

00 Parking Lot

You were hired by XYZ Corp. to implement a parking allocation system for their new mall complex, the Object-Oriented Mall.

The new parking system will pre-assign a slot for every vehicle coming into the complex. No vehicle can freely choose a parking slot and no vehicle is reserved or assigned a slot until they arrive at the entry point of the complex. The system must assign a parking slot that satisfies the following constraints:

1. There are initially three (3) entry points, and can be no less than three (3), leading into the parking complex. A vehicle must be assigned a possible and available slot closest to the parking entrance. The mall can decide to add new entrances later.

2. There are three types of vehicles: small (S), medium (M) and large (L), and there are three types of parking slots: small (SP), medium (MP) and large (LP).

- (a) S vehicles can park in SP, MP and LP parking spaces;
- (b) M vehicles can park in MP and LP parking spaces; and
- (c) L vehicles can park only in LP parking spaces.

3. Your parking system must also handle the calculation of fees, and must meet the following pricing structure:

- (a) All types of car pay the flat rate of 40 pesos for the first three (3) hours;
- (b) The exceeding hourly rate beyond the initial three (3) hours will be charged as follows:
 - 20/hour for vehicles parked in SP;
 - 60/hour for vehicles parked in MP; and
 - 100/hour for vehicles parked in LP

Take note that exceeding hours are charged depending on parking slot size regardless of vehicle size.

For parking that exceeds 24 hours, every full 24 hour chunk is charged 5,000 pesos regardless of parking slot.

The remainder hours are charged using the method explained in (b).

Parking fees are calculated using rounding up method, e.g. 6.5 hours must be rounded to 7.

- (c) A vehicle leaving the parking complex and returning within one hour must be charged continuous rate,

i.e. the vehicle must be considered as if it did not leave. Otherwise, rates must be implemented as described.

You are free to design the system in any pattern you wish. However, take note that the system assumes the input of the following:

(a) The number of entry points to the parking complex, but no less than three (3). Assume that the entry points are also exit points, so no need to take into account the number of possible exit points.

(b) The map of the parking slot. You are welcome to introduce a design that suits your approach. One suggested method, however, is to accept a list of tuples corresponding to the distance of each slot from every entry point. For example, if your parking system has three (3) entry points. The list of parking spaces may be the following: [(1,4,5), (3,2,3), ...], where the integer entry per tuple corresponds the distance unit from every parking entry points (A, B, C).

(c) The sizes of every corresponding parking slot. Again, you are welcome to introduce your own design. We suggest using a list of corresponding sizes described in integers: [0, 2, 1, 1, ...] where 0, 1, 2 means small, medium and large in that order. Another useful design may be a dictionary of parking sizes with corresponding slots as values.

(d) Two functions to park a vehicle and unpark it. The functions must consider the attributes of the vehicle as described above. When the unpark function is called, it must also return how much the vehicle concerned is charged.