Exercise 3 (10 points) – can be done individually or in pair

- The first lines of all source files must be comment containing names & IDs of all members. Also create file readme.txt containing names & IDs of all members.
- Put all files (source, input, output) in folder Ex3_xxx where xxx = your full ID. That is, your source files must be in package Ex3_xxx and input/output files (if there is any) must be read from/write to this folder. From now on, you'll get point deduction for wrong package & folder structure.
- The group representative zips Ex3_xxx & submits it to Google Classroom. The other members submit only readme.txt. Email submission is not accepted.
- The exercise is graded only once, and after graded, members can't be added.

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1. Copy class Customer to your source file. This class must not be changed at all.

```
class Customer
{
    private   int ID;
    protected int totalPrice;
    public Customer(int id)              { ID = id;}
    public int  getID()                  { return ID; }
    public void printCustomer()          { /* override this in child class */ }
    public void calculatePrice()         { /* override this in child class */ }
}
```

2. Write classes HumanCustomer and CatCustomer that extend Customer. Add at least the following variables.
   - HumanCustomer : spa options (face, body, hand, foot) – you may use individual booleans or array of booleans.
   - CatCustomer : weight and hair type (short hair or long hair).
   - Other variables & methods can be added to these classes

3. Write another class that acts as the main class. In its main method,
   3.1 Ask user for the number of customers N.
   3.2 Create array of N Customer objects e.g. Customer [] allCustomers. This array can keep both HumanCustomer and CatCustomer objects. We will create objects & their contents by random using

```
Random rand = new Random();              // import java.util.*
int x     = rand.nextInt(0, 100);        // random an int [0, 100)
double y  = rand.nextDouble(0, 100);     // random a double [0, 100)
boolean z = rand.nextBoolean();          // random a boolean
```

   3.2.1 Random type of customer and create either HumanCustomer or CatCustomer. The IDs of all customers must run from 0, 1, 2, ... (see the demo).

   3.2.2 For HumanCustomer ➔ random spa options. Make sure that at least 1 option is set to True.

   3.2.3 For CatCustomer ➔ random weight (a double 3-20 kg.) and hair type.

4. After creating & filling array allCustomers
   4.1 Print all customer (both HumanCustomers & CatCustomers), from last to first.
   4.2 For HumanCustomer, calculate total spa price:

Option	Face	Body	Hand	Foot
Price	1200	1200	600	800

   You may have static & final variables to keep these prices in class HumanCustomer, since they are constant for all HumanCustomer objects.

4.3 For CatCustomer, calculate total grooming price:

	<5 kg.	5-10 kg.	>10 kg.
Price, short hair	600	700	800
Price, long hair	750	850	1100

Again, you may keep these prices in static & final variables (or arrays) in class CatCustomer, since they are constant for all CatCustomer objects.

Note – To check type of object

```
if ( allCustomers[i] instanceof HumanCustomer ) {
   HumanCustomer human = (HumanCustomer) allCustomers[i];
   human.method();
}
```

```
Enter #customers =
15
=== All customers in reverse order ===
Customer 14 (cat)   >> weight =  6.5, hair = short
Customer 13 (human) >>                              spa options = body  hand
Customer 12 (human) >>                              spa options = body  foot
Customer 11 (human) >>                              spa options = face  body  hand  foot
Customer 10 (cat)   >> weight = 17.0, hair = long
Customer  9 (human) >>                              spa options = face  body
Customer  8 (cat)   >> weight = 10.5, hair = short
Customer  7 (cat)   >> weight = 15.2, hair = long
Customer  6 (cat)   >> weight = 13.4, hair = short
Customer  5 (cat)   >> weight =  5.7, hair = long
Customer  4 (human) >>                              spa options = body  foot
Customer  3 (human) >>                              spa options = face  hand
Customer  2 (human) >>                              spa options = hand
Customer  1 (human) >>                              spa options = face  body  hand
Customer  0 (cat)   >> weight = 17.8, hair = long

=== Human customers ===
Customer  1 (human) >> total price = 3,000
Customer  2 (human) >> total price =   600
Customer  3 (human) >> total price = 1,800
Customer  4 (human) >> total price = 2,000
Customer  9 (human) >> total price = 2,400
Customer 11 (human) >> total price = 3,800
Customer 12 (human) >> total price = 2,000
Customer 13 (human) >> total price = 1,800

=== Cat customers ===
Customer  0 (cat)   >> total price = 1,100
Customer  5 (cat)   >> total price =   850
Customer  6 (cat)   >> total price =   800
Customer  7 (cat)   >> total price = 1,100
Customer  8 (cat)   >> total price =   800
Customer 10 (cat)   >> total price = 1,100
Customer 14 (cat)   >> total price =   700
------------------------------------------------------------------------
BUILD SUCCESS
------------------------------------------------------------------------
```