Subway Rides

1   Introduction

The cost of a standard subway ride is $2.75. You can purchase individual rides by adding money to your MetroCard or you can purchase an unlimited number of rides for a 7-day period for $33 (or a 30-day period for $127, but we will ignore this for now in order to simplify the problem). What is the lowest price you can pay to purchase the number of subway rides you need for the week?

2   Objective

The goal of this activity is to develop a function, named min_sub_cost, that determines the lowest cost to buy n subway rides to be taken in a 7-day period. This function will then be implemented in Python.

Assume that your Python function will accept as an input a positive integer n that represents the number of subway rides you plan to take in a 7-day period. It is guaranteed that $1 \leq n \leq 30$. The output of your function will be the minimum cost to purchase those n subway rides based on the two purchase options given in the introduction.

3   Example

Suppose that you typically use the subway $n = 4$ times per week (by 4 times we mean 4 one-way trips). This means you expect to spend $11 per week on subway rides if you buy each ride individually. This suggests that you should not purchase an unlimited number of rides for a 7-day period and that the minimum cost for you is $11.

4   Additional Notes

Think about plotting the weekly cost in terms of the number of subway rides in two different cases:

1. How much do you pay per week for n subway rides if you purchase each individually?

2. How much do you pay per week if you purchase the unlimited number of subway rides for a 7-day period?

5   Grading Criteria

This project is worth a total of 10 points:

- (3 points) Introduction and Discussion - Introduce the problem and explain how your algorithm/function works.

- (5 points) Algorithm and Implementation - The algorithm designed and implemented in Python solves the problem.

- (2 points) Neatness and Timeliness - Your write-up is neat, clear, and turned in on time. The assignment must be typed (as a Jupyter notebook) and completed by 11:59pm on September 9th.