SHOPPING PLAN

---Department of Computer Science and Engineering, IIT Bombay---
---CS 154, Project---
---Abhinav Gupta : 120050029---
---Siddharth Patel : 120050001---

PROBLEM

Your house is located at 0,0.
A number of shops are located at various co-ordinates.
You have to purchased a number of items from these shops.
The prices and availibility of different items are different in different shops
The program has to find the way in which the items are to be purchased so that
In addition to this, some of the items are perishable and hence they need to be

PROGRAM DESIGN:

The problem is somewhat analogous to the "Travelling Salesman Problem (TSP)", b
The algorithm used is similar to the "branch and cut" algorithm used for the TS

The program starts by deciding to purchase the items in a certain order and for
If a particular item is not availabe in a store it immediately discards that li
Also, at every stage of purchasing, the program keeps a track of the lowest cos
A function is recursively called which finds out the minimum of the cases when
If I have to buy items A, B and C. The recursive function buy is somewhat like

(buy '(A B C)
min((cost A) + (buy '(B C)), (cost B) + (buy '(A C)), (cost C) + (buy '(A B))))

with ofcourse the afore mentioned checks and balances in place.

This way, every possibility is covered and the answer is 100% accurate.

The program also creates an image pictorially depicting the ideal plan.

If there are m stores and n items, the order of time of brute force is of the o

Depending on the situation, the program solves the problem in some time between

SAMPLE INPUT and OUTPUT

INPUT 1:

```
Enter Gas Price: 1
Enter Number of Stores: 3
Enter x-coordinate of store 1: 100
Enter y-coordinate of store 1: 200
Enter number of items in store 1: 2
Enter name of item 1: pen
Is it perishable? Enter #t or #f: #f
Enter the price of pen: 300
Enter name of item 2: pencil
Is it perishable? Enter #t or #f: #f
Enter the price of pencil: 1000

Enter x-coordinate of store 2: -150
Enter y-coordinate of store 2: -150
Enter number of items in store 2: 2
Enter name of item 1: pen
Is it perishable? Enter #t or #f: #f
Enter the price of pen: 1000
Enter name of item 2: pencil
Is it perishable? Enter #t or #f: #f
Enter the price of pencil: 400

Enter x-coordinate of store 3: 120
Enter y-coordinate of store 3: -300
Enter number of items in store 3: 2
Enter name of item 1: pen
Is it perishable? Enter #t or #f: #f
Enter the price of pen: 3000
Enter name of item 2: eraser
Is it perishable? Enter #t or #f: #f
Enter the price of eraser: 500
```

```
How many items to buy? 3
Enter name of item 1: pen
Enter name of item 2: pencil
Enter name of item 3: eraser

OUTPUT 1:

Follow the following procedure:
Buy pencil at store at -150,-150. Buy eraser at store at 120,-300. Buy pen at s
The total cost is 2445.0075764634253

IMAGE 1: solution1.png

INPUT 2:

Enter Gas Price: 1
Enter Number of Stores: 2
Enter x-coordinate of store 1: 100
Enter y-coordinate of store 1: 100
Enter number of items in store 1: 1
Enter name of item 1: milk
Is it perishable? Enter #t or #f: #t
Enter the price of milk: 200

Enter x-coordinate of store 2: 200
Enter y-coordinate of store 2: 0
Enter number of items in store 2: 2
Enter name of item 1: curd
Is it perishable? Enter #t or #f: #t
Enter the price of curd: 100
Enter name of item 2: cookies
Is it perishable? Enter #t or #f: #f
Enter the price of cookies: 200


How many items to buy? 3
```

```
Enter name of item 1: milk
Enter name of item 2: curd
Enter name of item 3: cookies

OUTPUT 2:

Follow the following procedure:
Buy cookies at store at 200,0. Buy curd at store at 200,0 and return home to ke
The total cost is 1182.842712474619

IMAGE 2: solution2.png

LIMITATIONS OF THE PROGRAM

The program allows carry of only one perishable item at a time. The code will h

CONCEPTS USED IN THE PROJECT

Classes and Objects
State Variables
Environmental Model

Features Not Discussed in Class:- Reading Keyboard Input
  Drawing images
```