

In class exam1 (2/28/18) NAME: _____

Question 1 In package exam01, write a class `website` that has a private `String` field called `url` and a private `double` field called `pop` (short for popularity—pop and popularity will mean the same thing in the explanations below). In this exam, `url` will never be null and `pop` will never be negative.

ASSUME there is a constructor with 2 parameters to initialize both fields and ASSUME the getter methods `getPop` and `getUrl` are also provided in the class—do not write them (you are tested on constructors and getters in later questions).

Override `toString` to return a `String` with the format "`url (pop)`" so that the `toString` of a `website` with `url` "`google.com`" having a popularity of 1.3 will return: `google.com(1.3)`.

Provide a void method `incrPop` which has a `double factor` as its only parameter. If `factor` is less than 0, throw an `IllegalArgumentException` with the message "positive only". The method should increase the `pop` field of the website by multiplying by `factor`. A website's popularity can only be so high and we cap the popularity at 10. In your code do not allow the `pop` field to grow above 10.

In package exam01, write a class `Tester` with a `main` method that would make one `website` object (use a short `url` like `binghamton.edu`), put a call in to `incrPop(2.0)` and then test that it worked by printing the call to `toString` and by also printing what the expected value is.

Question 2 In package exam01, import `java.util.List` and `java.util.ArrayList` and write a class `Internet` that has a private field `sites` which is a `List` of `website`.

Write a constructor with a `List` of `website` as parameter and sets `sites` equal to the parameter. ASSUME the parameter is not null—we already tested you on exceptions in Question 1!

We are also ASSUMING that all the `url`'s that are in `sites` are different (we should be using `Set` instead of `List` but we are not that far in the course).

Provide a public void method `addSite` which accepts a `website` parameter and adds it to `sites`. ASSUME the argument to this method will never be null and is a different `url` to any others in `sites`.

Write a getter for the `sites` field called `getSites`.

Write a public method `boolean incPop(String urlstr, double fact)`, which looks for a `website` in `sites` with its `url` equal to the parameter `urlstr` and, if found, increases the popularity of that `website` (the field `pop`) by `fact`, and returns `true`. If no `website` with its `url` equal to `urlstr` is found then return `false`. The `urlstr` argument will never be null.

Provide a public method `int[] profile()`. This method should return an array of length 11 where the element at index `idx` is the number of `websites` in `sites` with popularity between `idx` (inclusive) and `idx+1` (exclusive). For example, the index 0 will hold the number of websites with popularity ≥ 0 and < 1 . Index 5 will hold the number of websites with popularity ≥ 5 and < 6 . This means that the last index will hold the number of websites with popularity 10. HINT for a double `d`, `k = (int)d` is the `int` such that `k <= d < k+1`.

Provide a **protected** void method `remSite(website w)` which calls `sites.remove(w)`. (FYI protected methods can only be called from this class, classes in the same package and any subclass.)

TURN OVER

Question 3 In package exam01, import `java.util.List` and `java.util.ArrayList` and write a subclass of `Internet` called `SnobbyInternet` (use `SnobbyInternet extends Internet`). This class will extend `Internet` with the idea that websites under a certain popularity (the threshold) should be removed occasionally. This is called trimming.

Give this class a private double field called `threshold`.

Provide a constructor with two parameters: a `List` of `website` and a double to set the `sites` field in `Internet` using *super* and to set the `threshold` field.

Write a public void method `void Trim()` which performs a trim of the `sites`. Every `website` with a popularity below `threshold` should be removed from the `sites` field. HINT: first make another `List` of those `websites` from `sites` that have `pop` value less than `threshold`. Then, for all the elements `w` in this `List` that you have just made, call `remSite(w)`.