Written exercises #2

1) Consider the following class (given as a class diagram)

```
Person
| - int age
| - String name
| + Person(String, int)
| + Person()
| + void speak()
```

Among the following statements, indicate which are valid and which are invalid. A valid statement is a statement that compiles and executes in any class, which has access to the Person class. If a statement is invalid, explain why. Assume that the variables p and q are of type Person and have been correctly initialized before being used.

a) Person p = new Person(“Maryjane”, 30);
b) p.speak();
c) p.sleep();
d) Person p = new Person;
e) Person.speak();
f) Person p = new Speak();
g) p.age = 25;
h) System.out.println(“p.name”);
i) System.out.println(p.name);
j) p = q;
k) new Person(“Huy”,26).speak();

2) For each snippet of code below, draw an object diagram showing the memory organization once the snippet of code has been executed. The variables p, q and r are all of type Person (as defined in question 1)). Indicate on the object diagram any alias and any object that has been garbage-collected (see the given example).
Example:

```java
Person p = new Person();
Person q = new Person();
Person r = new Person();
p = q;
r = q;
q = null;
```

The execution of the above code is illustrated by the following object diagram:

```
r is an alias of p
```

a) Person p = new Person();
   Person q = new Person();
   Person r = new Person();
p = q;
q = r;
r = p;

b) Person p = new Person();
   Person q = p;
   p = new Person();
   Person r = p;
p = new Person();
q = p;
p = new Person();
r = p;
p = null;
c) Person p = new Person();
    Person q = new Person();
    Person r = new Person();
    p = q;
    q = null;
    r = q;
    q = p;

3) Consider the following piece of code:
   Person p = null;
   p.speak();

   a) Does it compile? Explain.
   b) Does it execute? Explain.

4) You are given three variables p, q, and r of type Person. The three variables have been correctly initialized. Write a piece of code that writes the initial value of p in q, the initial value of q in r, and the initial value of r in p. Try to make your code as compact as possible.