Preparation for Phone Interview

Answer the questions below, and send them back via email ahead of the phone interview. At the phone interview, please have your homework in front of you and be prepared to discuss your answers with the interviewer.

Algorithms

Implement the method nextNum() and a minimal but effective set of unit tests. Implement in the language of your choice, Python is preferred, but Java and other languages are completely fine. Make sure your code is exemplary, as if it was going to be shipped as part of a production system.

As a quick check, given Random Numbers are [-1, 0, 1, 2, 3] and Probabilities are [0.01, 0.3, 0.58, 0.1, 0.01] if we call nextNum() 100 times we may get the following results. As the results are random, these particular results are unlikely.

-1: 1 times
0: 22 times
1: 57 times
2: 20 times
3: 0 times

Languages

Python

You may use random.random() which returns a pseudo random number between 0 and 1.

```python
import random


class RandomGen(object):
  # Values that may be returned by next_num()
  _random_nums = []
  # Probability of the occurence of random_nums
  _probabilities = []


  def next_num(self):
    """
    Returns one of the randomNums. When this method is called
    multiple times over a long period, it should return the
    numbers roughly with the initialized probabilities.
    """
    pass
```

Please describe how you might implement this more "pythonically"

Java

You may use Random.nextFloat() which returns a pseudo random number between 0 and 1.

```java
public class RandomGen {
  // Values that may be returned by nextNum()
  private int[] randomNums;
  // Probability of the occurence of randomNums
  private float[] probabilities;

  /**
    Returns one of the randomNums. When this method is called
    multiple times over a long period, it should return the
    numbers roughly with the initialized probabilities.
  */
  public int nextNum() {
  }
}
```

SQL

Given the following tables

```
create table product
(
product_id number primary key,
name varchar2(128 byte) not null,
rrp number not null,
available_from date not null
);

create table orders
(
order_id number primary key,
product_id number not null,
quantity number not null,
order_price number not null,
dispatch_date date not null,
foreign key (product_id) references product(product_id)
);
```

Write an sql query to find books that have sold fewer than 10 copies in the last year, excluding books that have been available for less than 1 month.

Some example data, intended to give an idea of the sort of data that might exist, can be found below. Note that the data is not complete, nor does it necessarily cover all the cases that might be encountered.

product_id	name	rrp	available_from
101	Bayesian Methods for Nonlinear Classification and Regression	94.95	(last thursday)
102	(next year) in Review (preorder)	21.95	(next year)
103	Learn Python in Ten Minutes	2.15	(three months ago)
104	sports almanac (1999-2049)	3.38	(2 years ago)
105	finance for dummies	84.99	(1 year ago)

order_id	product_id	quantity	order_price	Dispatch Date
1000	101	1	90.00	(two months ago)
1001	103	1	1.15	(40 days ago)
1002	101	10	90.00	(11 months ago)
1003	104	11	3.38	(6 months ago)
1004	105	11	501.33	(two years ago)