the credit card purchases at a variety of merchants. As part of this campaign, customers will be awarded monthly rewards points calculated based on the customer's credit card purchases.

### The Problem Statement

The aim is to create a rewards calculation system that calculates the total monthly reward points earned based on a customer's credit card purchases. More than one reward points calculation rules could apply to a merchant's transaction(s) and the system should maximize the calculated points for a merchant by considering different priorities or combinations of the rules.

### **Sample Transactions**

Here is a list of transactions for a customer that needs to be considered for your solution.

```
transactions = {
    "T01": {"date": "2021-05-01", "merchant_code" : "sportcheck", "amount_cents": 21000},
    "T02": {"date": "2021-05-02", "merchant_code" : "sportcheck", "amount_cents": 8700},
    "T03": {"date": "2021-05-03", "merchant_code" : "tim_hortons", "amount_cents": 323},
    "T04": {"date": "2021-05-04", "merchant_code" : "tim_hortons", "amount_cents": 1267},
    "T05": {"date": "2021-05-05", "merchant_code" : "tim_hortons", "amount_cents": 2116},
    "T06": {"date": "2021-05-06", "merchant_code" : "tim_hortons", "amount_cents": 2211},
    "T07": {"date": "2021-05-07", "merchant_code" : "subway", "amount_cents": 1853},
    "T08": {"date": "2021-05-08", "merchant_code" : "subway", "amount_cents": 7326},
    "T10": {"date": "2021-05-10", "merchant_code" : "sportcheck", "amount_cents": 7326},
    "T10": {"date": "2021-05-10", "merchant_code" : "tim_hortons", "amount_cents": 7326},
```

# The Ask

Assuming that each \$1 spend is only counted once, implement a method that takes the customer transactions as an input (Merchant Code -> Purchase Amount) and calculates the total maximum rewards points earned for the month, the maximum reward points applied for each transaction.

- Rule 1: 500 points for every \$75 spend at Sport Check, \$25 spend at Tim Hortons and \$25 spend at Subway
- Rule 2: 300 points for every \$75 spend at Sport Check and \$25 spend at Tim Hortons
- Rule 3: 200 points for every \$75 spend at Sport Check
- Rule 4: 150 points for every \$25 spend at Sport Check, \$10 spend at Tim Hortons and \$10 spend at Subway
- Rule 5: 75 points for every \$25 spend at Sport Check and \$10 spend at Tim Hortons
- Rule 6: 75 point for every \$20 spend at Sport Check
- Rule 7: 1 points for every \$1 spend for all other purchases (including leftover amount)

# **Examples**

Here are a few examples to help understand how to use rules to calculate the reward points. Each example has a set of transactions and rules to use for reward points calculation. These examples may not necessarily be the solution to the main problem.

### Example 1

#### Transactions:

```
transactions = {
    'T1': {'date': '2021-05-09', 'merchant_code' : 'sportcheck', 'amount_cents': 7326},
    'T2': {'date': '2021-05-10', 'merchant_code' : 'tim_hortons', 'amount_cents': 1321}
}
```

#### Rules:

• Rule 1: 10 points for every \$1 spend at Sport Check

#### Solution:

- Rule 1: 10 points for every \$1 spend at Sport Check
  - Promotion Applied x 73

Total Points: 730

**Transaction Level Points:** 

- T1 730
- T2 0

### Example 2

### Transactions:

```
transactions = {
    'T1': {'date': '2021-05-09', 'merchant_code' : 'sportcheck', 'amount_cents': 7326},
    'T2': {'date': '2021-05-10', 'merchant_code' : 'tim_hortons', 'amount_cents': 1321}
}
```

#### Rules:

- Rule 1: 10 points for every \$1 spend at Sport Check
- Rule 2: 100 points for every \$5 spend at Sport Check

#### Solution:

- Rule 1: 10 points for every \$1 spend at Sport Check
  - Promotion Applied x 3
- Rule 2: 100 points for every \$5 spend at Sport Check
  - Promotion Applied x 14

Total Points: 1430

**Transaction Level Points:** 

- T1 1430
- T2 0

## **Example 3**

#### **Transactions:**

```
transactions = {
    'T1': {'date': '2021-05-09', 'merchant_code': 'sportcheck', 'amount_cents': 7326},
```

```
'T2': {'date': '2021-05-10', 'merchant_code' : 'tim_hortons', 'amount_cents': 1321} }
```

#### **Rules:**

- Rule 1: 100 points for every \$5 spend at Sport Check
- Rule 2: 10 points for every \$1 spend for all other purchases

#### Solution:

- Rule 1: 100 points for every \$5 spend at Sport Check
  - Promotion Applied x 14
- Rule 2: 10 points for every \$1 spend for all other purchases (including leftover amount)
  - Promotion Applied x 16

Total Points: 1560

**Transaction Level Points:** 

- T1 1430
- T2 130

### **Example 4**

#### **Transactions:**

```
transactions = {
    'T1': {'date': '2021-05-09', 'merchant_code' : 'sportcheck', 'amount_cents': 2500},
    'T2': {'date': '2021-05-10', 'merchant_code' : 'tim_hortons', 'amount_cents': 1000},
    'T3': {'date': '2021-05-10', 'merchant_code' : 'the_bay', 'amount_cents': 500}
}
```

#### **Rules:**

Same rules as stated in the main problem.

#### Solution:

- Rule 6: 75 point for every \$20 spend at Sport Check
  - o Promotion Applied x 1
- Rule 7: 1 points for every \$1 spend for all other purchases (including leftover amount)
  - Promotion Applied x 20

# Total points: 95

## Transaction level points:

- T1 80 (rule 6 & 7)
- T2 10 (rule 7)
- T3 5 (rule 7)

### Explanation:

Two sets of rules apply to this input

- If you use combination rules 5 and 7, the total points is 80 but that's not the max total that can be achieved.
- If you use combination rules 6 and 7, the total points is 95 which is the correct solution.