This assignment will help you learn the following:

1. Inheritance
2. Polymorphism
3. Random class

Your neighbor has been planning to open a Diner and requests your help to come up with some estimates on quantity of food stock he will need, and income he will be able to generate. From his market research of neighborhood-diners, he has collected some data. He wants you to use this data and develop a simulation program that projects his potential daily income. His study has shown that the guests belong usually to one of the four categories: Families, Individuals, Groups, or Couples. Further, each of these categories usually places order in the quantities shown in the table below.

Table 1: Order quantities

Guest type	Drink	Soup	Salad	Entree	Dessert
Family	4	2	3	4	2
Couple	2	1	1	2	1
Individual	1	1		1	
Group	4	3	3	4	3

The guests arrive in a random order, which means the next guest can be a family, a couple, an individual or a group. You recently learned about Random class and polymorphism. So use these concepts in the following way. Use the Random class to generate a number from 0 to 3 for the four types of guests. Based on the generated number, you make the guest to be one of the four types. The food order will be placed and the kitchen stock will be reduced accordingly. The program should stop as soon as any item-stock reaches or drops below 4 servings. The opening stock for kitchen and item-rate card are in Table 2.

Table 2: Kitchen stock and Rate card

Item	Kitchen opening stock	Rate card $/serving
Drink	120 servings	$2
Soup	75 servings	$3
Salad	75 servings	$5
Entree	120 servings	$7
Dessert	65 servings	$4

Once the program stops, it should calculate and print the following:

1. Total income of the day
2. No. of different guest types who were served
3. Total no. of guests
4. Closing stock of soup, salad etc.

Here is what my program printed when I ran it couple of times:

First run:

```
******* Total income for the day: $1,679 *********
** Guest type count **
Family: 7
Couple: 10
Individual: 17
Group: 10

******** Total number of orders: 44 *********
** Closing stock **

Drink: 15
Soup: 4
Salad: 14
Entree: 15
Dessert: 11
```

Second run:

```
******* Total income for the day: $1,819 *********
** Guest type count **
Family: 11
Couple: 12
Individual: 8
Group: 9

******** Total number of orders: 40 *********
** Closing stock **

Drink: 8
Soup: 6
Salad: 3
Entree: 8
Dessert: 4
```

Hints:

1. Make Guest as the parent class, and the Family, Couple, Group, and Individual etc. as its subclasses.
2. Each class should be instantiated only once. Do not create a clutter of objects.
3. Based on the random number generated, a reference of type 'Guest' should point to one of the four concrete objects. You could think of creating an array of Guest, each element holding different types.
4. Use polymorphism to invoke appropriate methods.
5. Last page of this document shows a class diagram. This is only to guide you through your design process. You can always think of a different design. In other words, you can have different number or types of classes. The important requirement is to follow the principles of object oriented programming you have learned so far, and demonstrate polymorphism in this application.

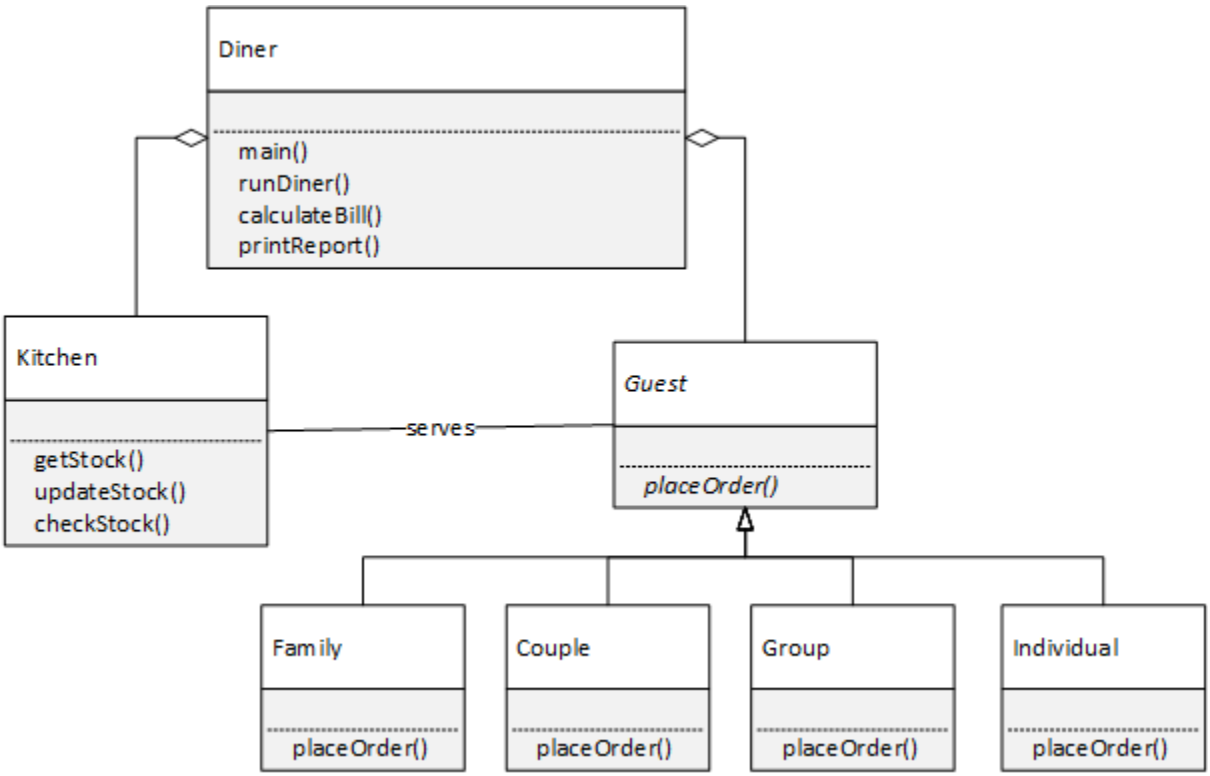

Figure 1: A potential class diagram